Fractions, Decimals, Percentages and Ratio 2022-23

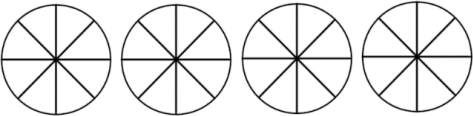| Fraction	**Definition:** "Any part of a group, number or whole" *From Jenny Eather's "A Maths Dictionary for Kids"* http://www.amathsdictionaryforkids.com	**Vocabulary:** Numerator, Denominator, Proper fraction, Improper Fraction, Mixed number. Unit fraction – A fraction that has 1 as the numerator. Non-unit fraction – A fraction that has any whole number other than 1 as the numerator.	**Structure:** Proper fraction $\frac{1}{2}$ — Numerator / Denominator. Improper fraction $\frac{5}{4}$ — A fraction is improper when the numerator is greater than the denominator. Mixed Number $2\frac{3}{4}$ — A mixed number combines a whole number and a proper fraction
Decimal fraction	**Definition:** The result of dividing a numerator by a denominator	**Vocabulary:** Tenth, Hundredth, Thousandth	**Structure:** O t h / 2 . 2 4 / Two and twenty-four hundredths / *When saying a decimal use the correct place value terminology, so in the above example say, "two and twenty-four hundredths", NOT "two point two four".
Percentage	**Definition:** A number expressed as a proportion of one hundred	**Vocabulary:** Percent, Percentage, Out of 100	**Structure:** 87%, forty-five percent

Declarative knowledge

Declarative knowledge	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fractions Automatically recall… **Blue highlight = Roche's Specific Expectations** **Red font = Roche's Priorities for Revisiting**	Half facts in relation to doubles, up to half of 10 = 5	Define a half as one of two equal parts of a shape, object or amount. Define a quarter as one of four equal parts of a shape, object or amount. Half facts in relation to doubles, up to half of 20 = 10	$\frac{1}{2}$ is equivalent to $\frac{2}{4}$ Define one third as one of three equal parts of a shape, object or amount. Recall half facts for multiples of 10 up to 100 Example: half of 60 = 30, half of 70 = 35.	Define fractions as being either unit- or non-unit fractions. Know that 1/10 is equivalent to 0.1, 2/10 is equivalent to 0.2… up to 10/10 is equivalent to 1	Know decimal equivalents of ½, ¼ and ¾ . Know fractional and decimal equivalents of any number of tenths or hundredths. Define proper fractions, improper fractions and mixed numbers.	Recall percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25. Write percentages as a fraction /100 and its decimal equivalent. Say whether any fraction with an even-numbered denominator is greater than or less than a half. Example: is 6/8 bigger or smaller than a half?	Say whether any fraction is greater than or less than a half, including fractions with odd-numbered denominators. Example: is 3/5 bigger or smaller than a half?
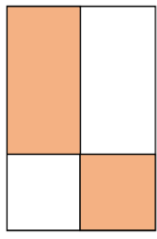
Year 1
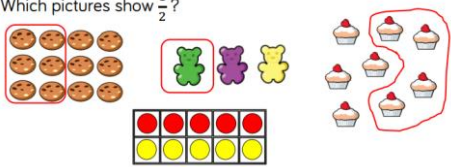
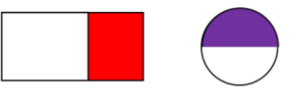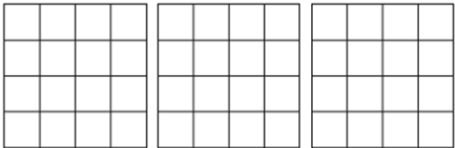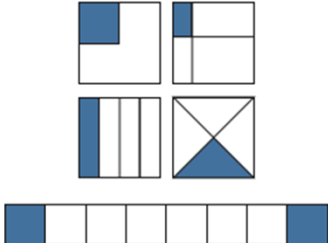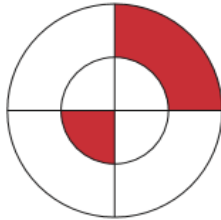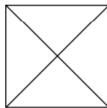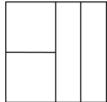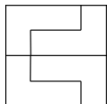| Year group:	NC L.O.	Practical	Pictorial	Abstract	Problem Solving		Reasoning
		Make it! **SAY IT**	**Show it/Draw it!** **SAY IT**	**Read/Write it!** **SAY IT**			

| 1 | Recognise, find and name a half as one of two equal parts of an object, shape or quantity.

Progression

Launch for half – carousel of cutting string in half, cutting paper in half =, filling a glass half way and finding half way between two places

Practical – cutting objects

Practical – cutting shapes

Pictorial – shapes fluency, R and PS

Practical – sets of objects.

Pictorial – sets of objects

Abstract – sets of objects, drawing the amount in their book and then sharing it into 2 equal groups. | Counters

Objects

2 x Hoops, cups or plates for sharing into.

Numicon

Unifix

Money

Dienes

Dice

Shapes

"Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers | Pictures of objects and groups.

Pictures of practical resources.

Arrays (That will divide by 2.)

Shapes (Regular + Irregular)

Pictorial versions of food items | Number sentences (Make relationship between dividing by 2.)

Missing numbers

Missing symbols

Move the equals sign

Bar Model | What is half of this amount?

5p 1p

How many different ways can you show half in these shapes

These images show squares split in half:

How might you check that each was correct? Can you find any other ways to split a square in half? | Sam is trying to halve the number 20. He gets 20 cubes and tries to split them between 3 plates.

Has Sam done this correctly? |

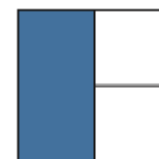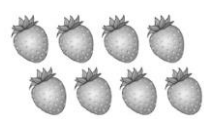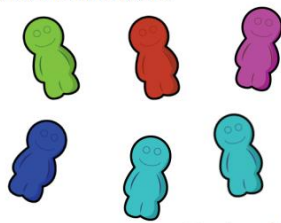|						

| 1 | Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.
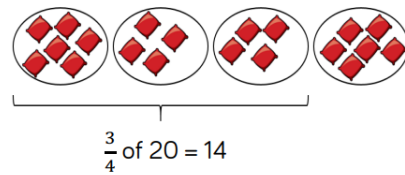
Follow the same progression for finding half. | Counters

Objects

4 x Hoops, cups or plates for sharing into.

Numicon

Unifix

Money

Dienes

Dice

Shapes

Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers | Pictures of objects and groups.

Pictures of practical resources.

Arrays (That will divide by 4)

Shapes (Regular + Irregular)

Pictorial versions of food items | Number sentences (Make relationship between dividing by 4 = Half it and half it again.)

Missing numbers

Missing symbols

Move the equals sign

Bar Model | This a feast that Jon, Mike, Faye and Kyra will share. What will each person get?

I have two pizzas and I want to share them between 4 people. How much pizza does each person receive? | I find one quarter of my starting number. The answer is 3. What was my number?

Mr. White has asked us to put $\frac{1}{4}$ of the balls into the hoop. Who is correct? Explain why.

I'm going to put one ball in because the top number is one

I will put six in the hoop because half of 12 is 6

I'm going to share the balls into 4 groups and then place one of the groups into the circle

Can you quarter any number?

Can you prove it? |
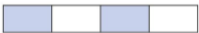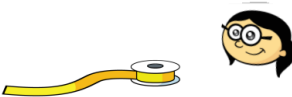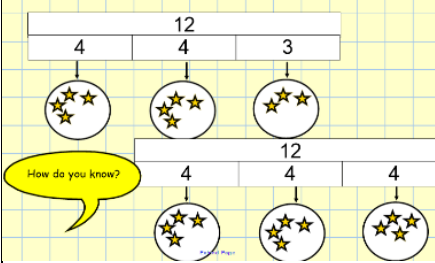
Year 2

Year group:	NC L.O.	Practical	Pictorial	Abstract	Problem Solving	Reasoning
		Make it! SAY IT	**Show it/Draw it!** SAY IT	**Read/Write it!** SAY IT		
2	Recognise, find, name and write 1/2 of a length, shape, set of objects or quantity. (Recap of Y1 objective, do a diagnostic assessment beforehand to see how much needs to be covered)	Counters Objects Hoops, cups or plates for sharing into. Numicon Unifix Money Dienes Dice Shapes Lengths of materials e.g., border paper.	Pictures of objects and groups. Pictures of practical resources. Arrays (That will divide by 2) Shapes (Regular + Irregular)	Number sentences (Make relationship between division and fractions). Missing numbers Missing symbols Move the equals sign Bar Model ½ of 2 = ½ of 4 = ½ of 6 = ½ of 8 = ½ of 10 =	Which pictures show $\frac{1}{2}$? Which pictures show $\frac{1}{2}$?	Odd One Out $\frac{1}{2}$ One half Which is the odd one out? Explain your answer. Rosie says the shaded part of the shape does not show a half because there are four parts, not two equal parts. Do you agree? Explain why.
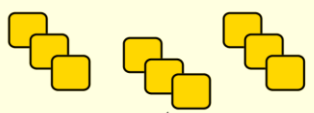
| 2 | [EXS] Recognise, find, name and write fractions 1/3, **1/4**, 2/4 and 3/4 of a length, shape, set of objects or quantity.

Reminder to use GT LT and equals symbols.

Write simple fractions for example, 1/4 of 12 = 3 and recognise the equivalence of 2/4 and 1/2. | Counters

Objects

Hoops, cups or plates for sharing into.

Numicon

Unifix

Money

Dienes

Dice

Shapes

Lengths of materials e.g., border paper. | Pictures of objects and groups.

Pictures of practical resources.

Arrays (That will divide by 4)

Shapes (Regular + Irregular)

Draw lines to divide the rectangle into quarters.

Use the dots to help you. | Number sentences (Make relationship between division and fractions).

Missing numbers

Missing symbols

Move the equals sign

Bar Model

¼ of 4 =

¼ of 8 =

¼ of 12 =

¼ of 16 =

¼ of 20 = | Colour in ¼ of each of these grids in a different way.

Which of these diagrams have ¼ of the whole shaded? | What fraction is the red part of the whole circle? Explain why.

Three children are splitting a square into quarters.

