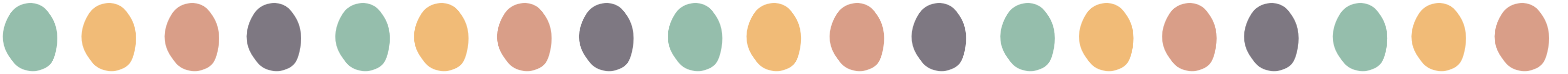


Y6- Overview

	Autumn 1		Autumn 2		Spring 1		Spring 2		Summer 1		Summer 2			
Unit	1	2	3	4	5	6	7	8	KS2 tests	9	10	11	12	13

- Number and place value
- Number facts
- Addition and subtraction
- Multiplication and division
- Fractions
- Geometry
- Other

	Addition and subtraction of fractions (2 weeks)
Ready to progress	6F-1 Recognise when fractions can be simplified, and use common factors to simplify fractions. 6F-2 Express fractions in a common denominator and use this to compare fractions that are similar in value. 6F-3 Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denominator as a comparison strategy
NCETM documents	FROM TEACHING POINT 3! https://www.ncetm.orguk/media/d45jqjsc/ncetm_spine3_segment07_y5.pdf#page=36 TEACHING POINT 1,2,3 AND 4 https://www.ncetm.orguk/media/uxlfqsg5/ncetm_spine3_segment08_y5.pdf#page=4
Small steps	- To explain how to write a fraction in its simplest form. - To reason about how to write a fraction in its simplest form. - To use knowledge of fractions in their simplest form when solving addition and subtraction problems. - To solve problems involving adding and simplifying fractions with different denominators. - To explain how to add related unit fractions with and without a representation or image. - To explain how to subtract related unit fractions. - To use knowledge of adding and subtracting related unit fractions to solve problems. - To explain with and without an image how to add and subtract related non-unit fractions. - To explain with and without an image how to add and subtract related non-unit fractions that bridge a whole. - To add and subtract non-related fractions with different denominators.
Links	NCETM UP TO SLIDE 115 - https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.ncetm.orguk%2Fmedia%2Fb4rhtsxm%2Fcp-year-6-unit-7-fractions-and-percentages.pptx&wdOrigin=BROWSELINK OAK https://www.thenationalacademy/teachers/programmes/maths-primary-ks2/units/addition-and-subtraction-of-fractions/lessons?sid-15c982=dxOcUb69bx&sm=0&src=3 <i>Mastery with greater depth</i> https://www.ncetm.orguk/media/uitjlx5g/mastery_assessment_y6.pdf
Reasoning	Spot the mistake A pupil simplifies 12/20 to 6/10. Explain the mistake and show how to write the fraction in its simplest form. What do you notice? 3/12 + 1/12 = 4/12 2/10 + 3/10 = 5/10 What do you notice when you simplify the answers? True or false? Convince me 2/5 + 3/10 = 5/15 Is this true or false? Convince me True or false? 6/8, 12/16, 9/12, 18/20 In all of these fractions, the simplified form is the same. True or false? Change some numbers if needed to make it true. Do, then explain Work out each calculation and simplify the answer: 7/12 + 5/12 3/8 + 5/12 11/6 - 5/6 4/5 - 7/10 Then explain how you know your answers are in simplest form. What's the same, what's different? What's the same and what's different about adding: 1/6 + 1/6 and 1/6 + 1/3 ? Odd one out Which is the odd one out? 6/12, 4/6, 3/4, 5/10 Explain your choice.



