

Small Steps Guidance – FDP

Year 7

#MathsEveryoneCan

White  
Rose  
Maths

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
<b>Autumn</b>	<b>Algebraic Thinking</b>						<b>Place Value and Proportion</b>					
	Sequences	Understanding and using algebraic notation			Equality and equivalence		Place value and ordering integers and decimals			Fraction, decimal and percentage equivalence		
<b>Spring</b>	<b>Applications of Number</b>						<b>Directed Number</b>			<b>Fractional Thinking</b>		
	Solving problems with addition & subtraction		Solving problems with multiplication and division				Four operations with directed number			Addition and subtraction of fractions		
<b>Summer</b>	<b>Lines and Angles</b>						<b>Reasoning with Number</b>					
	Constructing, measuring and using geometric notation			Developing geometric reasoning			Developing number sense		Sets and probability		Prime numbers and proof	

# Autumn 2: Place Value and Proportion

## Weeks 1 to 3: Place Value and Ordering

In this unit, students will explore integers up to one billion and decimals to hundredths, adapting these choices where appropriate for your groups e.g. standard index from could additionally be introduced to student following the Higher strand. Using and understanding number lines is a key strategy explored in depth, and will be useful for later work on scales for axes. When putting numbers in order, this is a suitable point to introduce both the median and the range, separating them from other measures to avoid getting them mixed up. Rounding to the nearest given positive power of ten is developed, alongside rounding to one significant figure. Decimal places will come later, again to avoid too similar concepts being covered at the same time. Topics from last term such as sequences and equations, will be interleaved into this unit.

National curriculum content covered:

- Consolidate their understanding of the number system and place value to include decimals
- understand and use place value for decimals, measures and integers of any size
- order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols  $=$ ,  $\neq$ ,  $<$ ,  $\geq$
- work interchangeably with terminating decimals and their corresponding fractions
- round numbers to an appropriate degree of accuracy
- describe, interpret and compare observed distributions of a single variable through: the median and the range
- interpret and compare numbers in standard form

## Weeks 4 to 6: Fraction, Decimal and Percentage Equivalence

Building on the recent work on decimals, the key focus for this three weeks is for students to gain a deep understanding of the links between fractions, decimals and percentages so that they can convert fluently between those most commonly seen in real-life. The Foundation strand will focus will be on multiples of one tenth and one quarter whilst the Higher strand will look at more complex conversions. Whilst looking at percentage is, pie charts will be introduced. In addition, various forms of representation of any fraction will be studied, focusing on equivalence, in an appropriate depth to the current attainment of students; this will be revisited later in the year. The focus is very much on a secure understanding of the most common fractions under one, but fractions above one will be touched upon, particularly in the Higher strand.

National curriculum content covered:

- consolidate their understanding of the number system and place value to include decimals, fractions
- move freely between different numerical representations [for example, equivalent fractions, fractions and decimals]
- extend their understanding of the number system; make connections between number relationships
- express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1
- define percentage as 'number of parts per hundred', interpret percentages as a fraction or a decimal
- compare two quantities using percentages
- work with percentages greater than 100%
- interpret pie charts

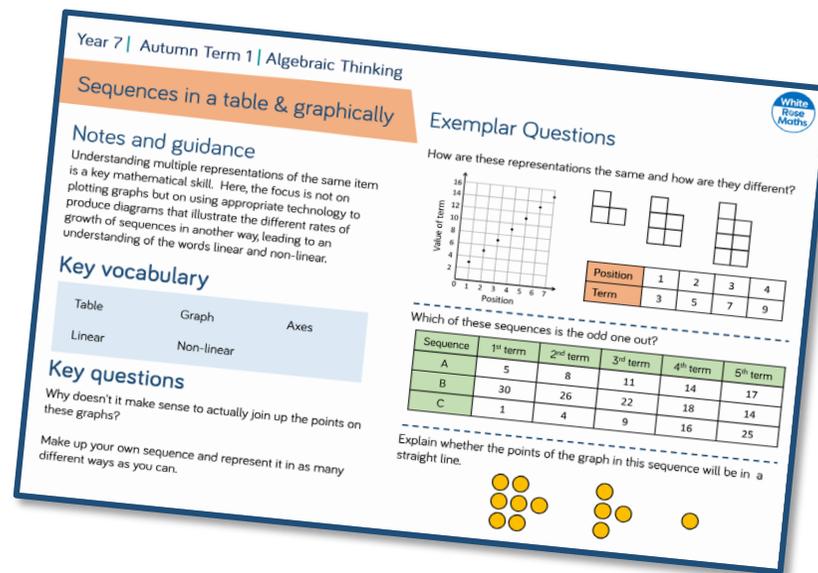
## Why Small Steps?

We know that breaking the curriculum down into small manageable steps should help students to understand concepts better. Too often, we have noticed that teachers will try and cover too many concepts at once and this can lead to cognitive overload. We believe it is better to follow a “small steps” approach.

As a result, for each block of content in the scheme of learning we will provide a “small step” breakdown. ***It is not the intention that each small step should last a lesson – some will be a short step within a lesson, some will take longer than a lesson.*** We would encourage teachers to spend the appropriate amount of time on each step for their group, and to teach some of the steps alongside each other if necessary.