Teddy

Alex

Mo

Who has split the square into equal parts? Explain why. |
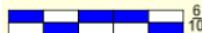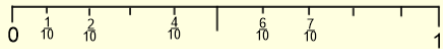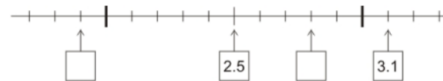
				Tim had a birthday party. 20 children went. ¼ were girls. How many girls went to Tim's party?	
[EXS] Recognise, find, name and write fractions 1/3, 1/4, **2/4** and 3/4 of a length, shape, set of objects or quantity. Reminder to use GT LT and equals symbols. Recap half of length/shape/objects and amounts. **Write simple fractions for example, 2/4 of**	Counters Objects Hoops, cups or plates for sharing into. Numicon Unifix Money Dienes Dice Shapes	Pictures of objects and groups. Pictures of practical resources. Arrays (That will divide by 4) Shapes (Regular + Irregular)	Number sentences (Make relationship between division and fractions). Missing numbers Missing symbols Move the equals sign Bar Model 2/4 of 4 = 2/4 of 8 = 2/4 of 12 = 2/4 of 16 = 2/4 of 20 =	Ben ate half a pizza. Which fraction shows the amount he ate? Circle it ¼ 2/4 ¾ 1/3	Tommy has a jar of 12 cookies. He gives half of them to Alex, and $\frac{2}{4}$ of them to Mo. Cookies Who gets the most cookies?
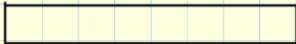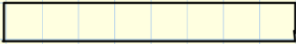
	12 = 6 and recognise the equivalence of 2/4 and 1/2.	Lengths of materials e.g. border paper.		Look at these fractions. $\frac{1}{2}$ $\frac{1}{3}$ $\frac{2}{4}$ $\frac{3}{4}$ Circle the **two fractions** that are **equal**.		Jayne says that the shaded part of the whole square below does not show a half because there are three pieces not two. Explain your reasoning.
	[EXS] Recognise, find, name and write fractions 1/3, 1/4, 2/4 and **3/4** of a length, shape, set of objects or quantity. Reminder to use GT LT and equals symbols. **Write simple fractions for example, 3/4 of 12 = 9 and** recognise the equivalence of 2/4 and 1/2.	Counters Objects Hoops, cups or plates for sharing into. Numicon Unifix Money Dienes Dice Shapes Lengths of materials e.g., border paper.	Pictures of objects and groups. Pictures of practical resources. Arrays (That will divide by 4) Shapes (Regular + Irregular) Sita has 8 strawberries. She eats 3/4 of them. How many does she eat?	Number sentences (Make relationship between division and fractions). Missing numbers Missing symbols Move the equals sign Bar Model 3/4 of 4 = 3/4 of 8 = 3/4 of 12 = 3/4 of 16 = 3/4 of 20 = Use counters, cubes, or bar models to help you fill in the blanks:	The Giant finds a beanstalk that is 40m tall and climbs half way up. Jack finds a beanstalk that is 40m tall and climbs $\frac{3}{4}$ of the way up. Who climbed the highest? Eva eats three-quarters of her sweets. She eats these sweets. How many sweets does Eva have left?	Amir is using beanbags and hoops to find three quarters of 20. Can you spot his mistake? $\frac{3}{4}$ of 20 = 14

			$\frac{1}{4}$ of 24 = ☐ $\frac{2}{4}$ of 24 = ☐ $\frac{3}{4}$ of 24 = ☐ $\frac{4}{4}$ of 24 = ☐ ┃ $\frac{1}{4}$ of 4 = ☐ $\frac{3}{4}$ of 4 = ☐ $\frac{1}{4}$ of 8 = ☐ $\frac{3}{4}$ of 8 = ☐ ┃ $\frac{1}{4}$ of ☐ = 5 $\frac{3}{4}$ of ☐ = 15 $\frac{1}{4}$ of ☐ = 2 $\frac{☐}{4}$ of 8 = 6			

	[EXS] Recognise, find, name and write fractions **1/3,** 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity. Reminder to use GT LT and equals symbols. **Write simple fractions for example, 1/3 of 12 = 4 and** recognise the equivalence of 2/4 and 1/2.	Counters Objects Hoops, cups or plates for sharing into. Numicon Unifix Money Dienes Dice Shapes Lengths of materials e.g., border paper.	Pictures of objects and groups. Pictures of practical resources. Arrays (That will divide by 3.) Shapes (Regular + Irregular) Tick the shape that has exactly 1/3 shaded. (four bar model diagrams)	Use the cubes to make 3 equal groups. There are ____ cubes altogether. One third of ____ is ____ $\frac{☐}{☐}$ of ____ is ____ 1/3 of 3 = 1/3 of 6 = 1/3 of 9 = 1/3 of 12 = 1/3 of 15 = 1/3 of 18 = Complete: $\frac{1}{3}$ of 9 = ☐ $\frac{1}{3}$ of 15 = ☐ $\frac{1}{3}$ of 12 = ☐ $\frac{1}{3}$ of 18 = ☐	Annie has a piece of ribbon. She cuts it into **three** equal parts. **One third** of the ribbon is **6 cm long**. How long would **half** the ribbon be?	Tick the correct bar model for the calculation 1/3 of 12 = 4: How do you know? Dora says, I have one third of a pizza because I have one slice and there are three slices left. Do you agree? Explain your reasoning.
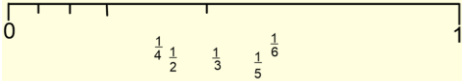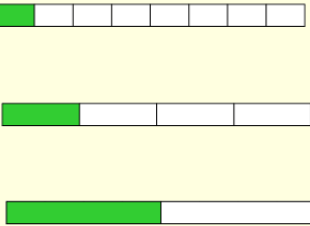
Year 3

Year group:	NC L.O.	Practical	Pictorial	Abstract	Problem Solving	Reasoning
		Make it! **SAY IT**	**Show it/Draw it!** **SAY IT**	**Read/Write it!** **SAY IT**		
3	Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators. (Using Fractions of a shape or number.)	Counters Objects Hoops, cups or plates for sharing into. Numicon Multilink	Pictures of objects and groups. Pictures of practical resources. Arrays Shapes Number lines	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model	Mark buys a bag of 12 apples. He eats $\frac{2}{3}$ of them. How many did he eat? Claire takes $\frac{1}{3}$ of the orange squares. Simon takes $\frac{4}{9}$. How many will be left?	What do you notice? 1/10 of 10 = 1 2/10 of 10 = 2 3/10 of 10 = 3 Continue the pattern. What do you notice? What about 1/10 of 20? Use this to work out 2/10 of 20, etc.
	2020 Guidance and progression	**3F–1** Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts.			**6F–1** Recognise when fractions can be simplified, and use common factors to simplify fractions.	
		3F–3 Reason about the location of any fraction within 1 in the linear number system.	**4F–1** Reason about the location of mixed numbers in the linear number system.		**6F–3** Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.	
	Shape, space, measure and statistic opportunities:					

	Fractions of a metre					
3	Recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.	Counters Objects Hoops, cups or plates for sharing into 10. Numicon Multilink Smarties! Money e.g., 10 x 1p. 10 x 10p	Pictures of objects and groups. Pictures of practical resources. Shapes – shading tenths.	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model $6 \div 10 = 0.6$, $7 \div 10 = 0.7$ We are not expecting the children to do this but as a teacher please model when working on tenths the other way of writing it e.g. 0.1 is the same as 1 tenth. Use the specific language please.	Mrs Welch wants $\frac{5}{10}$ of the cake. Mrs Grigg wants $\frac{4}{10}$ of the cake. Using your resources, who will get the most cake?	This is one (1) bar of chocolate. What fraction is each piece? Why? This is another bar of chocolate. What fraction is each piece? Why? True or false? $\frac{4}{10}$ $\frac{6}{10}$ $\frac{2}{10}$ Explain your reasoning!
3	Count up and down in tenths.	The children will know what 1/10 is due to the work on the above objective so now you are working abstractly straight away with this.	Number lines Here is a diagram with 4/10s shaded. Shade 2 tenths more. How many tenths are shaded in total? This diagram has 5/10s shaded how much more do I need to shade to have 8 tenths shaded? Encouragement to count on with the	Missing fraction sequences. Fraction and decimal number lines.	Fill in the missing fractions 0 $\frac{1}{10}$ $\frac{2}{10}$ $\frac{4}{10}$ $\frac{6}{10}$ $\frac{7}{10}$ 1 Write the missing numbers in the boxes 2.5 3.1	Simon has a cake, cut into tenths. He promises to give 4 slices to Tom, two-tenths to Sarah and half the cake to Jim. Can Simon keep his promise? Explain why / why not.

			above questions. This will also help you when you get to adding and subtracting fractions with the same dominator.				
3	Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators. Stick to 2–digit amounts and denominators that are Y3ARE tables (2,5,10,3,4,8)	Counters Objects Hoops, cups or plates for sharing into. Numicon Multilink	Pictures of objects and groups. Pictures of practical resources. Arrays	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model	Lucas ate ¾ of the cakes. Archie ate the rest. How many cakes did Archie eat?	Sophia says "1/3 of the stars are shaded." Tegan says "3/9 of the stars are shaded." Who is correct? Explain your answer.
	2020 Guidance and progression	**3F–2** Find unit fractions of quantities using known division facts (multiplication tables fluency).		**5F–1** Find non-unit fractions of quantities.	**6F–2** Express fractions in a common denomination and use this to compare fractions that are similar in value.	
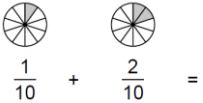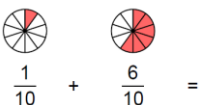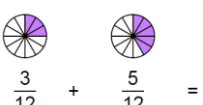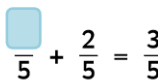
| 3 | Recognise and show, using diagrams, equivalent fractions with small denominators.

(Stick with denominators in the X Tables you do in Y3 and Y2, 2,5,10,3,4,8) | Counters

Objects

Numicon

Multilink | Pictures of objects and groups.

Pictures of practical resources.

Arrays

Shapes | Number sentences

Missing numbers

Missing symbols

Move the equals sign

Bar Model / Fraction wall | 9. Peter ate $\frac{1}{2}$ of his bar of chocolate, Damian ate $\frac{2}{4}$ of his bar of chocolate and Polly ate $\frac{3}{6}$ of her bar of chocolate. Who had the most remaining? | What fraction of each shape are shaded?

Are they equivalent?

How do you know?

Are these fractions equivalent:

Explain your reasoning: ....
....

Prove to me that $\frac{1}{2} = \frac{4}{8}$
Is there another equivalent fraction?

Hannah says the diagrams below show that ¼ > ½ Do you agree? Explain why / why not. |

| 3 | Add and subtract fractions with the same denominator within one whole [for example, 3/8 + 2/8 = 5/8]. | Numicon! Think of staff meeting example. | Shading parts of a diagram. (Not always circles or squares.)

Cutting up tenths to add or subtract which emphasises the size doesn't change, just the number of parts. | Number sentences

Missing numbers

Missing symbols

Move the equals sign

Bar Model / Fraction wall | **What is the missing fraction?**

$\frac{3}{10} + \bigcirc = \frac{7}{10}$

$\frac{2}{5} = \square - \frac{1}{5}$

$\bigcirc + \frac{3}{7} = 1$

$\frac{2}{6} + \frac{2}{6} = \frac{1}{6} + \boxed{}$ | Mrs Welch has been adding fractions with Mrs Grigg. Mrs Welch thinks the answer is $\frac{5}{10}$ Mrs Grigg thinks it is $\frac{5}{8}$. Who is correct? Explain.