Addition and subtraction of fractions (2 weeks)

Problem solving



Glossary

- Equivalent - If two numbers or expressions have the same value, they are said to be equivalent.
- Common factor - When we compare lists of factors of two or more numbers, any factors that are the same are common factors.
- Simplify - To simplify a fraction is to identify the highest common factor shared by the numerator and denominator and to scale down both by that factor.
- Simplest form - A fraction is in its simplest form when the numerator and denominator cannot be any smaller, while still being whole numbers.
- Common denominator - When two or more fractions share the same denominator, you can say they have a common denominator.
- Related fractions - When the denominator of one fraction is a multiple of the denominator of another fraction, we can say these fractions are related fractions.
- Related fractions - Related fractions are when the denominator of one fraction is a multiple of the denominator of the other fraction.
- Non-related fractions - Non-related fractions are when the denominator of one fraction is not a multiple of the denominator of the other fraction.
- Common multiple - A multiple that is common between two or more numbers is known as a common multiple.

Stem sentences

At this point, you may like to introduce the following generalisations:
'A fraction can be simplified when the numerator and denominator have a common factor other than one.' 'To write a fraction in its simplest form, divide both the numerator and denominator by their highest common factor.'

Generalisation: 'Related fractions have denominators where one denominator is a multiple of the other.'
'When adding fractions with the same denominators, just add the numerators.'

STEM SENTENCE
: '_____ and _____ are related fractions because the denominator, "", is a multiple of the other denominator, "____"'

When subtracting fractions with the same denominators, just subtract the numerators.

The whole is divided into _____ equal parts, and we have eaten _____ of them.

To add or subtract fractions with different denominators, first convert to fractions with a common denominator.

We can find a common denominator for two nonrelated fractions by multiplying their denominators.

When we compare fractions with the same denominator, the greater the denominator, the greater the numerator, the greater the fraction.

Representations

Finding the highest common factor:

÷4

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

÷4

÷1

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

÷1

÷2

$\frac{4}{12} = \frac{2}{6}$

÷2

÷2

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

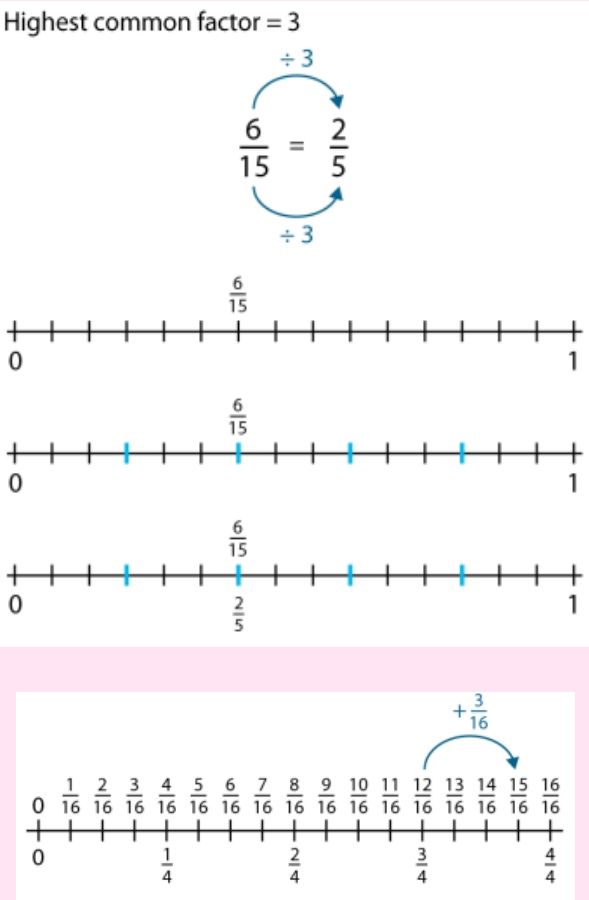
÷2

÷4

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

÷4

Highest common factor = 4



Method 1:

÷4

$\frac{20}{12} = \frac{5}{3}$

÷4

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$\frac{20}{12}$

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÷4

$\frac{20}{12} = \frac{5}{3}$

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Method 2:

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$\frac{20}{12} = \frac{5}{3}$

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$\frac{20}{12}$

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$\frac{20}{12} = \frac{5}{3}$