## What We Provide

- Some ***brief guidance*** notes to help identify key teaching and learning points
- A list of ***key vocabulary*** that we would expect teachers to draw to students’ attention when teaching the small step,
- A series of ***key questions*** to incorporate in lessons to aid mathematical thinking.
- A set of questions to help ***exemplify*** the small step concept that needs to be focussed on.



Year 7 | Autumn Term 1 | Algebraic Thinking

### Sequences in a table & graphically

**Notes and guidance**  
Understanding multiple representations of the same item is a key mathematical skill. Here, the focus is not on plotting graphs but on using appropriate technology to produce diagrams that illustrate the different rates of growth of sequences in another way, leading to an understanding of the words linear and non-linear.

**Key vocabulary**

Table	Graph	Axes
Linear	Non-linear	

**Key questions**  
Why doesn't it make sense to actually join up the points on these graphs?  
Make up your own sequence and represent it in as many different ways as you can.

**Exemplar Questions**  
How are these representations the same and how are they different?

Which of these sequences is the odd one out?

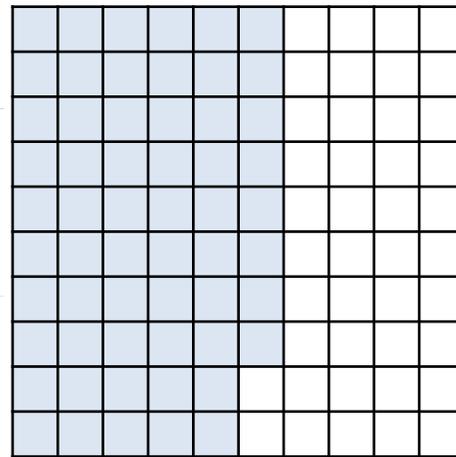
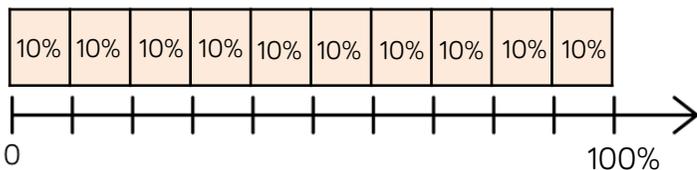
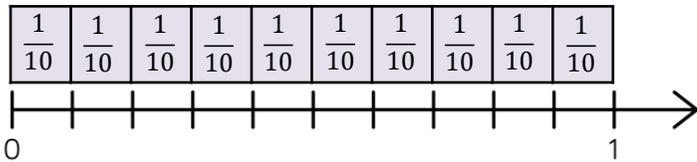
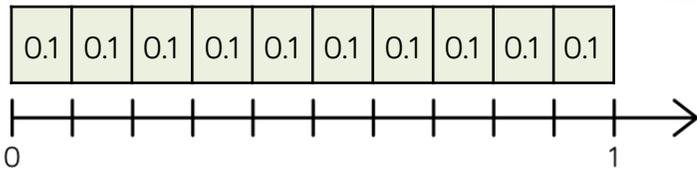
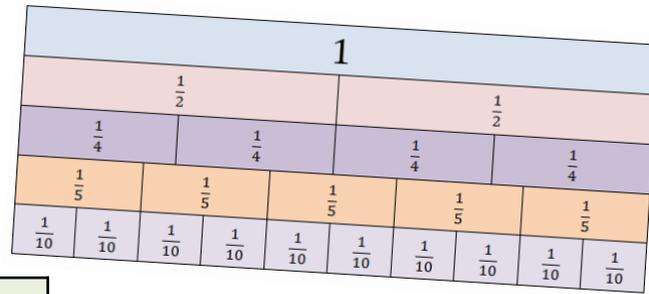
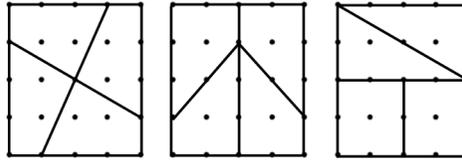
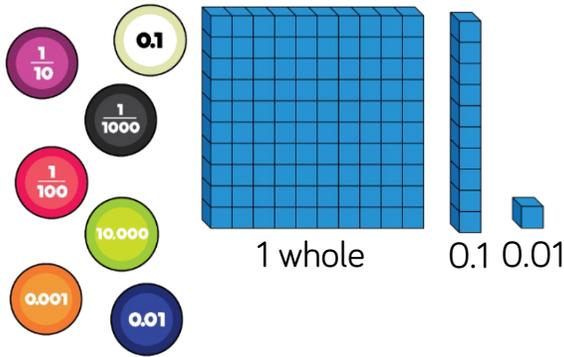
Sequence	1 <sup>st</sup> term	2 <sup>nd</sup> term	3 <sup>rd</sup> term	4 <sup>th</sup> term	5 <sup>th</sup> term
A	5	8	11	14	17
B	30	26	22	18	14
C	1	4	9	16	25

Explain whether the points of the graph in this sequence will be in a straight line.

- These include reasoning and problem-solving questions that are fully integrated into the scheme of learning. Depending on the attainment of your students, you may wish to use some or all of these exemplars, which are in approximate order of difficulty. Particularly challenging questions are indicated with the symbol .
- For each block, we also provide ideas for key representations that will be useful for all students.

In many of the blocks of material, some of the small steps are in **bold**. These are content aimed at higher attaining students, but we would encourage teachers to use these with as many students as possible – if you feel your class can access any particular small step, then please include it in your planning.

# Key Representations



Here are a few ideas for how you might represent fractions, decimals and percentages.