Mrs Welch has made a mistake. Can you explain what she has done wrong?

$\frac{3}{9} + \frac{4}{9} = \frac{7}{18}$

Fill in the numerators to make the calculation correct.

$\frac{}{8} + \frac{}{8} = 1$

How many ways can you do it?

Explain how you know that you have found them all. |
| | 2020 Guidance and progression | **3F–4** Add and subtract fractions with the same denominator, within 1. | **4F–3** Add and subtract improper and mixed fractions with the same denominator, including bridging whole numbers. | **5F–3** Recall decimal fraction equivalents for ½ ,1/4 , 1/5 and 1/10 , and for multiples of these proper fractions. | | |

| 3 | Compare and order <mark>unit fractions,</mark> and fractions with the same denominators. | Numicon

Multilink

Smarties | Number lines | Bar Model

GT LT and equals symbols | Ordering unit fractions

0 ———————————————— 1

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

What have you noticed about my number line?
Why are the intervals not spaced evenly?
Which fraction is easiest to begin with? Why?
Can you place the other fractions? | What fraction is shown on each bar?

Which fraction is the biggest amount?

What have you noticed? |

| 3 | Solve problems that involve my understanding of fractions.

This is where you use all the content from above and put it into problems. Still do them practically pictorially and abstractly. You will have done some of this already, but this can be used for more consolidation. | Counters

Objects

Hoops, cups or plates for sharing.

Numicon

Multilink

Smarties!

Money | Pictures of objects and groups.

Pictures of practical resources.

Shapes | Number sentences

Missing numbers

Missing symbols

Move the equals sign

Bar Model | **As above** | **As above** |

Year 4

Year group:	NC L.O.	Practical	Pictorial	Abstract	Problem Solving	Reasoning
		Make it! **SAY IT**	**Show it/Draw it!** **SAY IT**	**Read/Write it!** **SAY IT**		
4	Add and subtract fractions with the same denominator. (Use any denominator up the value of 12 to link in with your X Tables.)	Numicon! Think of staff meeting example. "Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers	Shading parts of a diagram. (Not always circles or squares.) Cutting up fractions to add or subtract which emphasises the size doesn't change, just the number of parts. $\frac{1}{10} + \frac{2}{10} =$ $\frac{1}{10} + \frac{6}{10} =$ $\frac{3}{12} + \frac{5}{12} =$	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model / Fraction wall *Complete the calculations below: 2/10 + 4/10 = 9/12 - 6/12 = 7/11 + 4/11 = 1 - 2/5 = 2/9 + ☐ = 7/9 ☐ - 8/20 = 5/20 1 - ☐ = 2/7 3/10 + ☐ + 5/10 = 1	1. Sam has to walk $\frac{7}{8}$ of a mile to school and Lucy has to walk $\frac{3}{8}$ of a mile to school. How much further does Sam have to walk? 2. Fred has read $\frac{9}{10}$ of his book and Jake has read $\frac{3}{10}$ of the same book. How much more has Fred read? 3. There are $\frac{5}{6}$ of a cheese and ham pizza left in the fridge. Dave takes out and eats $\frac{4}{6}$. How much pizza is left? 4. Sarah had $\frac{7}{9}$ of a chocolate bar. She gave Bethany $\frac{3}{9}$. How much does Sarah have left? 5. Ben baked 15 brownies. He took $\frac{11}{15}$ into school for his classmates. His classmates ate $\frac{7}{15}$ of the brownies. How many brownies did he take home? 1. Parts of this calculation have been hidden. What could the missing number be? $\frac{☐}{5} + \frac{2}{5} = \frac{3}{5}$	**What do you notice?** 5/5 – 1/5 = 4/5 4/5 – 1/5 = 3/5 1. Ronnie the rat says: "On Tuesday, I ran $\frac{3}{9}$ of a marathon. On Wednesday, I ran $\frac{2}{9}$ of a marathon. Altogether, I ran $\frac{6}{9}$ of a marathon." Is Ronnie correct? Explain your answer.

| 1 | 4 | 3 |

$$\frac{\square}{5} - \frac{\square}{5} = \frac{\square}{5}$$

Is there more than one solution?

Find three ways to complete each calculation.

$$\frac{\square}{\square} + \frac{\square}{\square} = \frac{8}{9}$$

$$\frac{\square}{\square} - \frac{\square}{\square} = \frac{8}{9}$$

**C. Compare the calculations below:

$$\frac{4}{12} + \frac{3}{12} \quad \square \quad \frac{11}{12} - \frac{3}{12}$$

- **True or False**

$$\frac{5}{12} + \frac{3}{12} = \frac{8}{12}$$

$$\frac{5}{12} + \frac{3}{12} = \frac{8}{24}$$

$$\frac{5}{12} + \frac{3}{12} = \frac{4}{6}$$

Explain your reasoning.

*Charlie has a cake cut into 10 equal pieces.

Charlie promises 3/10 of the cake to Oliver, 4/10 of the cake to Haydyn and 5/10 of the cake to Josh.

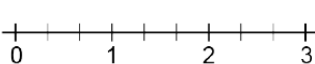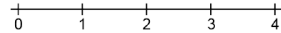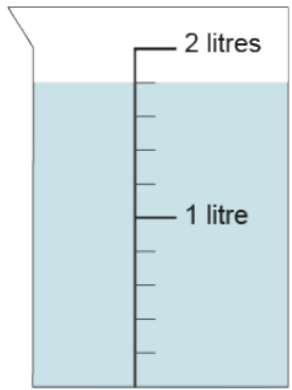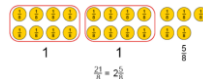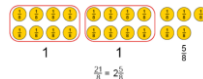Charlie thinks he can keep his promise.

Do you agree? Explain your answer.

**F. Jack took a test with 100 questions. Jack got half the questions correct, missed out 10 and got the rest incorrect.
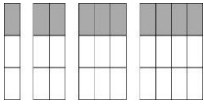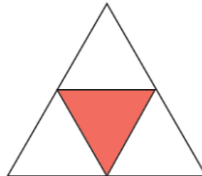
Jack says: "The fraction of questions I got incorrect was 30/100"

Is Jack's statement true or false? Explain your answer.

***There are only two unique ways to add two amounts of halves to make a whole:

1/2 + 1/2 = 1 and **0/2 + 2/2 = 1**

We could swap the addends, but we don't need to as addition is commutative.

How many unique ways are there of adding amounts of quarters to create a whole? What about eighths?

Shape, space, measure and statistic opportunities:
Adding and subtracting fractions of length, weight or capacity as 2-star questions e.g., 1/5 m + 2/5 m = ? m = ? cm

| 4 | 4F–1 Reason about the location of mixed numbers in the linear number system.

Was new in 2020/21 | Folding / cutting activities with paper, card, cake etc. | Number lines with marked intervals

See 2020 gov guidance Y4 p48

Draw a number line. Put the following fractions on the line:

½, 1 and ¼ , 2 and ½, 1 and 3/5, 1 and ¾

Fraction walls | Add labels to each mark on the number lines.

Estimate the position of the following numbers on the number line.

$2\frac{2}{9}$ $\frac{2}{3}$ $3\frac{3}{7}$ $1\frac{1}{5}$

 | How much water is in the beaker? Write your answer as a mixed number.

 | Circle the larger number in each of these pairs. Explain your reasoning.

$3\frac{3}{9}$ $3\frac{8}{9}$ $4\frac{1}{3}$ $4\frac{1}{8}$ $2\frac{1}{3}$ $1\frac{2}{3}$ |

4	4F–2 Convert mixed numbers to improper fractions and vice versa. Was new in 2020/21	Numicon. Use 10 as one whole and show numicon additions and subtractions to go over and under 1. "Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers	Shading parts of a diagram. (Not always circles or squares.) $\frac{21}{8} = 2\frac{5}{8}$	Number lines with mixed and improper labels (see 2020 guidance, Y4 p51). Express the following mixed numbers as improper fractions. $4\frac{1}{8}$ $6\frac{4}{9}$ $3\frac{11}{12}$ $8\frac{2}{3}$ Express the following improper fractions as mixed numbers. $\frac{17}{2}$ $\frac{13}{6}$ $\frac{28}{10}$ $\frac{41}{7}$ How many quarters are there in $2\frac{3}{4}$?	I have a 6 and 1/2m length of string. How many ½m lengths can I cut? The school kitchen has 17 packs of butter. Each pack weighs ¼ Kg. How many kilograms of butter do they have altogether? Express your answer as a mixed number.	Sarah wants to convert 17 / 4 to a mixed number. She writes: $$\frac{17}{4} = 3\frac{5}{4}$$ Explain what mistake Sarah has made and write the correct answer.
	2020 Guidance and progression		**4F–2** Convert mixed numbers to improper fractions and vice versa.	**5F–2** Find equivalent fractions and understand that they have the same value and the same position in the linear number system.		
4	4F–3 Add and subtract improper and mixed fractions with the same denominator, including bridging whole numbers. Was new in 2020/21	Numicon. Use 10 as one whole and show numicon additions and subtractions to go over and under 1. "Cuttable" food items, pizzas, cake, apples. Include non-circular items,	Shading parts of a diagram. (Not always circles or squares.) $\frac{21}{8} = 2\frac{5}{8}$	Tick (✔) **two** cards that give a **total of 5** $1\frac{1}{4}$ $1\frac{1}{2}$ $1\frac{3}{4}$ $3\frac{1}{2}$ $3\frac{3}{4}$ $4\frac{1}{4}$	I have 5m of rope. I cut off 4/10m How much rope is left? It is a 2 3/4km cycle ride to my friend's house, and a further 3/4km ride to the park. How far do I have to cycle altogether? The table below shows the number of hours Josie read each day during a school week. For how long did Josie read altogether? <table><tr><th>Mon</th><th>Tues</th><th>Wed</th><th>Thurs</th><th>Fri</th></tr><tr><td>$1\frac{3}{4}$ hours</td><td>1 hour</td><td>$1\frac{1}{4}$ hours</td><td>$1\frac{1}{4}$ hours</td><td>$2\frac{3}{4}$ hours</td></tr></table>	

		such as cucumbers				
	2020 Guidance and progression	**3F–4** Add and subtract fractions with the same denominator, within 1.	**4F–3** Add and subtract improper and mixed fractions with the same denominator, including bridging whole numbers.	**5F–3** Recall decimal fraction equivalents for ½ ,1/4 , 1/5 and 1/10 , and for multiples of these proper fractions.		
4	Recognise and show, using diagrams, families of common equivalent fractions. E.g., ½, ¼, 1/3, 1/10, 1/5 extend onto 1/100 (Not done before.)	"Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers	Shading parts of a diagram. (Not always circles or squares.) Cutting up fractions to add or subtract which emphasises the size doesn't change, just the number of parts. Look at these diagrams: Complete the fractions. $\frac{1}{3} = \frac{?}{3} = \frac{3}{?} = \frac{?}{12}$ Each of these diagrams is divided into equal parts. Some of the parts are shaded.	Number sentences Missing numbers Missing symbols GT and LT symbols Move the equals sign Bar Model / Fraction wall	Harry says, " $\frac{3}{4}$ is always the same as $\frac{6}{8}$ " Jenny says, " $\frac{3}{4}$ is equivalent to $\frac{6}{8}$ but isn't always the same amount." Use diagrams to show and prove your answer.	Mrs Gardner says that $$\frac{2}{5} = \frac{4}{10}$$ Is she right? Convince her by drawing bars. Keanu says "one-third of the shape shown is shaded". Explain why Keanu is incorrect. What mistake might Keanu have made to get one-third?
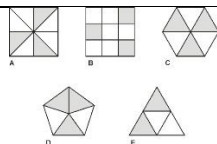
Write the letters of all the diagrams that have exactly **half** shaded.