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$\frac{20}{12}$

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÷3

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

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÷4

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

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

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

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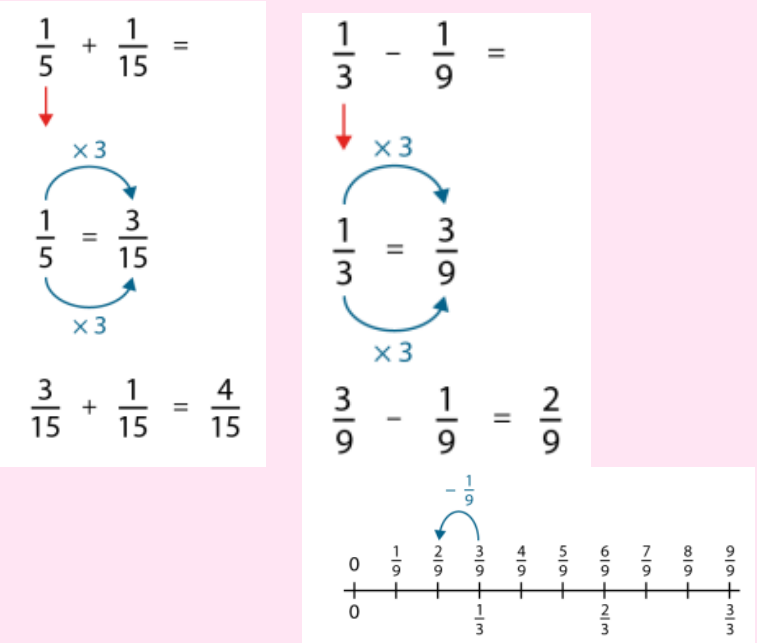
$\frac{1}{3} = \frac{4}{12}$

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$\frac{1}{3}$

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÷3

$\frac{1}{5} = \frac{3}{15}$

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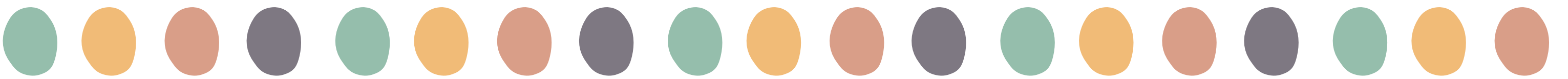
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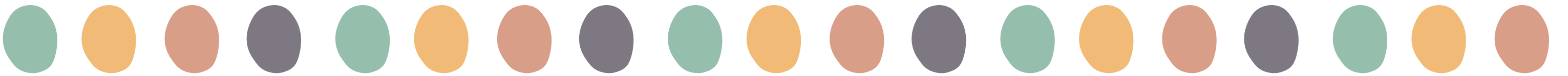


Y6- Overview

	Autumn 1		Autumn 2		Spring 1		Spring 2		Summer 1		Summer 2			
Unit	1	2	3	4	5	6	7	8	KS2 tests	9	10	11	12	13

- Number and place value
- Number facts
- Addition and subtraction
- Multiplication and division
- Fractions
- Geometry
- Other