- Number lines are a useful way of assessing whether children understand the size of a F, D or P. Extending the number line above 1 is an option for some students.
- Paper strips can be folded to represent different F, D and P.
- Tiles such as equilateral triangles can be placed together to build patterns, allowing students to consider what fraction is represented by a specific coloured tile. This can be extended to include questions such as “what happens if I add another blue triangle”.
- Different types of paper (isometric, square) to draw non-standard representations of fractions, decimals and percentages
- Bar models are particularly useful when comparing F, D, P.

# FDP Equivalence

## Small Steps

- ▶ Represent tenths and hundredths as diagrams
- ▶ Represent tenths and hundredths on number lines
- ▶ Interchange between fractional and decimal number lines
- ▶ Convert between fractions and decimals – tenths and hundredths
- ▶ Convert between fractions and decimals – fifths and quarters
- ▶ **Convert between fractions and decimals – eighths and thousandths** H
- ▶ Understand the meaning of percentage using a hundred square
- ▶ Convert fluently between simple fractions, decimals and percentages
- ▶ Use and interpret pie charts

H denotes higher strand and not necessarily content for Higher Tier GCSE

# FDP Equivalence

## Small Steps

- ▶ Represent any fraction as a diagram
- ▶ Represent fractions on number lines
- ▶ Identify and use simple equivalent fractions
- ▶ Understand fractions as division
- ▶ Convert fluently between fractions, decimals and percentages
- ▶ **Explore fractions above one, decimals and percentages**

H

**H** denotes higher strand and not necessarily content for Higher Tier GCSE

# Tenths & hundredths as diagrams

## Notes and guidance

Students will recognise tenths and hundredths when represented diagrammatically. They should be exposed to various representations and be able to make a number using different diagrams. It is important that students can also work the opposite way, and be able to write a given representation in numerals and words.

## Key vocabulary

Place value	Digit	Placeholder
Tenths	Hundredths	

## Key questions

Is it possible to represent 120 hundredths on one hundred square? What could you do?

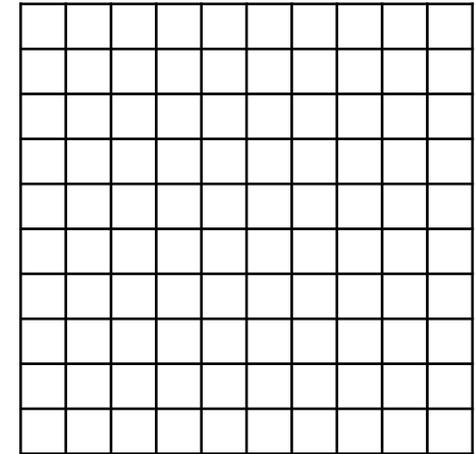
What's the same and what's different between the counters showing decimals and the counters showing fractions?

How can you work out the value of each piece of Base 10?

## Exemplar Questions

If the hundred square is worth 1 whole, represent:

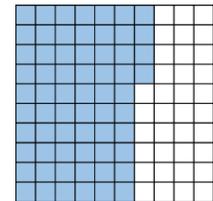
- ◆ 1 tenth
- ◆ 1 hundredth
- ◆ 4 tenths
- ◆ 40 hundredths
- ◆ 10 tenths
- ◆ 120 hundredths



What do you notice?

Write the numbers represented below in figures and words.

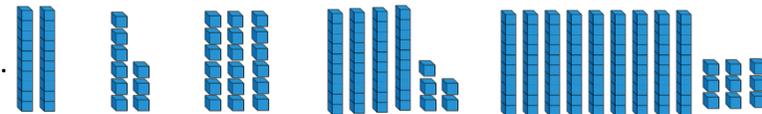
Ones	Tenths	Hundredths



Is there more than one way?



If is equal to one, write the given representations in both words and figures.



## Tenths & hundredths on number lines

## Exemplar Questions

### Notes and guidance

Students will recognise tenths and hundredths when represented on different number lines. They should be exposed to number lines split into different intervals and be able to estimate the value of a number highlighted. It is important that students can also work the opposite way, and be able to write a highlighted number in both figures and words.

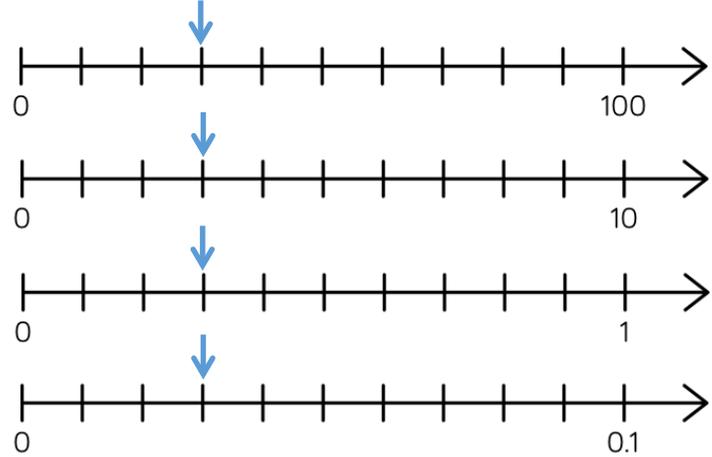
### Key vocabulary

Place value	Digit	Placeholder
Tenths	Hundredths	Interval

### Key questions

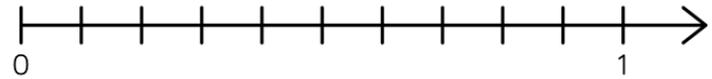
Do we need to split a number line into a hundred parts in order to show hundredths?  
 If a number line is split into tenths, how can use it to show hundredths?