Use the digit cards to fill in the boxes below.

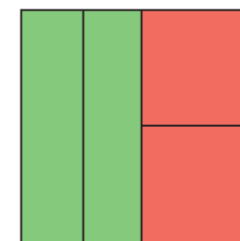$$\frac{\square}{\square} \qquad \frac{\square}{\square} \qquad \frac{\square}{\square\square}$$

$$\frac{2}{6} = \frac{5}{8}$$

Are these equivalent?

Sam says:

"I know that ƒ is equivalent to ƒ as the numerators are the same."

Is Sam correct?

Explain why / why not.

*Meave says "This shape is cut into four quarters"

Ngaire says "It can't be cut into quarters because the four parts don't all look the same"

What do you think?

What numbers could go in the boxes?

2. Use the digit cards below to fill in the boxes. How many different ways can you find?

| 4 | 8 | 3 | 6 |

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

$$\frac{1}{5} = \frac{2}{10} = \frac{4}{20} = \frac{8}{40}$$

Are these equivalent?

Show me using bars.

$$\frac{\square}{3} = \frac{\square}{6}$$

How many ways can you show me? Draw diagrams to convince me.

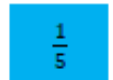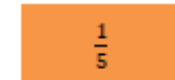Spot the pattern, explain the pattern using diagrams.

$$\frac{1}{8} = \frac{2}{16} \qquad \frac{2}{8} = \frac{4}{16}$$

$$\frac{3}{8} = \frac{6}{16}$$

$$\frac{4}{16}$$

Can you continue the pattern?

- Two paper strips are ripped. Which paper strip was originally the longest?
  Explain your answer.
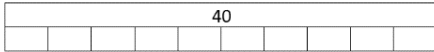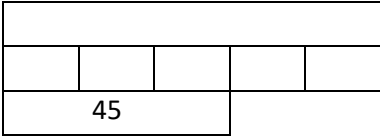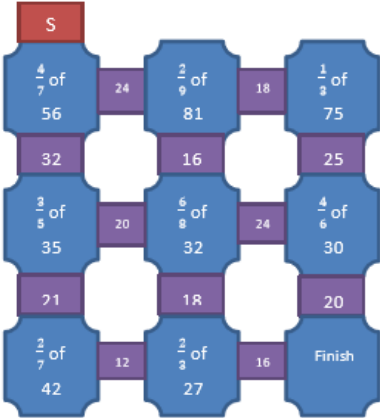
$\frac{1}{5}$ $\frac{1}{5}$

A pizza is cut into 8 slices. Zara says,

If I take half of the pizza, and my brother takes 4 slices, we will both have the same amount

Is she correct?
Convince me by using a diagram.

| 4 | Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.

 Big push on the strategy to do this!

 DDMN – Divide by the Denominator, Multiply the result by the Numerator. | Counters

 Objects

 Hoops, cups or plates for sharing into.

 Numicon

 Multilink | Pictures of objects and groups.

 Pictures of practical resources.

 Arrays | Number sentences

 Missing numbers

 Missing symbols

 Move the equals sign

 Bar Model | $? = \frac{5}{10}$ of 40

 [bar model: 40]

 Archie has 60p. He spends 2/3 of his money on an apple. How much did the apple cost?

 Emily buys a box of 24 chocolates. She eats $\frac{1}{4}$ of the chocolates and her Mum eats $\frac{1}{3}$. How many chocolates are left?

 **Complete this equation:

 1/2 of 50 = 1/4 of ?

 Here's a bar model:

 [bar model: 45]

 What is the number in the top bar?

 Write the fraction calculation that this bar model shows.

 **Liam spends $\frac{2}{5}$ of an hour reading and Jaden spends $\frac{3}{10}$ of an hour reading. | Captain conjecture says: *"To find a tenth of a number I divide by 10 and to find one fifth of a number I divide by 5."* Is he correct? Explain your answer.

 These three squares are $\frac{1}{4}$ of a whole shape.

 How many different shapes can you draw that could be the complete shape?

 • Work out the answer to each question to make it through the maze.

 [maze diagram]

 ***I.

 Look at the equations below:

 1/2 of 50 = 1/4 of 100

 1/3 of 60 = 1/9 of 180 |

How many minutes do Liam and Jaden spend reading altogether?

1/2 of 100 = 1/8 of 400

Can you spot and describe a pattern between the denominators and whole numbers in the equations above?

Can you use this to complete the following equation without finding a fraction of an amount?

1/2 of 200 = 1/10 of ☐

The school kitchen needs to buy carrots for lunch. A large bag has 200 carrots and a medium bag has $\frac{3}{5}$ of a large bag.

Mrs Rose says:

I need 150 carrots so I will have to buy a large bag.

Do you agree with Mrs Rose? Explain your answer.

Shape, space, measure and statistic opportunities:
Fractions of measure where conversions are needed (2/5 of metre, ¾ of a litre, 5/6 of an hour)

| 4 | Count up and down in hundredths; recognise that hundredths arise when dividing an | Coins, £1 and 1p Counters | Number lines Pictures of objects split into 100. Here is a diagram with 20/100ths | Missing fraction sequences. Bar models for comparing tenths to hundredths | Complete the bar models below: | 1 | | Miss Tonkin says: You can't write a number greater than 1 in hundredths, |

object by one hundred and dividing tenths by ten.		shaded. Shade 2 hundredths more. How many hundredths are shaded in total? This diagram has 47 hundredths shaded, how much more do I need to shade to have 60 hundredths (or 6 tenths if pushing GD) shaded?	Complete these calculations: i. $\frac{16}{100} + \frac{24}{100} =$ ii. $\frac{78}{100} - \frac{23}{100} =$ iii. $\frac{79}{100} + \frac{}{100} = 1$ iv. $\frac{80}{100} - \frac{}{100} = \frac{32}{100}$		the largest number you can write in hundredths is 100/100. Do you agree with Miss Tonkin? Explain why / why not.

4/10		50/100

1	
65/100	1/10

**James has £4. He spends three-tenths on his money on a magazine and 45/100 on a sandwich.

How much money does James have left?

Complete the bar model below:

$\dfrac{70}{100}$		
0.33		$\dfrac{28}{100}$

Give the missing number as both a fraction and a decimal.

Oliver says:

"If I add two amounts of hundredths together my total **will always need an amount of hundredths**, for example 0.41 + 0.42 = 0.83 ; There are 3 hundredths there."

Mr Moore doesn't agree, and gives the example

0.13 + 0.17

Explain how Mr Moore's example **disproves** Oliver's conjecture.

Shape, space, measure and statistic opportunities:

Count up and down in fractions of a metre.

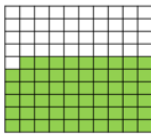| 4 | Recognise and write decimal equivalents of any number of tenths or hundredths. | Coins, £1 and 1p

Counters | Images split up into tenths / hundredths

How much of this shape is shaded? Write your answer as a decimal. | Say it out loud!

If a pupil can say a fraction with a denominator of ten or one hundred then that will be the decimal fraction equivalent e.g., 4/10 = four tenths = 0.4

23/100 = twenty-three hundredths = 0.23

Look at this number.

24.65

Circle the number below that shows the value of the 6.

60   6/10   6

6/100 600 | 3. Which is the odd one out? Explain your answer.

0.006 $\frac{6}{10}$

3. Match the decimals to their place value grid representations.
a. 0.51   1.
b. 0.72   2.
c. 0.16   3. | **Decimal Place Value Ch**

Put this fraction into the place value chart as a decimal.

$$\frac{5}{10}$$

What calculation do you need to do?

Mrs Gardner has completed this place value chart to show $\frac{3}{10}$. Mark her work. Is she right?

Fill in the place value chart to show the fraction as a decimal. Mrs Gardner does the calculation 67 ÷ 10=. Is she correct?

$$\frac{67}{100}$$

Explain why? |

Spot the mistake Mrs Tibbles has made:

0.59 $\dfrac{59}{100}$

nine tenths
and five
hundredths

Explain why?

Shape, space, measure and statistic opportunities:
Fractional and decimal equivalents of metres and pounds (£)

| 4 | Recognise and write decimal equivalents to 1/4, 1/2, 3/4.

 Start with 100 squares and writing it over 100 | Coins, £1 and 1p

 Counters | Number lines (0-100 on top and 0-1 on the bottom)

 On the diagram below (empty hundred square) shade the following and write the amount shaded as a fraction and a decimal in hundredths:

 $*\dfrac{1}{2} + \dfrac{1}{4} =$

 $**\dfrac{1}{4} + \dfrac{14}{100} =$

 $**\dfrac{3}{4} - \dfrac{4}{10} =$ | Number sentences

 Missing numbers

 Missing symbols

 Move the equals sign

 Bar Model

 *Circle the numbers that are equal to $\dfrac{1}{2}$

 0.12   0.5   5.0
     0.05   0.50 | Tick the **two** numbers that are equivalent $\dfrac{1}{4}$ to

 Tick two.
 0.25 ☐
 0.75 ☐
 $\dfrac{25}{100}$ ☐
 0.5 ☐
 $\dfrac{2}{5}$ ☐

 2. Complete the set of loop cards below using a mixture of fractions, decimals, words and pictorial representations.

 one quarter
 $\dfrac{6}{12}$ $\dfrac{3}{6}$
 $\dfrac{6}{8}$ 0.75 $\dfrac{2}{8}$

 Each card must be different and must show the amounts represented in different ways. | ½, ¼ and ¾ can all be written as a fraction with a denominator of 100.

 Can they all be written with a denominator of 10?

 Explain why / why not.