	Comparing fractions (1 WEEK)
Ready to progress	6F-1 Recognise when fractions can be simplified, and use common factors to simplify fractions. 6F-2 Express fractions in a common denominator and use this to compare fractions that are similar in value. 6F-3 Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denominator as a comparison strategy
NCETM documents	FROM TEACHING POINT 5 AND ONWARDS https://www.ncetm.org.uk/media/uxlfqsg5/ncetm_spine3_segment08_y5.pdf#page=4
Small steps	- To use equivalent fractions with common denominators to compare non-related fractions. - To compare pairs of non-related fractions by comparing to a half - To compare pairs of non-related fractions using fraction sense. - To explain which strategy for comparing non-related fractions is most efficient. - To decide on the most efficient strategy to compare and order sets of non-related fractions.
Links	NCETM SLIDE 117 TO 151 - https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.ncetm.org.uk%2Fmedia%2Fb4rhtsxm%2Fcp-year-6-unit-7-fractions-and-percentages.pptx&wdOrigin=BROWSELINK OAK https://www.thenationalacademy/teachers/programmes/maths-primary-ks2/units/comparing-fractions/lessons?sid-617442=0i9rNI4KRI&sm=0&src=3 Mastery with greater depth https://www.ncetm.org.uk/media/uitjlx5g/mastery_assessment_y6.pdf
Reasoning	Odd one out Which is the odd one out? 3/4, 9/12, 26/36, 18/24 Explain your choice using equivalent fractions. Which is the odd one out? 4/20, 1/5, 6/25, 6/30 Explain your choice using equivalent fractions. What do you notice? 8/5 of 25 = 40 5/4 of 16 = 20 7/6 of 36 = 42 Can you write three similar statements using fractions greater than one? Complete the pattern 1/2, 2/3, 3/4, ... What comes next? Explain how you know using equivalent fractions. Another and another Write a unit fraction with a value less than 0.5. Write another, and another. Ordering Which is larger, 1/3 or 2/5? Explain how you know using equivalent fractions. Put the following in order, starting with the largest: 23%, 5/8, 3/5, 0.8 Another and another Write two fractions that have a difference of 1/2. Write another pair, and another, and another. Continue the pattern 1/3 ÷ 2 = 1/6 1/6 ÷ 2 = 1/12 1/12 ÷ 2 = 1/24 What comes next? Explain the pattern using fraction sense. What do you notice? 1/2 × 1/4 = ? Can you explain using fraction sense why the product is smaller than both fractions?



Comparing fractions (1 WEEK)

Problem solving

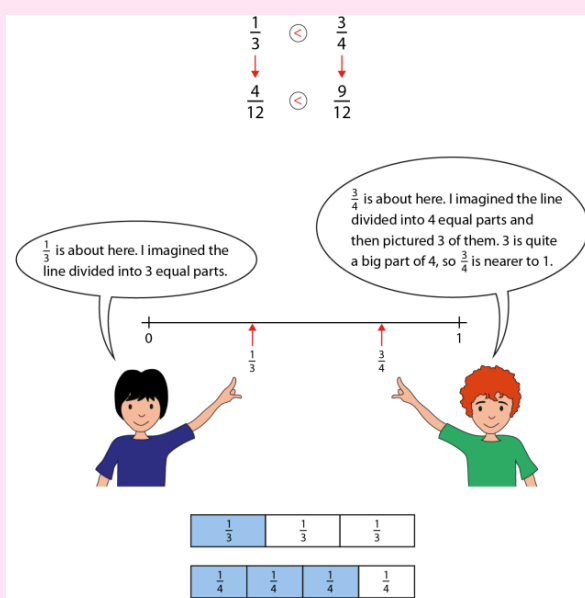
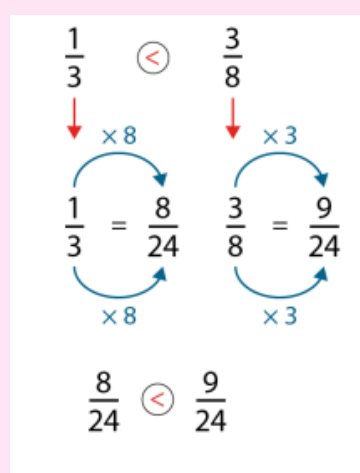
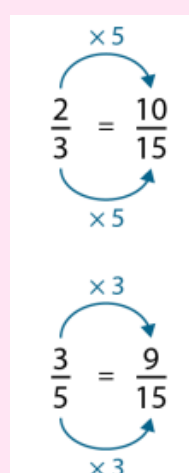