Write the numbers marked with an arrow in figures and words.

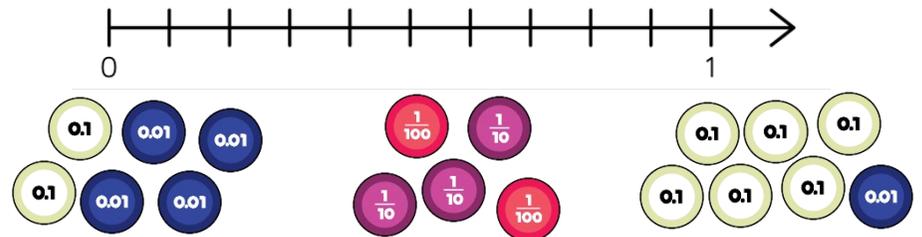


Draw an arrow to show  $\frac{9}{10}$  on the number line.

How can you show  $\frac{11}{10}$ ?



Draw arrows to show where the numbers would lie on the number line.



## Fractional & decimal number lines

## Exemplar Questions

### Notes and guidance

Students will be able to use both fractional and decimal number lines and be able to move freely between the two. They should understand the equivalence of 0.1 and one tenth etc., and use this to show both decimals and fractions on the same number line.

### Key vocabulary

Tenth	Hundred	Fraction
Decimal	Number line	Interval

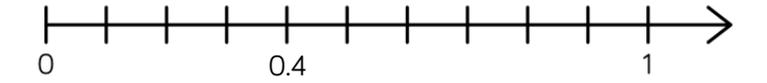
### Key questions

What interval is the number line going up in? How do you know?

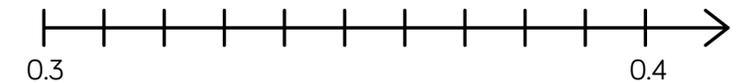
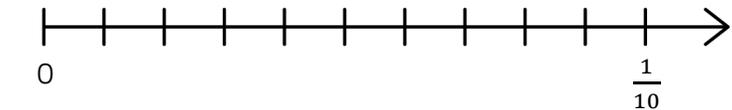
Are we counting in tenths or hundredths? How do you know?

How can we show fractions and decimals on the same number line?

What's the same? What's different?



Complete the number lines.



On a number line, draw arrows to show the approximate position of:

◆ 0.65

◆  $\frac{9}{10}$

◆ Three tenths

◆  $\frac{9}{100}$

◆ Three hundredths

◆  $\frac{99}{100}$

Explain why we can represent 8 tenths on a number line in the same position as 80 hundredths.

# Convert tenths and hundredths

## Notes and guidance

In this small step, students will understand and explore fractional and decimal representation of tenths and hundredths and be able to convert between them. They should make connections between the place value of the decimal notation and the fraction. Diagrams or concrete resources can be used to aid understanding.

## Key vocabulary

Place value	Tenths	Hundredths
Placeholder	Fraction	Decimal

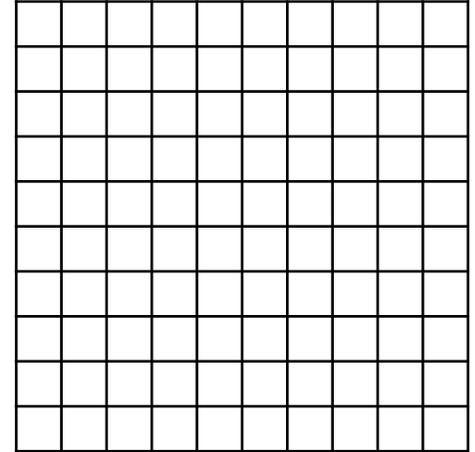
## Key questions

How can we easily convert from tenths to hundredths?  
 Why might it not be so easy to convert from hundredths to tenths?  
 Is there more than one solution? Compare yours with a friend.

## Exemplar Questions

Use the 100 square to show that:

- 0.3 is equivalent to  $\frac{3}{10}$  and  $\frac{30}{100}$
- $\frac{27}{100}$  is equivalent to 0.27
- $\frac{2}{10}$  is greater than 0.19



Continue the linear sequences.

$$\frac{1}{10}, \frac{25}{100}, \frac{4}{10}, \dots$$

$$0.57, \frac{6}{10}, 0.63, \dots$$

Work out

$$\frac{3}{10} + 0.6$$

$$\frac{21}{100} - 0.1$$

$$1 - \frac{9}{10}$$

Complete the boxes to make the statements correct.

$$\frac{\square}{10} > 0.5$$

$$\frac{\square}{100} < 0.\square 7$$

## Convert fifths and quarters

### Notes and guidance

Continuing the theme of previous small steps, students now focus on fifths and quarters and their relationships to tenths and hundredths. Use of pictorial and concrete resources will be necessary to cement understanding of equivalence in value.

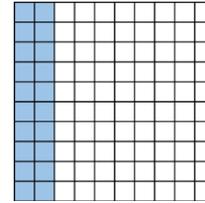
### Key vocabulary

Fifth	Quarter	Tenth
Hundredth	Equivalent	

### Key questions

- Can we write fifths as tenths and hundredths?
- Can we write quarters as tenths and hundredths?
- Why? Why not?
- How is the hundred square representation and the bar model representation the same? How is it different?