 Alex says: *If I know 1/2 is 0.5 as a decimal, I also know 3/6 is equivalent to 0.5 as a decimal.*

 Explain Alex's thinking. |

				$$**\frac{1}{2} + \frac{2}{10} + \frac{2}{100} =$$			

<table>
<tr><td colspan="8" style="background:green">Shape, space, measure and statistic opportunities:

Fractions of a metre, link back to dividing 100 by factors from Y3 non-statutory guidance:

"3NPV–4 Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts."</td></tr>
</table>

| 4 | Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths. | Counters

Objects

Hoops, cups or plates for sharing.

Numicon

Multilink

Smarties!

Coins

Hundreds, tens and ones dienes

Rulers / Metre sticks / other | Place value charts

Number lines | Number sentences

Missing numbers

Missing symbols

Move the equals sign

Bar Model | Jack buys 10 boxes of apples for £12.

How much does one box of apples cost?

Kiera buys 10 pens for £9.

Mrs George buys 100 pens for £80.

Whose pens were cheaper?

Show your workings. | Sam buys 10 pens for £7.

Mrs George buys 100 pens for £70.

Mrs George says, *"My pens must cost more **each** because I paid more."* Is Mrs George correct? |

| | | measurement equipment | | | | |

Which equation matches the answer shown in the place value grid below?

10 ÷ 8 = 0.8

8 ÷ 10 = 0.8

0.8 ÷ 10 = 8

Tens	Ones	Tenths	Hundredths
	0	8	

Find a path

Can you find a path from 6 to 0.06?

You can move horizontally or vertically but **not** diagonally

6	÷ 10	X 10	÷ 10
X 10	X 10	÷ 100	X 10
X 100	÷ 100	÷ 10	÷ 100
÷ 100	X 10	÷ 10	0.06

Describe the pattern.

$$7,000 \div 100 = 70$$
$$700 \div 100 = 7$$
$$70 \div 100 = 0.7$$
$$7 \div 100 = 0.07$$

Can you complete the pattern starting with 5,300 divided by 100?

Teddy says,

45 divided by 100 is 0.45 so I know 0.45 is 100 times smaller than 45

Mo says,

45 divided by 100 is 0.45 so I know 45 is 100 times bigger than 0.45
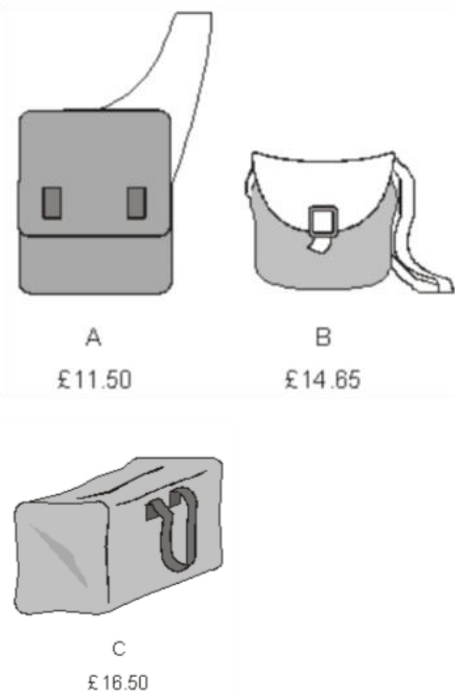
Who is correct?
Explain your answer.

***H. How many different **positive two-digit whole numbers** can you give that make the statement below true:
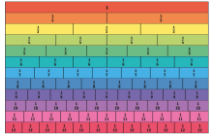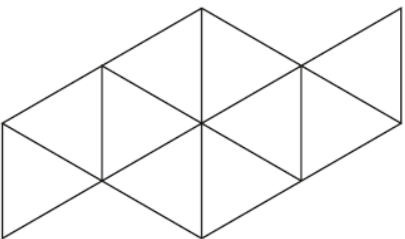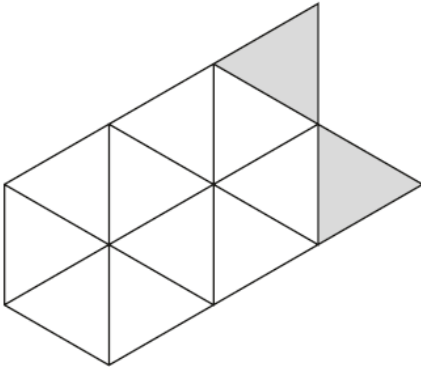
						$\div\ 100 < 0.53$
4	Compare numbers with the same number of decimal places up to two decimal places.	Coins Rulers / Metre sticks / other measurement equipment	Place value charts Number lines	Number sentences Missing numbers Missing symbols GT and LT symbols Move the equals sign Bar Model *Insert digits to complete these comparisons: 0.1__ < 0.1__ < 0.15 1.9__ < 1.9__ < 2.01 6.67 > 6.__7 > 6.37 *Place these numbers in **descending order.** **46.2 9.64 46.02 40.46**	This table shows the times of some children in a 100-metre race. | Name	Time (seconds)
---	---
Nick	19.75
Felix	20.09
Adam	20.15
Gabs	19.68	 Who won the race? What was the time of the runner who came in **third?** **Put these amounts of money in **ascending** order: £2.65 99p £0.50 187p £1.68 . Use the numbers below to complete the statements. 5.3 0.5 5.5 0.3 5.6 0.6 ☐ > ☐ ☐ < ☐ ☐ > ☐ ☐ < ☐	Mr Moore says: *"0.65 is larger than 0.9 because 65 is greater than 9."* Explain why Mr Moore is wrong. ***When I compare two numbers, I need one symbol: 	1.25	>	1.15	 When I compare three numbers how many symbols do I need? How many symbols would I need to compare 10 numbers? Can you write a rule explaining how many symbols you would need to compare any amount of numbers?

Shape, space, measure and statistic opportunities:

Compare times, lengths (in decimal metres), volume (in litres), money (combinations of pounds and pence)

| 4 | Round decimals with one decimal place to the nearest whole number. | Coins

Rulers / Metre sticks / other measurement equipment | Place value charts

Number lines | Number sentences

Missing numbers

Missing symbols

Move the equals sign

Bar Model | Sally buys wood from a shop that sells it in lengths of 0.1 metres.

Sally buys a piece of wood that is 2 metres long, rounded to the nearest 0.1 metre.

What is the shortest length Sally could have bought?

What is the longest length that Sally could have bought? | Donna is rounding some numbers to the nearest whole number:

14.5 rounds to 15.0

9.2 rounds to 9.0

3.8 rounds to 4.0

Do you agree with Donna's responses? Explain your thinking. |

8a. Fill in the gaps using these decimals and whole numbers.

2	8.3	2.5	8	2.4	3

_____ **rounds down to** _____.

_____ **rounds up to** _____.

_____ **rounds down to** _____.

Ngaire says:

"You can't round $5\frac{6}{10}$ to the nearest whole number because you need a decimal to round to the nearest whole number."

Explain why Ngaire is **incorrect**.

Shape, space, measure and statistic opportunities:

Rounding metres / centimetres to the nearest metre.
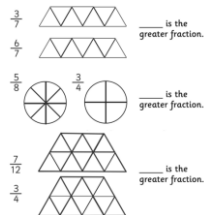
4	Solve simple measure and money problems involving fractions and decimals to two decimal places.	Coins Rulers / Metre sticks / other measurement equipment	Place value charts Number lines	Number sentences Missing numbers Missing symbols GT and LT symbols Move the equals sign Bar Model	Here are three bags in a shop A £11.50 B £14.65 C £16.50 How much does bag B cost to the nearest pound? Jamie buys bag A and bag C. How much change does he get from £40?	Some pupils are trying to add up three lengths; 8cm, 0.5m and 1.25m. Jenny says: The total is 1.38m Taima says: The total is 9.75m Alicia says: The total is 1.83m Who is correct? Explain why. Can you explain the mistakes the two pupils that are incorrect have made?

Steven has £30 in his pocket. He gives ½ his money to his mum and then buys a football costing £8.55.

How much money does Steven have left?

Mr Walden needs 1m of wood for a shelf in his office.

The hardware shop sells two lengths: a 3m length for £4.50 of a 4m length for £5.80.

Mr Walden is happy to cut the wood; he just wants the cheapest length **per metre**.

Which length should Mr Walden buy?
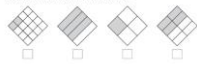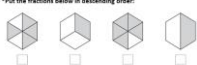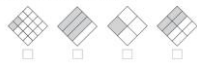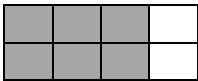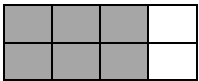
Year 5						

Year group:	NC L.O.	Practical	Pictorial	Abstract	Problem Solving	Reasoning
Objectives running through the unit						
		Make it! **SAY IT**	**Show it/Draw it!** **SAY IT**	**Read/Write it!** **SAY IT**		
5	5F–1 Find non-unit fractions of quantities. Was new in 2020/21. This has previously been covered in Y4 Do a couple of days on this include 4-digit amounts to link into their Y5 division	Counters Objects Hoops, cups or plates for sharing into. Numicon Multilink	Pictures of objects and groups. Pictures of practical resources. Arrays	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model	*Jacob is completing a Lego model comprising of 840 pieces. Jacob is $\frac{2}{5}$ of the way through the build. How many pieces has Jacob used? **Shannon has a litre bottle of orange juice. Shannon has used $\frac{3}{8}$ of the bottle. How many **millilitres** has Shannon got **left**? ** Dylon has 1.8 metres of wood to make a shelf. Dylon uses 5/6 of the wood to make the shelf. How many **centimetres** of wood are left over? **F) Jack buys a sandwich for £2.75 and a drink for £1.40. Jack spent 3/4 of his money. How much money did Jack have to	The school kitchen needs to buy carrots for lunch. A large bag has 200 carrots and a medium bag has $\frac{3}{5}$ of a large bag. Mrs Rose says: I need 150 carrots so I will have to buy a large bag. Do you agree with Mrs Rose? Explain your answer.
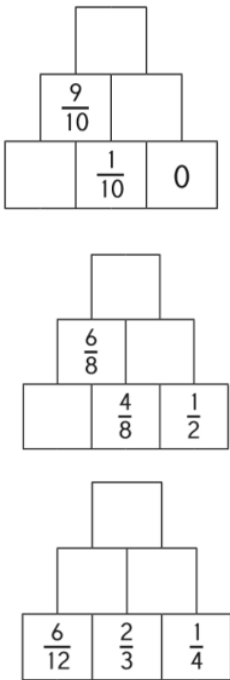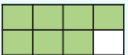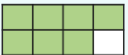
				begin with?		
	2020 Guidance and progression	**3F–2** Find unit fractions of quantities using known division facts (multiplication tables fluency).		**5F–1** Find non-unit fractions of quantities.	**6F–2** Express fractions in a common denominator and use this to compare fractions that are similar in value.	