Glossary

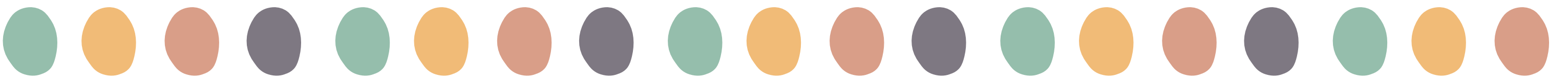
- Portion - A portion is a part of a whole.
- Common denominator - When two or more fractions share the same denominator, you can say they have a common denominator.
- Related fractions - Related fractions are when the denominator of one fraction is a multiple of the denominator of the other fraction.
- Proper fraction - A proper fraction is a fraction where the numerator (the top number) is less than the denominator (the bottom number).
- Order - To order things means to put things into their correct place following a set rule.
- Magnitude - The magnitude of something refers to the size of something.
- Efficient - To be efficient means finding a way to solve a problem quickly whilst also maintaining accuracy.
- Improper fraction - An improper fraction is a fraction where the numerator is greater than the denominator.
- Proper fraction - A proper fraction is a fraction where the numerator is less than the denominator.

Stem sentences

If the numerators are the same, then the bigger the denominator, the smaller the fraction.



Representations

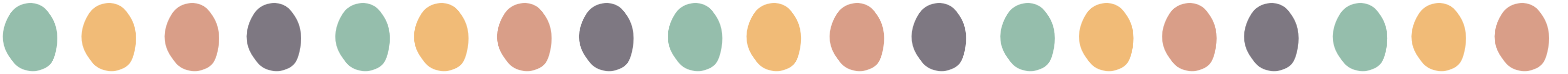


Y6- Overview

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- Fractions
- Geometry
- Other

	Multiplication and division of fractions (1 WEEK)
Ready to progress	6F-1 Recognise when fractions can be simplified, and use common factors to simplify fractions. 6F-2 Express fractions in a common denominator and use this to compare fractions that are similar in value. 6F-3 Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denominator as a comparison strategy
NCETM documents	THE WHOLE DOCUMENT https://www.ncetm.org.uk/media/a05nb5mi/ncetm_spine3_segment09_y6.pdf#page=5
Small steps	- To explain how to multiply two unit fractions. - To explain how to multiply two non-unit fractions. - To explain how to divide a unit fraction by a whole number. - To explain how to divide a non-unit fraction by a whole number. - To explain how to divide a fraction by a whole number efficiently.
Links	NCETM SLIDE 151 TO 197 - https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.ncetm.org.uk%2Fmedia%2Fb4rhtsxm%2Fcp-year-6-unit-7-fractions-and-percentages.pptx&wrdOrigin=BROWSELINK OAK https://www.thenationalacademy/teachers/programmes/maths-primary-ks2/units/multiplication-and-division-of-fractions/lessons?sid-16316e=KTkZVfJTf&sm=0&src=3 Mastery with greater depth https://www.ncetm.org.uk/media/uitjlx5g/mastery_assessment_y6.pdf
Reasoning	Spot the mistake Identify and explain the mistake in this calculation: $1/2 \times 1/4 = 1/6$ What do you notice? $1/3 \times 1/6 = 1/18$ $2/5 \times 3/7 = 6/35$ Can you write similar statements multiplying two fractions? True or false? $1/2 \div 3 = 1/6$ Is this true or false? Explain your reasoning. True or false? $2/3 \div 4 = 1/6$ Is this always true? Change the numbers to make a true statement if needed. Do, then explain Write the answer of each calculation: $3/4 \times 2/5 = ?$ $5/6 \times 3/7 = ?$ Explain how you know your answer using fraction multiplication rules. What's the same, what's different? ... when you multiply two unit fractions versus two non-unit fractions? Odd one out Which is the odd one out in these fraction multiplications? $1/2 \times 1/3$, $1/3 \times 1/2$, $1/2 \times 2/3$, $1/4 \times 1/3$ Explain your reasoning. Another and another Write a fraction $\div$ a whole number that gives a result smaller than $1/10$. Write another, and another. Continue the pattern $1/2 \div 2 = 1/4$ $1/4 \div 2 = 1/8$ $1/8 \div 2 = ?$ What comes next? Explain the pattern. What do you notice? $1/3 \div 2 = 1/6$ $2/5 \div 5 = 2/25$ Explain why dividing a fraction by a whole number always gives a smaller fraction.