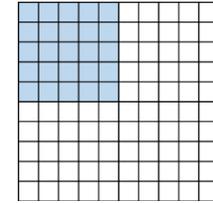
### Exemplar Questions



$\frac{1}{5}$  of the grid is shaded.

How many tenths is this?

What is this as a decimal?

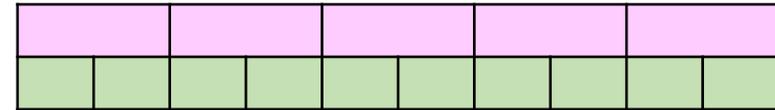


$\frac{1}{4}$  of the grid is shaded.

How many hundredths is this?

What is this as a decimal?

Use a hundred square to represent  $\frac{3}{4}$ ,  $\frac{2}{5}$ ,  $\frac{3}{5}$  and  $\frac{4}{5}$  then write each one as a decimal.



Use the bar model to complete the following.

$$\frac{1}{5} = \frac{\square}{10} = 0.\square \quad \frac{\square}{5} = \frac{8}{10} = 0.\square \quad \frac{\square}{5} = \frac{\square}{10} = 0.6$$

Find three ways to show that  $\frac{4}{5}$  is greater than  $\frac{3}{4}$

Circle the expressions that are equivalent to three-quarters of the number  $x$ ?

$\frac{3x}{4}$       $\frac{3}{4}x$       $0.34x$       $0.75x$       $\frac{x}{4} \times 3$

# Convert eighths & thousandths H

## Notes and guidance

Students who are comfortable with all the conversions met so far should advance to this step, but if more time is needed to consolidate earlier concepts then it may be omitted. The move from hundredths to thousandths should echo the move from tenths to hundredths. Then, starting from recognising one eighth as half of a quarter, students should be able work with multiples of one eighth.

## Key vocabulary

Thousandths	Eighths	Tenth
Hundredth	Equivalent	Quarter

## Key questions

Why are we unable to write  $\frac{1}{8}$  in tenths?

Can we write  $\frac{1}{8}$  in hundredths? Explain your answer.

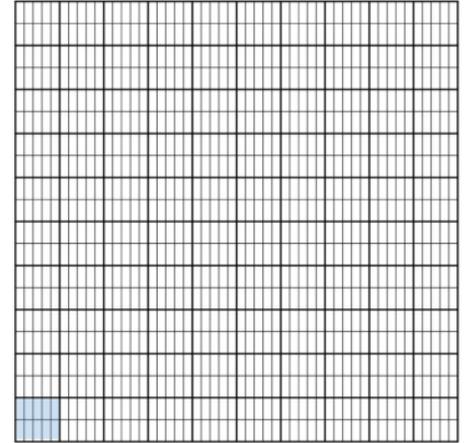
Can we write  $\frac{1}{8}$  in thousandths? Explain your answer.

## Exemplar Questions

What has this hundred square been divided up into?

How many thousandths are in one hundredth?

How many thousandths are in one tenth?



Complete the table.

Fraction	Tenths	Hundredths	Thousandths
$\frac{1}{2}$			$\frac{500}{1000}$
$\frac{1}{4}$		$\frac{25}{100}$	
$\frac{1}{8}$			
$\frac{5}{8}$			

Put these numbers in order of size, starting with the smallest:

$$\frac{5}{8} \quad \frac{607}{1000} \quad \frac{4}{5} \quad \frac{3}{4} \quad \frac{63}{100}$$

## Percentages on a hundred square

### Notes and guidance

In this small step, familiarisation with representing percentages on a hundred square enables students to quickly identify the percentage not shaded using the fact that one whole is 100%. They need to recognise that to represent percentages above 100% more than one hundred square is required.

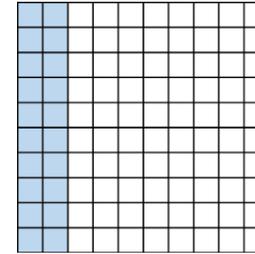
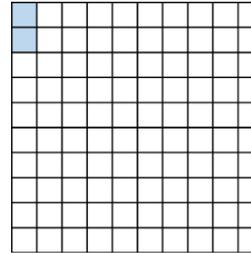
### Key vocabulary

Hundredth	Percentage	Shaded
Percent	Out of one hundred	

### Key questions

- Is it possible to give “110%” effort?
- Is it possible to find 110% of an amount?
- What does 100% mean? What does 110% mean?
- What’s the same and what’s different about 30% and 3%?

### Exemplar Questions



Express the amount shaded in each of these hundred squares as a percentage.

What percentage is not shaded?

I subtract the shaded percentages, what percentage is shaded now? Is it possible to have a negative percentage? Explain your answer.

Represent the following percentages on a hundred square:

10%

30%

5%

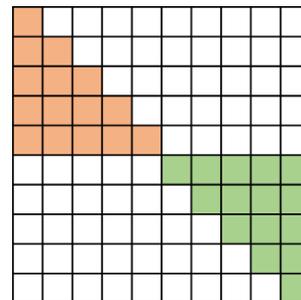
1%

36%

If you shade  $\frac{3}{10}$  of a hundred square, what percentage is shaded?