Shape, space, measure and statistic opportunities:

Fractions of measure where conversions are needed (2/5 of metre, ¾ of a litre, 5/6 of an hour)

5	Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.	"Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers Paper shapes that can be cut up.	Shading parts of a diagram. (Not always circles or squares.) Fraction wall questions: *A. Put your ruler on the line that splits the two halves. Use this to list all fractions on the wall that are equivalent to 1/2. *B. What do you notice about the denominators of all the fractions that are equivalent to 1/2?	Number sentences Missing numbers Missing symbols GT and LT symbols Move the equals sign Bar Model / Fraction wall	Shade $\frac{1}{5}$ of this shape. Shade **more** triangles on this shape so that is $\frac{1}{3}$ shaded	 Holly says, ***'One-third of this shape is shaded'.*** Is Holly correct? Explain how you know. Maisie has a bar of chocolate that has 7 pieces. Charlie has a bar of chocolate that is the same size as Maisie's
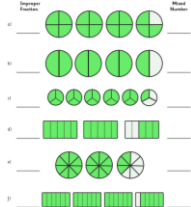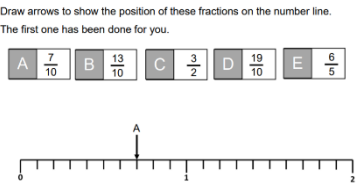
*C. List all the fractions that are equivalent to ¾ .

*D. Dominic says: "The only equivalent to 2/3 on the sheet is 4/6."

Do you agree with Dominic? Explain why / why not.

*E.   Faith says: "There are 3 equivalents to 4/12 on the sheet."

    Miley says: "There are 2 equivalents to 4/12 on the sheet."

    Who is correct? Prove your answer

**F. Which two fraction groups do not have any equivalent fractions in the diagram?

What type of number are the denominators of those two families?

**G. What fraction family (not on the sheet) will give me the first fraction equivalent to 1/7 ?

Karen makes a fraction using two number cards.

She says,

'My fraction is equivalent to $\frac{1}{2}$

 One of the number cards is 6'

but has four pieces instead of seven.

Can they eat an equivalent fraction of their bars?

Explain your answer.

					What could Karen's fraction be? Give both possible answers.	
	2020 Guidance and progression		**4F–2** Convert mixed numbers to improper fractions and vice versa.	**5F–2** Find equivalent fractions and understand that they have the same value and the same position in the linear number system.		
5	Compare and order fractions whose denominators are all multiples of the same number.	"Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers Paper shapes that can be cut up.	Shading parts of a diagram. (Not always circles or squares.) 	Number sentences Missing numbers Missing symbols GT and LT symbols Move the equals sign Bar Model / Fraction wall	Choose numbers for each numerator to make this number sentence true. $$\frac{}{15} > \frac{}{5}$$	Russell says that $\frac{3}{8}$ is greater than $\frac{3}{4}$ because 8 > 4. Do you agree? Explain your reasoning. Which is closer to 1? $\frac{7}{8}$ or $\frac{23}{24}$ Explain how you know.

| | | | | Draw diagrams to show that this number sentence is incorrect: $$\frac{13}{16} > \frac{7}{8} > \frac{3}{4}$$ **Kaci reads ¾ of her book one night then 1/8th of her book the next night. How much of her book did she read in total? How much has she got left to read? | Mr Moore thinks three fifths is closer to a half than four tenths. Is Mr Moore correct? Can you prove it calculations? Convince Mr Moore of your answer with some diagrams. **Kyle and Dominic are comparing the two fractions below: $\frac{5}{4}$ and $\frac{17}{20}$ Kyle says " I don't need to convert 5/4 into twentieths to know that 5/4 is larger than 17/20. Explain how Kyle knows this. |

Shape, space, measure and statistic opportunities:

Comparing fractions of length, weight and volume.

| 5 | Add and subtract fractions with the same denominator and denominators that are multiples of the same number. | Numicon! Think of staff meeting example. "Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers | Shading parts of a diagram. (Not always circles or squares.) Cutting up fractions to add or subtract which emphasises the size doesn't change, just the number of parts. | Number sentences Missing numbers Missing symbols GT and LT symbols Move the equals sign Bar Model / Fraction wall Complete these number pyramids, where each block is | Liam and Caitlin each have a bar of chocolate. They eat the shaded amount of each bar shown below: **Liam**   **Caitlin** | Victoria has a bag of sweets. She says: *"I'm going to give three fifths of the bag to Harvey and $\frac{14}{20}$ of the bag to Kieran"* |

		Paper shapes that can be cut up.		the sum of the two blocks directly underneath. $\frac{9}{10}$ $\frac{1}{10}$ $\quad 0$ $\frac{6}{8}$ $\frac{4}{8}$ $\quad \frac{1}{2}$ $\frac{6}{12}$ $\quad \frac{2}{3}$ $\quad \frac{1}{4}$	How much did they eat in total? Mr Moore and Ms Palk have a chocolate cake each. Mr Moore eats three quarters of his and Ms Palk eats ½ of hers. How much cake do they eat in total? How much cake is left? Daniel uses the following representation to show that: $\frac{7}{8} + \frac{5}{8} = \frac{12}{16}$ Is he correct? If not, explain why.	Prove that Victoria cannot do this. Ole has 7/8ths of a whole bar of chocolate and then eats 3/8ths of the whole bar. Ole says: "*I have half a bar of chocolate left*" Grace says *"You can't have a half because that would give you a denominator of 2, you should have a denominator of 8.* Explain why Ole is correct.

Shape, space, measure and statistic opportunities:

Adding fractional lengths / weights. Finding the perimeter of regular shapes with fractional lengths.

| 5 | Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements greater than 1 as a mixed number [for example, 2/5 | "Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers | Shading parts of a diagram. (Not always circles or squares.)

Below are six shaded amounts. For each, write the amount shaded as an improper fraction on the left and a mixed | Number sentences

Missing numbers

Missing symbols

GT and LT symbols

Move the equals sign

Bar Model / Fraction wall | Jamie eats 7/8 of a pizza and Sarah eats 5/8 of a pizza. How much did they eat altogether?

Give your answer as a mixed number.

**Insert numerators to make this number sentence correct: | Tim has 2 1/2 cakes and Julie has nine quarters of cake. Who has more? Prove your answer.

Write 3 **improper fractions that are equivalent to **5**.

***Can you describe the relationship between the denominator and the numerator |

	+ 4/5 = 6/5 = 1 1/5]. **Pictorial is the most powerful way of embedding pupil's understanding of the concept.** **This was introduced in Y4 as a non-statutory objective that was covered in 2020/21. Pre-teach / DA to determine how much they recall and proceed from there.**	Paper shapes that can be cut up.	number on the right.	Draw arrows to show the position of these fractions on the number line. The first one has been done for you. A $\frac{7}{10}$ B $\frac{13}{10}$ C $\frac{3}{2}$ D $\frac{19}{10}$ E $\frac{6}{5}$	$3\dfrac{\ }{5} < \dfrac{\ }{5}$	for **all** improper fractions that are **equivalent to 5**?
5	Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. **There are two methods to multiplying mixed numbers by wholes; either convert to mixed, multiply and convert the product back into a mixed number or**	"Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers Paper shapes that can be cut up.	Shading parts of a diagram. (Not always circles or squares.)	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model / Fraction wall	Mrs Powell uses 2 and 3/5 packs of paper a week. What's the smallest order of whole packs she can ask Mrs George for to ensure she has enough for six weeks? **C. Compare these calculations using <, > or =: $3 \times 3\frac{5}{8}$ ☐ $4 \times 2\frac{3}{8}$	Mr Moore wants to give each of his sixteen Year 5 pupils 1 and 1/2 apples for their class treat. He has 20 apples. Does Mr Moore have enough apples? Prove your answer. Sarah, Harry and Zidane are calculating 6 x 2 and 3/4 Sarah says: "The product is 16 2/4"

	partition the mixed number into whole and proper fraction, multiply each part and then combine. The second method is the most efficient, as it keeps the numbers small, which makes converting the improper fraction back to mixed easier.				Prove your response.	Harry says: "The product is 66/4 Zidane says: "The product is 16 1/2" Who is correct? Explain why. Dominic says: *"Because multiplication is commutative* *$3 \times 4\frac{2}{5}$ will give the same* *product as $4 \times 3\frac{2}{5}$."* Do you agree with Dominic? Can you find any examples that will work by swapping the **whole number multiplier and the whole number in the mixed number?**

Shape, space, measure and statistic opportunities:

Areas of squares and rectangles for 2-star questions.

| 5 | Read and write decimal numbers as fractions [for example, 0.71 = 71/100]. | Coins Rulers / Metre sticks / other measurement equipment | Place value charts Number lines Which diagram is **incorrect?** Explain your answer. | Number sentences Missing numbers Missing symbols Move the equals sign Bar Model If the pupils can say the decimal fraction / number using the correct place value then it will | Shania beat the school record for the 400-meter hurdles by seven hundredths of a second. Write seven hundredths as a decimal. One Canadian dollar is valued at 0.96 of a US dollar. One Canadian | Sarah has 0.75 of a metre of wood, Jim has 82/100 of a metre of wood and Ashley has 8/10 of a metre of wood. Who has the longest piece of wood? Prove and explain your answer. |

already be in a fraction e.g. 0.3

$= \text{three tenths} = \dfrac{3}{10}$

2.54 = two and fifty-four

$\text{hundredths} = 2\dfrac{54}{100}$

How many different ways can you complete the part-whole model using fractions and decimals?

Now complete the following part-whole models using a mixture of fractions and decimals.

dollar is valued at what fraction of a US dollar?

For each colour write its representation as a fraction and a decimal

| 5 | Recognise and use thousandths and relate them to tenths, hundredths and decimal | Coins

Rulers / Metre sticks / other measurement equipment | Place value charts

Number lines

Two videos from sports, the first showing when | Number sentences

Missing numbers

Missing symbols

Move the equals sign | An imperial pint is equivalent to 568ml.

Write 568ml as a fraction of a litre. | Mrs Powell is looking at the following fraction: |

| equivalents. | (millimetre to metre and millilitre to litre conversions)

Thousand diene cube plus hundreds, tens and ones dienes | hundredths of a second isn't accurate enough:

https://www.youtube.com/watch?v=o1eCskUlrZE

(38secs onwards)

And when thousandths aren't enough:

https://www.youtube.com/watch?v=KVpi5IhzBDY | Bar Model

If the pupils can say the decimal fraction / number using the correct place value then it will already be in a fraction e.g. 0.3 = three tenths = $\frac{3}{10}$

2.54 = two and fifty-four hundredths = $2\frac{54}{100}$ | Complete this equation:

$$\frac{}{100} = \frac{600}{1000} = \frac{300}{}$$

Miss Palk measures 3 objects:

Pencil = 132mm

Ruler = 30cm

Whiteboard = 0.4m

What is the total length of the three objects?

Give your answer as a decimal and fraction of a metre | $$\frac{13}{1000}$$

She is trying to find an equivalent with a denominator of one hundred.