Problem solving



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Glossary

- **Commutative** - Commutative law states that you can write the values of a calculation in a different order without changing the calculation: the result is still the same. It applies for addition and multiplication.
- **Represent** - To represent something means to show something in a different way.
- **Dividend** - The dividend is what we are dividing.
- **Divisor** - The divisor is the number that we divide by. For example, in this equation, 3 is the divisor.

Stem sentences

When multiplying unit fractions, multiply the denominators.

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

To multiply fractions, we can multiply the numerators and multiply the denominators.

To divide a fraction by a whole number, we can change it to an equivalent's multiplication. To divide by _____, we can multiply by _____.

Equation	Comparison
$\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$	$\frac{1}{8} < \frac{1}{2}$ and $\frac{1}{8} < \frac{1}{4}$
$\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$	$\frac{1}{6} < \frac{1}{2}$ and $\frac{1}{6} < \frac{1}{3}$
$\frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$	$\frac{1}{12} < \frac{1}{2}$ and $\frac{1}{12} < \frac{1}{6}$
$\frac{1}{5} \times \frac{1}{3} = \frac{1}{15}$	$\frac{1}{15} < \frac{1}{3}$ and $\frac{1}{15} < \frac{1}{5}$

Equation	Comparison
$\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$	$\frac{1}{8} < \frac{1}{2}$ and $\frac{1}{8} < \frac{1}{4}$
$\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$	$\frac{1}{6} < \frac{1}{2}$ and $\frac{1}{6} < \frac{1}{3}$
$\frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$	$\frac{1}{12} < \frac{1}{2}$ and $\frac{1}{12} < \frac{1}{6}$
$\frac{1}{5} \times \frac{1}{3} = \frac{1}{15}$	$\frac{1}{15} < \frac{1}{3}$ and $\frac{1}{15} < \frac{1}{5}$

Simplifying products:

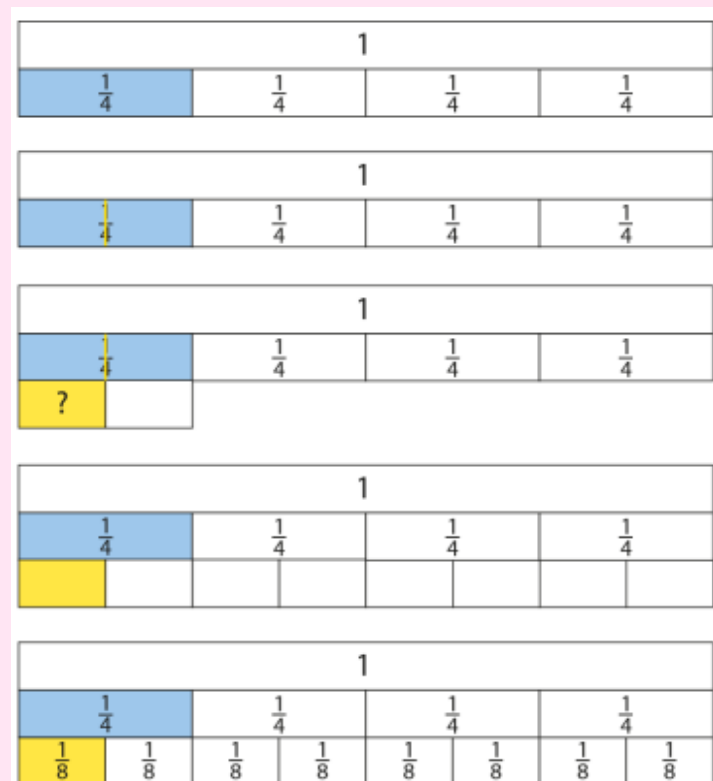
$$\frac{1}{2} \times \frac{1}{4} = \frac{1}{8} \quad (\text{can't be simplified})$$
$$\frac{3}{4} \times \frac{1}{3} = \frac{\cancel{3}^1}{\cancel{12}_4} = \frac{1}{4}$$
$$\frac{4}{5} \times \frac{2}{3} = \frac{8}{15} \quad (\text{can't be simplified})$$