If  $x\%$  of a hundred square is shaded, what percentage is not shaded?

How could you use a percentage square to show fiftieths?



Sam thinks 25% of the grid is shaded in total. Is he right?

What percentage of the shape is not shaded?

Sam wants to represent 330% using hundred squares. How many hundred squares does he need?

## Convert simple FDP

### Notes and guidance

In this small step, students draw together their knowledge of the previous steps to gain fluency in converting simple fractions, decimals and percentages. The focus remains of familiarity with commonly seen FDP rather than rote memorisation of a technique for any value – in particular students should be confident in converting multiples of 10% and 25% given in any form.

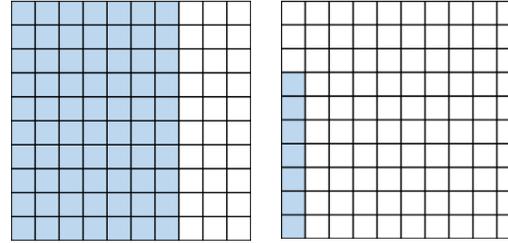
### Key vocabulary

Convert	Equivalent	Half
Three-quarters	Tenth	

### Key questions

- How is a fraction related to a decimal?
- How is a percentage related to a fraction?
- How is 100% represented as a fraction? Is there more than one way?
- How is 100% represented as a decimal?

### Exemplar Questions



Express the amount shaded as

- a fraction
- a decimal
- a percentage
- Repeat for the amount not shaded.

Christina says:



0.35 is the same as 35%,  
so 0.3 is the same as 3%

Explain why Christina is **wrong**.

Which of the following are equal in value to two-fifths?

$\frac{4}{10}$     25%    2.5     $\frac{40}{100}$     0.25    0.40    0.4

Explain why both of these statements are true:

- ◆ 0.08 is smaller than 10%
- ◆  $\frac{1}{4} < 0.4 < 45\%$

Fill the blanks below with a suitable percentage:

- $0.7 < \underline{\hspace{1cm}} < \frac{3}{4}$
- $\frac{1}{10} < \underline{\hspace{1cm}} < \frac{1}{5} < \underline{\hspace{1cm}} < 0.23 < \frac{1}{4} < \underline{\hspace{1cm}}$

## Use and interpret simple pie charts

### Notes and guidance

The focus here will be on pie charts where the fractions are clearly visible rather than on measuring and constructing, which will be covered later. It is also an opportunity to discuss estimation and assumptions e.g. unless labelled how can we tell whether exactly a half (etc.) is shaded? This is a good opportunity to revisit the conversions covered in the previous step.

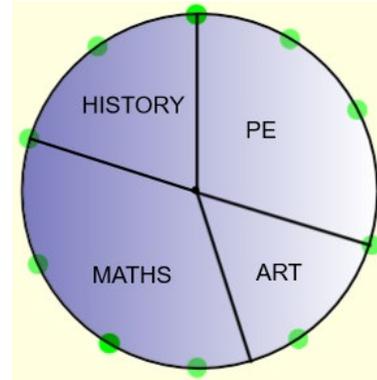
### Key vocabulary

Pie chart	Fraction	Decimal
Percentage	Equal parts	Sector

### Key questions

Why is it impossible to compare quantities by looking at two pie charts? What can we compare?  
 How do fractions and percentages help us to do this?  
 How accurate can we be estimating proportions from a pie chart?

### Exemplar Questions

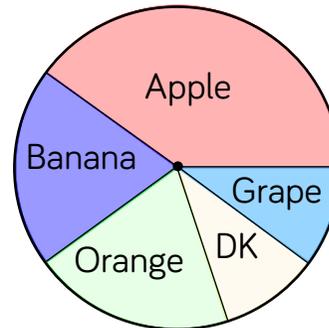
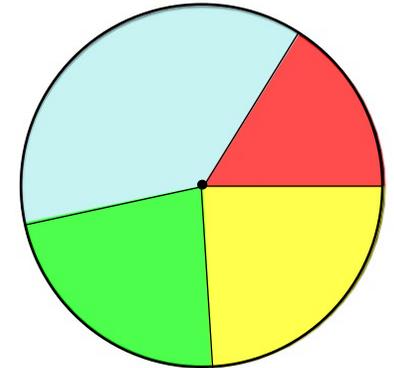


This pie chart has markings at each 10%. It shows some students' favourite subjects.

- What percentage chose PE?
- Estimate the percentage that chose maths?
- What fraction chose History?

Estimate the percentage of each colour in this pie chart.

Suppose  $\frac{2}{5}$  is blue, 0.2 is green and  $\frac{1}{4}$  is yellow, what percentage is red?



This pie chart shows the results of a survey of people's favourite fruits. 10% said "don't know" (DK).  
 What fraction chose a fruit?  
 Estimate the total percentage that chose either apple or grape.  
 What other questions could you ask?

## Represent any fraction as a diagram

### Notes and guidance

Now students are confident with simple fractions, they can extend their experience to include less commonly seen fractions, with the emphasis still on the need for equal parts. Non-standard examples of representations of fractions helps to reinforce the importance of equal parts rather than same shaped parts.

### Key vocabulary

Fraction

Equal parts

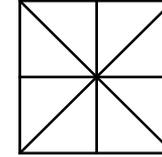
### Key questions

Can you use the same diagram to represent both one-third and two-thirds?

Does a diagram have to be cut into equal parts in order to identify the fraction shaded or not shaded?