**Explain why she cannot do this.

***Are there any other amounts of **thousandths** that cannot be simplified to either **hundredths or tenths?** How would you describe these numbers? |
|---|---|---|---|---|---|

Shape, space, measure and statistic opportunities:

Dividing litres, kilometres and kilograms into equal parts. Relate back to Y4 non-statutory guidance:

NPV–4 Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts.

5	Read, write, order and compare numbers with up to three decimal places	Coins Rulers / Metre sticks / other measurement equipment	Place value charts Number lines	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model	(see below)	(see below)

Column 6:

Name	Time (seconds)
Nick	39.82
Felix	40.09
Adam	40.13
Gabs	39.56

The table shows the times of some children in a 200-metre race.

a) Who won the race?

b) Whose time is nearest to 40 seconds?

Write a number that is more than 10.04 and less than 10.05.

Write a number with **three decimal places** that is between the two numbers below:

8.3 ☐ 8.52

***Look at the statement below:

$$\frac{457}{1000} < \boxed{} < 0.8$$

Column 7:

Amber says:

"13.85 must be greater than 13.9 because they have the same number of tens and ones but after the decimal point 85 is greater than 9."

Is this true or false? Explain your answer.

Name	Time (seconds)
Nick	39.82
Felix	40.09
Adam	40.13
Gabs	39.56

Marcus ran in a different 200 m race. He looked at his time and said, "If I had been in your race, I would have finished fourth out of five". Write what his time could have been. Explain your answer.
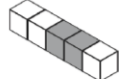
					How many different **2 decimal place numbers** would satisfy the statement?	
5	Round decimals with two decimal places to the nearest whole number and to one decimal place.	Coins Rulers / Metre sticks / other measurement equipment	Place value charts Number lines	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model	Barney throws a javelin 16.4 metres on his first attempt and 15.9 metres on his second attempt. What is Barney's combined throwing distance, rounded to the nearest metre. Here are four digit cards. 9 4 1 2 Use each digit card once to make the decimal number nearest to 20 ⬜⬜.⬜⬜ **Joshua goes to the shop and buys the following items: Tea bags: £1.55 1 pint of milk: 62p A bag of sugar: £1.07	Mr Moore has some money in his pocket. If he rounds the amount to the nearest pound, he has £3.00. What's the least amount of money Mr Moore could have in his pocket? What's the most amount of money Mr Moore could have in his pocket? Explain your two amounts. Leo says: "You can't round 22.01 to the nearest whole number because there's a zero in the tenths column." Explain why Leo is **incorrect.** **Can you find 4 different numbers that give the same answer when you round them to

					Find the total cost of Joshua's shopping (i) Rounded to the nearest pound (ii) Rounded to the nearest 10p	the nearest tenth and to the nearest whole number? ***Kyle says: "There are only ten possible answers for question above." Kyle is incorrect. Explain why, giving examples. Is there a set number of possibilities for the question above?

<table>
<tr><td colspan="7" style="background:green">Shape, space, measure and statistic opportunities:

Rounding money to the nearest pound. Rounding lengths to the nearest metre. Rounding time to the nearest minute</td></tr>
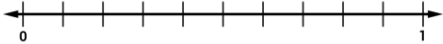<tr>
<td>5</td>
<td>Solve problems involving number up to three decimal places.</td>
<td>Coins

Rulers / Metre sticks / other measurement equipment</td>
<td>Place value charts

Number lines</td>
<td>Number sentences

Missing numbers

Missing symbols

Move the equals sign

Bar Model</td>
<td>A bag of 5 lemons costs £1.

A bag of 4 oranges costs £1.80

How much **more** does one orange cost than one lemon?

Write three decimals, **each greater than zero**, which add together to make a total of **0.01**

☐ + ☐ + ☐ = 0.01

Jane is constructing a fence with a square perimeter. She has 13.5</td>
<td>Mr Moore wants to share out a cake. He promises Victoria 0.355, Cristiano four-tenths and Ole 38/100.

Can Mr Moore keep his promise?

Explain why / why not?</td>
</tr>
</table>

metres of fence panels and wants to use it all to make her fence.

What is the length of one of sides of the fence?

Complete this pyramid, where each block is the **sum** of the two blocks directly underneath:

	4.999		
1.35	1.4		

The children at Farmfield School are collecting money for charity.

Their target is to collect £360

So far they have collected £57.73

How much **more** money do they need to reach **half** their target?

| 2020 Guidance and progression | **3F–4** Add and subtract fractions with the same denominator, within 1. | **4F–3** Add and subtract improper and mixed fractions with the same denominator, | **5F–3** Recall decimal fraction equivalents for ½ ,1/4 , 1/5 and 1/10 , and for multiples of these proper fractions. | | |

			including bridging whole numbers.			
5	Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.	Counters Objects Coins Hundreds, tens and ones dienes Rulers / Metre sticks / other measurement equipment	Place value charts Number lines	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model	Label the following on the number line: a. 30% b. 80% c. 100% d. 25% e. 5% f. 45% Mr Moore has done some percentage to decimal or fraction conversions. Mark his questions with a tick if correct or a cross and correct answer if he's wrong: i. 98% = 0.98 ii. 68% = 86/100 iii. 70% = 0.07 iv. 10/100 = 0.01	Sarah got 75/100 in a long maths test and 8/10 in a short maths. Sarah says *My score has gone up 5%* Do you agree with Sarah? Explain your answer. Casey, Matthew and Kieran are trying to share out a cake. Casey would like $^{30}/_{100}$ of the cake. Matthew would like 0.45 of the cake. Kieran would like 25% of the cake. Can all three children get what they want? Explain why / why not.

| 5 | Solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25. | Counters

Objects

Coins

Hundreds, tens and ones dienes

Rulers / Metre sticks / other measurement equipment

"Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers

Paper shapes that can be cut up. | Place value charts

Number lines | Number sentences

Missing numbers

Missing symbols

Move the equals sign

Bar Model | For each model, write the fraction, percentage and decimal of the cubes that are black.

 |

0.12 off

15% off

Which car is the better deal? Explain your reasoning.

There are 33 children in Class 6.

Adam says, "50% of the class are girls."

Explain why Adam **cannot** be correct. |

					Sale! Was **£60** Now **1 / 2** price Now costs: £	
					Sale! Was **£80** Now **1 / 4** off You save: £	
					Sale! Was **£30** Now **10%** off Now costs: £	
					Sale! Was **£200** Now **2/5** off You save: £	

Year 6

Objectives running through the unit	[EXS] Use written division methods in cases where the answer has up to two decimal places. Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.				
Year group:	**NC L.O.**	**Practical**	**Pictorial**	**Abstract**	**Problem Solving**	**Reasoning**
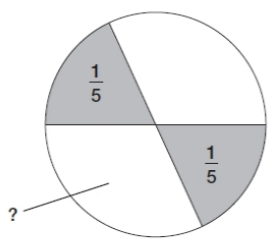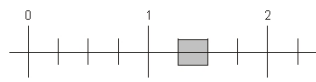
Year group:	NC L.O.	Practical	Pictorial	Abstract	Problem Solving	Reasoning
6	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.	"Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers Paper shapes that can be cut up.	Shading parts of a diagram. (Not always circles or squares.)	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model / Fraction wall Write these sets of fractions in the same denominator: A. $\frac{1}{4}$ and $\frac{1}{5}$ B. $\frac{3}{5}$ and $\frac{5}{6}$ C. $\frac{5}{8}$ and $\frac{9}{10}$ D. $\frac{4}{5}, \frac{2}{3}$ and $\frac{1}{6}$ Here is a number line. Draw an arrow to show the position of	Skye and Harley share some cake. Harley eats half of the cake and Skye eats 3/5 of the cake. How much cake did they eat altogether? How much cake is left? Addison and Tegen have been saving some of their pocket money this month. Addison saved 5/7 of his money and Tegen saved 3/4 of her money. Who saved the largest fraction of their money?	Lily, Maisie and Taima want to share a pizza. Lily wants 1/3, Maisie wants 3/5 and Taima wants 1/4. Will one pizza be enough? Explain how you know. https://nrich.maths.org/12935 as a 3-star investigation.

$$\frac{13}{32}$$

$\frac{1}{8}$ $\frac{2}{8}$ $\frac{3}{8}$

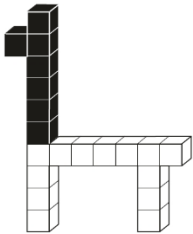|	2020 Guidance and progression	**3F–1** Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts.			**6F–1** Recognise when fractions can be simplified and use common factors to simplify fractions.	
		3F–2 Find unit fractions of quantities using known division facts (multiplication tables fluency).		**5F–1** Find non-unit fractions of quantities.	**6F–2** Express fractions in a common denomination and use this to compare fractions that are similar in value.	
6	Compare and order fractions, including fractions greater than 1.	"Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers Paper shapes that can be cut up.	Shading parts of a diagram. (Not always circles or squares.) Only a fraction of each whole rod is shown. Using the given information, identify which whole rod is longer.	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model / Fraction wall	Josh and Laura have identical cars. Josh has used 4/7 of the petrol in his car, Laura has used 5/9 of the fuel in hers. Who has more fuel left in their tank? Miss Goatman ran the length of 2 3/4 football pitches and Mr Moore ran 2 11/16 lengths of the same pitch. Who ran further?	7/8 23/24 100/96 Which fraction is the closest to 1? Explain your reasoning.