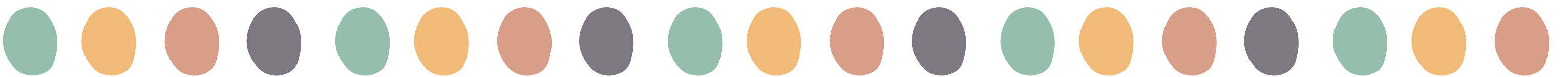
$$\frac{1}{2} \times \frac{1}{4} = \frac{1}{8} \quad (\text{can't be simplified})$$

$$\frac{3}{4} \times \frac{1}{3} = \frac{\cancel{3}^1}{\cancel{12}_4} = \frac{1}{4}$$

$$\frac{4}{5} \times \frac{2}{3} = \frac{8}{15} \quad (\text{can't be simplified})$$

Representations



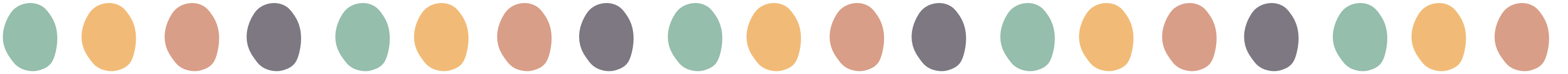


Y6- Overview

	Autumn 1		Autumn 2		Spring 1		Spring 2		Summer 1		Summer 2			
Unit	1	2	3	4	5	6	7	8	KS2 tests	9	10	11	12	13

- Number and place value
- Number facts
- Addition and subtraction
- Multiplication and division
- Fractions
- Geometry
- Other

	Understanding percentages (2 WEEKS)
Ready to progress	6F-1 Recognise when fractions can be simplified, and use common factors to simplify fractions. 6F-2 Express fractions in a common denominator and use this to compare fractions that are similar in value. 6F-3 Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denominator as a comparison strategy
NCETM documents	TEACHING POINT 4, 5 AND 6 https://www.ncetm.org.uk/media/a05nb5mi/ncetm_spine3_segment09_y6.pdf#page=5
Small steps	- To explain what percent means and represent a percentage in different ways. - To convert percentages to decimals and fractions with a denominator of 100. - To convert percentages to fractions where the denominator is not 100. - To use fraction-decimal-percentage conversions to solve problems. - To calculate 50%, 10% and 1% of a number and use this to solve problems. - To use knowledge of common percentages of a number to solve problems. - To calculate any percentage of a number and solve problems in context. - To solve problems where a percentage part is known but the whole is unknown. - To solve problems where a percentage part represents a change to the whole. - To solve problems involving percentages in a range of contexts.
Links	NCETM SLIDE 197 TO THE END - https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.ncetm.org.uk%2Fmedia%2Fb4rhtsxm%2Fcp-year-6-unit-7-fractions-and-percentages.pptx&wdOrigin=BROWSELINK OAK https://www.thenationalacademy/teachers/programmes/maths-primary-ks2/units/understanding-percentages/lessons?sid-2a2ff6=Dl9-c06A9J&sm=0&src=3 Mastery with greater depth https://www.ncetm.org.uk/media/uitjlx5g/mastery_assessment_y6.pdf
Reasoning	Odd one out Which is the odd one out? 25%, 0.25, 1/4, 2/5 Why? Which is the odd one out? 40%, 0.4, 2/5, 3/8 Why? What do you notice? 50% of 120 = 60 10% of 120 = 12 1% of 120 = 1.2 What do you notice about the relationships between these answers? Complete the pattern 10% of 50 = 5 20% of 50 = 10 30% of 50 = 15 ... Complete the pattern Another and another Write a percentage that is greater than 50%. Write another, and another. Ordering Put the following in order from smallest to largest: 0.3, 30%, 1/4, 0.35 Another and another Find two percentages of 200 that add to 100%. Now find another pair, and another. Continue the pattern 10% of 200 = 20 20% of 200 = 40 30% of 200 = 60 What comes next? What do you notice? 20% of 50 = 10 50% of 20 = 10 What do you notice? Can you write a similar pair of statements?