### Exemplar Questions

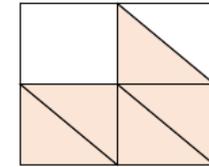
How many ways can you show  $\frac{5}{8}$  on this square?



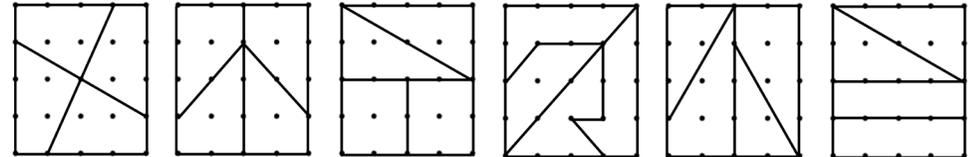
In the rectangle, Jack thinks  $\frac{5}{8}$  is shaded.

Teddy thinks  $\frac{5}{7}$  is shaded.

Who's right? Explain why.



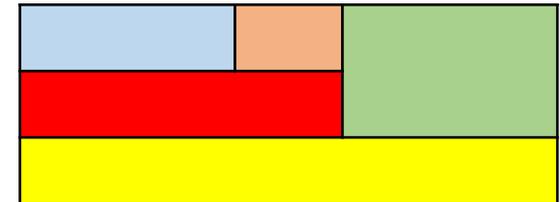
Which of these shapes are split into quarters and which are not?



How many more ways can you find to split a 4 by 4 dotted square into quarters?

Why can't we say what fraction of the shape is shaded red without further measuring?

What reasonable assumptions could you make?



## Represent fractions on number lines

## Exemplar Questions

### Notes and guidance

Students should be able to identify, or where appropriate estimate, fractions represented on different types of number lines (intervals marked and unmarked). This can be used to compare fraction size. We can also use lines to compare relative sizes of fractions. It is important that students think of fractions as numbers on a number line, not just a fraction of an object.

### Key vocabulary

Fraction	Denominator	Numerator
Part	Whole	

### Key questions

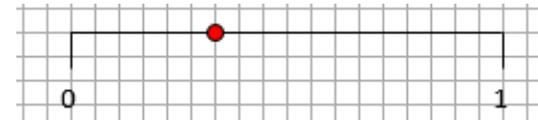
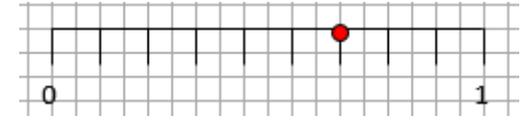
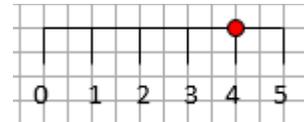
How can we represent the 'whole' on a number line?

Which fractions are easier to recognise on a number line?

How can we use these to recognise other fractions on a number line?

How far along the line is the point marked?

Write your answer as a fraction.



Represent the following on a number line, where the 1 represents an hour.



- ◆ Khrish spends half an hour on his homework
- ◆ Suki spends a quarter of an hour learning her French vocabulary
- ◆ Oli spends a 20 minutes researching for his History homework
- ◆ Bella spends  $\frac{1}{5}$  of an hour proof-reading her English homework

Would the representation of one quarter of £100 on a number line look different or the same as the representation of one quarter of £200 on a number line? Explain your answer.

Use number lines to show that  $\frac{3}{5} < \frac{7}{10}$

How else could you show this?

## Identify and use equivalent fractions

### Notes and guidance

Students must understand that a fraction represents a number that can be written in an infinite number of ways. Thinking of individual fractions as part of an “equivalence set” can be useful. This conceptual understanding should be supported with concrete and pictorial representations. These should sit alongside the abstract notation so that the student can make the necessary links.

### Key vocabulary

Fraction	Equivalence	Equal
Denominator	Numerator	Whole

### Key questions

What makes a fraction equivalent to another fraction?  
 How many equivalent fractions are there for any one fraction?  
 Why are equivalent fractions useful in making comparisons? How are they used in day to day life?

### Exemplar Questions

Shade  $\frac{2}{2}$  of the shape.

Does this picture also represent  $\frac{3}{3}$ ?



Explain your answer.

Write down 3 other names for the fraction shaded.

Using pictures and words, show which fraction in each pair is larger.

$\frac{2}{5}$  ,  $\frac{3}{10}$

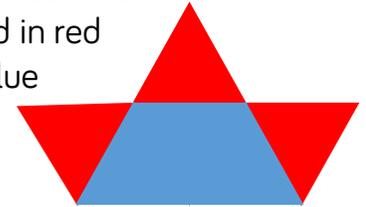
$\frac{8}{9}$  ,  $\frac{4}{3}$

$\frac{2}{3}$  ,  $\frac{4}{5}$

The shape is made up of a trapezium and 3 identical triangles.

- ◆ Eva says that half of the model is shaded in red
- ◆ Mo says that three quarters is shaded in red
- ◆ Amir says three sixths is shaded in blue

Who's right? Explain your answer.



- ◆ Dora says that if she adds another two red triangles to the shape then Mo will be right

Dora has made a mistake.

How could you make Mo's statement correct?

Copy and complete the following:  $\frac{\square}{6} < \frac{5}{8} < \frac{\square}{10}$

What numbers could work in the inequality? What numbers couldn't?