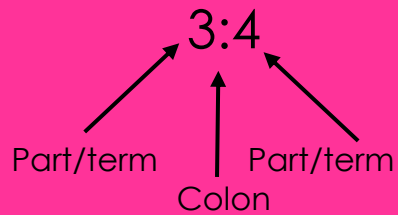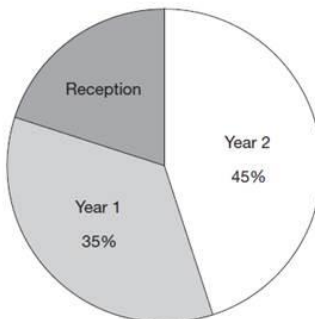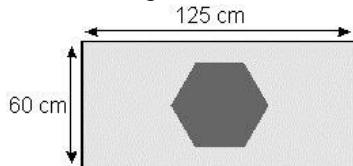|			Explain your reasoning.			
	2020 Guidance and progression	**3F–2** Find unit fractions of quantities using known division facts (multiplication tables fluency).		**5F–1** Find non-unit fractions of quantities.	**6F–2** Express fractions in a common denomination and use this to <mark>compare fractions that are similar in value.</mark>	
		3F–3 Reason about the location of any fraction within 1 in the linear number system.	**4F–1** Reason about the location of mixed numbers in the linear number system.		**6F–3** Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.	
6	[EXS] Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.	"Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers Paper shapes that can be cut up.	Shading parts of a diagram. (Not always circles or squares.)	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model / Fraction wall	Skye and Ashley are painting a room. Skye brings along 3 ½ litres of paint and Ashley brings 4 2/3 litres of paint. How much paint do they have altogether? Faye, Harley and Cory are wrapping a present. If Faye has 2 1/2 lengths of paper, Harley has 3 1/3 lengths and Cory has 4 1/4 lengths. Do they have enough to wrap a present requiring 10 lengths? A tank has 82 3/4 litres of water. 24 4/5 litres were used and the tank was filled with another 18 3/4 litres. What is the final volume of water in the tank? Give your answer as a mixed number and as an improper fraction. **The school measures out a new extension for the meadow. The meadow is a rectangle 2/9 Km wide and Km 3/4 long.	A teacher wants to share some pencils between 2 groups of children, offering one group 3/4 and the other 2/5 of the pencils. Explain how you could add the fractions to show this is not possible.
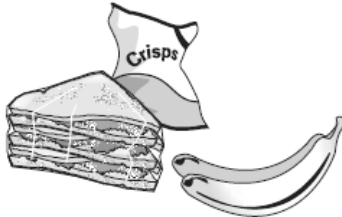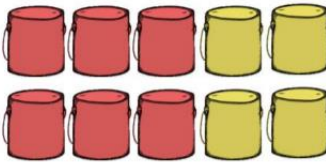
					What is the **perimeter** of the extension?	
6	[EXS] Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, 1/4 × 1/2 = 1/8].	"Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers Paper shapes that can be cut up.	Shading parts of a diagram. (Not always circles or squares.)	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model / Fraction wall	In each number sentence, replace the boxes with different whole numbers less than 20 so that the number sentence is true. $$\frac{1}{\Box} \times \frac{3}{\Box} = \frac{\Box}{\Box}$$ Shyan has a bar of chocolate. She gives half of it to Jago. Jago then gives 1/6 of his part to Mr Moore. How much of the whole bar does Mr Moore receive?	Jake cuts a pizza into equal slices. Harley takes one of Jakes pieces and then cuts that into equal slices. If one of Harley's slices is one-twelfth of the whole pizza how could Jake and Harley have cut the pizza?

Shape, space, measure and statistic opportunities:

Calculating area rectangles with fractional measurements.

| 6 | [EXS] Divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 1/6]. | "Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers

Paper shapes that can be cut up. | Shading parts of a diagram. (Not always circles or squares.) | Number sentences

Missing numbers

Missing symbols

Move the equals sign

Bar Model / Fraction wall | In this circle, each shaded part is $\frac{1}{5}$ of the area of the circle.
The two white parts have equal areas.

Not drawn accurately

$\frac{1}{5}$ $\frac{1}{5}$?

What fraction of the circle is **one** of the white areas? | Explain, using visual representations, why:

2/3 ÷ 4 = 1/6 |

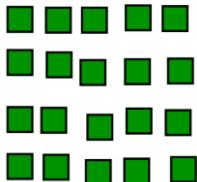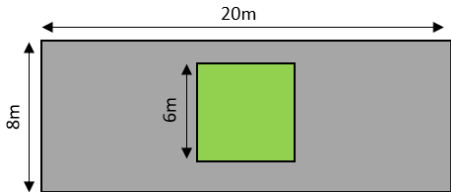| 6	[EXS] Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8].	"Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers Paper shapes that can be cut up.	Shading parts of a diagram. (Not always circles or squares.) Diagrams that have multiple objects.	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model / Fraction wall	Part of this number line is shaded. Circle **all** the numbers below that belong in the shaded part of the number line. 1.1 1.4 $1\frac{1}{3}$ $1\frac{1}{5}$ Join each fraction to the correct decimal card. The first one has been done for you. 	If you know that: $\frac{5}{11}$ = 0.454545 … Explain how you can use this to find a fraction equivalent of: 0.0454545 …
6	[EXS] Multiply one-digit numbers with up to two decimal places by whole numbers.	Counters Objects Coins Hundreds, tens and ones dienes Rulers / Metre sticks / other measurement equipment	Place value charts Number lines	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model	Pot plants cost £2.65 each. Lily buys 6 plants. She pays with a £20 note. How much change does she get? 	What is the largest product you can get from this blank calculation? ☐ . ☐ ☐ X ☐ Explain why. Skye says "If you multiply a number with 2 decimal places by a whole number

					Three identical bricks have the same mass as two concrete blocks. Each brick has a mass of 1.72 kg. What is the mass of one concrete block?	you'll always get a product that has 2 decimal places. Mr Moore disagrees and gives the calculations 1.15 x 2 and 1.25 x 4 as proof. Who is correct? Can they both be correct?
	Shape, space, measure and statistic opportunities: Calculating area and perimeter of shapes with decimal measurements. (Only do 1 side decimal for area)					
6	[EXS] Solve problems which require answers to be rounded to specified degrees of accuracy.	Counters Objects Coins Hundreds, tens and ones dienes Rulers / Metre sticks / other measurement equipment	Place value charts Number lines	Number sentences Missing numbers Missing symbols Move the equals sign Bar Model	Some children work out how much money two shopkeepers get from selling fruit. They use pie charts to show this. Mrs Binns gets £350 selling bananas. Estimate how much she gets selling oranges. A bus company has 62 minibuses. On average, each minibus travels 19 miles on a gallon of fuel and goes 284 miles each day. The Company says it needs about 1000 gallons of fuel every day.	

					Approximate these numbers and make an estimate to show whether what the company says is about right. You must show how you got your answer.	
6	[EXS] Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.	Counters Objects Coins Hundreds, tens and ones dienes Rulers / Metre sticks / other measurement equipment "Cuttable" food items, pizzas, cake, apples. Include non-circular items, such as cucumbers Paper shapes that can be cut up.	Place value charts Number lines	Number sentences Missing numbers Missing symbols GT and LT symbols Move the equals sign Bar Model	This model is made with 20 cubes What percentage of the cubes in the model is black? A cat sleeps for 12 hours each day. 50% of its life is spent asleep. Write the missing percentage. A koala sleeps for 18 hours each day. ? % of its life is spent asleep	Liam did a survey of 55 people to see how many were left-handed. Liam says, *'The results show that exactly 10% of the people in the survey are left-handed.'* Explain why Liam cannot be correct.

Ratio			Definition		Vocabulary	Structure
			A ratio is the comparison of two values of the same kind, which may be written as a to b, a:b or as a fraction a/b. Ratios may have more than 2 terms e.g. A:B:C		Ratio Relative size Scaling Unequal sharing Simplified ratio Fractional equivalent	3:4 Part/term Part/term Colon

| Year group:	NC L.O.	Practical	Pictorial	Abstract	Problem Solving	Reasoning
6	[EXS] Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison.	Counters Objects Coins	Percentages of amounts shaded	Find these percentages of amounts: *A. 20% of 420 *B. 75% of 320 *C. 80% of 500 *D. 15% of 80 *E. 3% of 1200 *F. 11% of 50 *G. 32% of 150 *H. 65% of 660 *I. 125% of 48 *J. 98% of 250	**250 000** people visited a theme park in one year. **15%** of the people visited in April and **40%** of the people visited in August. How many people visited the park in the rest of the year? The pie chart shows the Year groups of children at Woodland Infant School. There are **56** children in **Year 1**. How many children are there in Reception?	Liam did a survey of 55 people to see how many were left-handed. Liam says, '***The results show that exactly 10% of the people in the survey are left-handed.***' Explain why Liam cannot be correct.

					Here is a flag: The hexagon takes up 20% of the flag What is the **area** of the hexagon?	
6	Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.	Ratios of objects	Complete the sentences. For every two blue flowers there are ____ pink flowers. For every blue flower there are ____ pink flowers. Complete: The ratio of red counters to blue counters is ☐ : ☐ The ratio of blue counters to red counters is ☐ : ☐		David and his friends prepare a picnic. Each person at the picnic will get: ➢ **3** sandwiches ➢ **2** bananas ➢ **1** packet of crisps The children pack 60 sandwiches. How many bananas do they pack? There are 40 children in the lunch queue, including Nik. Nik says,	Tick the correct statements There are two yellow tins for every three red tins. There are two red tins for every three yellow tins. The ratio of red tins to yellow tins is 2 : 3 The ratio of yellow tins to red tins is 2 : 3 Explain which statements are incorrect and why.

|					'There are twice as many children in front of me as there are behind me'. How many children are in front of Nik?	
6	Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.	Unequal sharing of counters between two or more groups.	Share the squares below in the ratio 2:3	Share 600 in the ratio 3:5 Andy writes a ratio **equivalent** to 4:5. One of Andy's numbers is 64. What could the other number be? Could you give both possible answers?	Sapna makes a fruit salad using bananas, oranges and apples. For every one banana, she uses 2 oranges and 3 apples. Sapna uses 24 fruits. How many oranges does she use? A gardener plants tulip bulbs in a flower bed. She plants 3 red bulbs for every 4 white bulbs. She plants 84 bulbs altogether. How many white bulbs does she plant? **Mary, Kate and Ashley share some money in the ratio 7:3:2. If Ashley receives £28, how much does Mary receive? How much money was shared out in total?	Dylon, Jack and Jacob are trying to share out some PS5 games in the ratio 3:4:5 There are 90 games to share out. Can the 3 complete the task? Explain why / why not.
6	Solve problems involving similar shapes where the scale factor is known or can be found.			Draw the shape on the right, scaled by a ratio of 1:3.	**Amber has a square patch of grass in the middle of a patio, as in the diagram below:	* Ben says *"I scaled the hexagon on the left by a factor of two to get the shape on the right".* Do you agree with Ben's drawing?
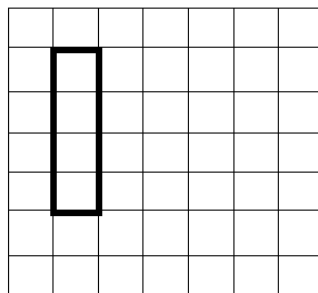
Draw the shape on the right, scaled by a ratio of 1:2.
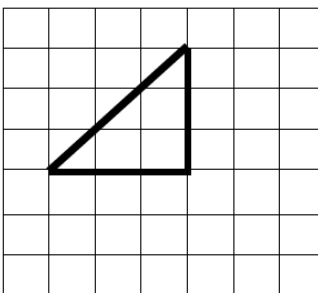
Ashleigh creates a similar design scaled in the ratio 2:1.

What is the **area** of Ashleigh's patio?
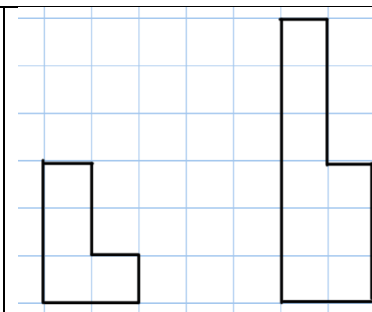
*** Mr Moore says:

"If you scale a square by a ratio of 1:2 the area of the new square will be double the area of the original square"

Investigate this, is Mr Moore correct?