Understanding percentages (2 WEEKS)

Problem solving

[Click on me](#)

- Glossary
- Percent - Percent means the number of parts in each hundred.
 - Percentage - A percentage is a proportion of a whole.
 - Convert - Convert means to change from one form to another
 - Efficient - Efficient means working in an organised way without wasting time or effort.

Stem sentences

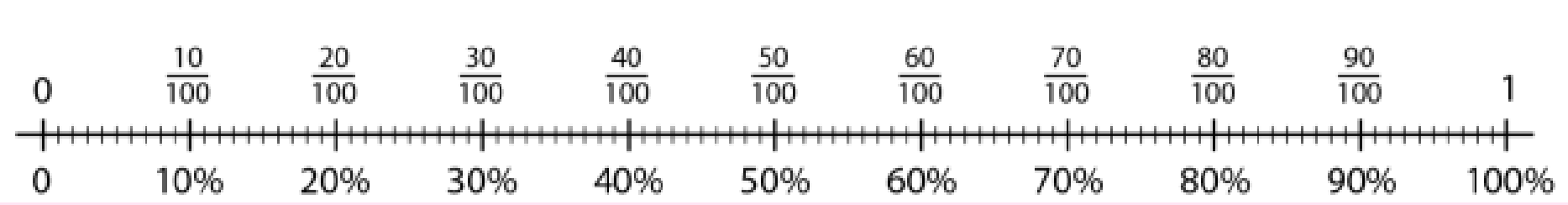
In order to convert a percentage to a fraction, first convert it to a fraction with a denominator of 100.

To find 50% of a number, halve it.

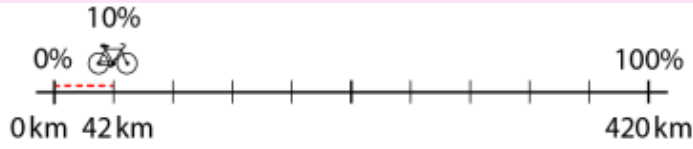
To find 100% of a number, divide it by ten.

To find 1% of a number, divide it by one hundred.

Representations



Percentages	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Fractions	0	$\frac{10}{100}$	$\frac{20}{100}$	$\frac{30}{100}$	$\frac{40}{100}$	$\frac{50}{100}$	$\frac{60}{100}$	$\frac{70}{100}$	$\frac{80}{100}$	$\frac{90}{100}$	1
Decimals	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1



100%	420 km		100%	420 km		100%	420 km
10%	42 km		10%	42 km		10%	42 km
5%	21 km		5%	21 km		5%	21 km
20%	84 km		20%	84 km		20%	84 km
30%			30%	3 × 42 km		30%	126 km
40%			40%	4 × 42 km		40%	168 km
50%		→	50%	5 × 42 km	→	50%	210 km
60%			60%	6 × 42 km		60%	252 km
70%			70%	7 × 42 km		70%	294 km
80%			80%	8 × 42 km		80%	336 km
90%			90%	9 × 42 km		90%	378 km

Bar model