## Understand fractions as division

### Notes and guidance

Students need to understand that a fraction also represents a division, rather than just a comparison with one whole. Therefore, contextualised problem solving questions should be interspersed throughout. A good starting point is to consider tenths, a concept students are already familiar with, and the different representations.

(e.g.  $\frac{1}{10}$ , 10%, 0.1). This illustrates  $\frac{1}{10}$  being the same as 0.1 and  $1 \div 10$

### Key vocabulary

Division	Quotients	Denominator
Operator		

### Key questions

When are fractions used as quotients?

What's the difference between a fraction as a quotient and a fraction as an operator?

## Exemplar Questions

Use a calculator to work out

■  $1 \div 10$

■  $3 \div 100$

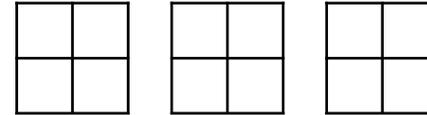
■  $7 \div 10$

Which fraction corresponds to each of your three calculations?

$\frac{1}{10}$ 
 $\frac{10}{7}$ 
 $\frac{3}{10}$ 
 $\frac{7}{10}$ 
 $\frac{3}{100}$

Three friends share four square pizzas.

Use the diagrams below to show that  $3 \div 4$  is the same as  $\frac{3}{4}$



Which of these are the same as  $7 \div 10$ ?

$\frac{100}{70}$ 
 $\frac{7}{10}$ 
 $\frac{70}{100}$ 
0.7
 $\frac{10}{7}$ 
0.70

Write a division for each of those that are not the same as  $7 \div 10$

Sort these cards into two matching groups.

Sam has 12 dog treats and shares them out between his 5 dogs.

$5 \div 12$ 
 $\frac{5}{12}$ 
 $2\frac{5}{2}$ 
 $\frac{12}{5}$ 
 $2\frac{2}{5}$

Julie has 5 pizzas and she shares them between 12 children.

## Convert fluently between FDP

### Notes and guidance

Students can now extend their knowledge of conversion to include any fraction, decimal and percentage. Calculators should be used where appropriate, but if students are happy to work mentally then of course they may. Mental strategies will be a focus later in the year. At this stage, there is no need to deal with “difficult” numbers and rounding, but thirds are worth exploring.

### Key vocabulary

Place value	Equivalence	Fraction
Decimal	Percentage	

### Key questions

- Why do we use all three representations of fractions, decimals and percentages? Where would you see each type?
- What happens if we try to change thirds into a decimal or percentage?
- What’s the relationship between fifths and tenths?
- Twentieths and hundredths? Eighths and thousandths?

### Exemplar Questions

Use a calculator to find the matching pairs.

$$\frac{13}{25}$$

$$\frac{27}{50}$$

$$\frac{11}{20}$$

$$\frac{23}{40}$$

0.575

52%

54%

0.55

In each of these lists, **two** of the numbers are not equal to the others. Which two?

- $\frac{3}{10}$       0.03      0.3       $\frac{1}{3}$       30%
- $\frac{8}{100}$       80%       $\frac{4}{50}$       0.08       $\frac{100}{8}$
- 35%       $\frac{7}{20}$       0.14      0.305       $\frac{14}{40}$
- 0.125      13%       $\frac{4}{32}$       0.125      12.5%

Use your calculator to convert  $\frac{1}{3}$  to a decimal. What do you notice? How can you convert two-thirds into a percentage?

Describe the following sequence.

$$\frac{1}{8}, \quad 0.225, \quad 42.5\%, \quad \frac{5}{8}$$

Write down the next term, firstly as a fraction and then as a decimal and a percentage.

## Explore fractions above one



## Exemplar Questions

### Notes and guidance

In this Higher strand step, students look at fractions above one and their decimal and percentage equivalents. Being able to convert between improper fractions and mixed numbers as well as linking these representations to percentages and decimals is the aim. To solve problems like this students might use a number line or count up. Formal multiplication of fraction is introduced later.

### Key vocabulary

Improper	Fraction	Mixed Number
Rational	Recurring	Convert

### Key questions

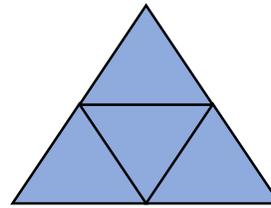
How can one whole be represented using decimals, different fractions and percentages?

Why do some numbers above one have a direct percentage and decimal equivalence, where others need to be rounded before converting?

Amir is baking pies. Each pie requires  $\frac{2}{3}$  cup of flour.

Amir wants to bake 5 pies. He has 3 cups of flour. Is this enough?

A pattern is made out of 4 identical triangles.



Rachel has 15 of these triangles. How many of these whole patterns will she be able to make?

What fraction of the whole pattern is left over?

Write  $\frac{19}{4}$  as a mixed number.

Find the next three terms of this sequence.

$$1, \quad \frac{8}{5}, \quad \frac{11}{5}, \quad \underline{\quad}, \quad \underline{\quad}, \quad \underline{\quad}$$

Write any improper fractions as mixed numbers.

Write these as percentages and then decimals.

What will be the next integer be in the sequence?

The rule for the  $n^{th}$  term of a sequence is given by  $\frac{3n}{4}$ .

Write the first four terms of the sequence as mixed numbers or integers where appropriate.

How often will the terms of the sequence be integers?

Create a linear sequence where every other term is an integer.

Create a linear sequence where every third term is an integer.