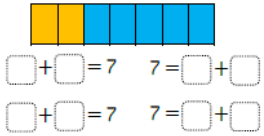
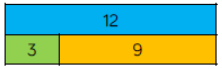
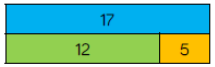
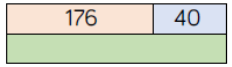
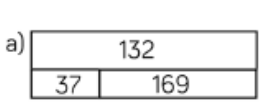
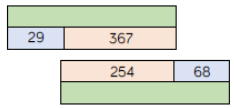
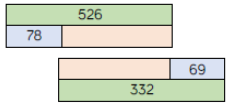
Bar Model Progression

Last Updated 13.10.21

In each area of the White Rose scheme or work the children should understand and be able to draw models as a method for each area stated below. The bar models are used within the end of unit assessments so children need to be aware of these to access them.

When doing anything with word problems please model this using bar model where possible, as it is assumed that children can do this in White Rose and KS2 SATs maths problems are lending themselves to the use of bar model.

Useful website for modelling the bar model: https://www.mathplayground.com/thinkingblocks.html

	Year 1	Year 2	Year 3
Au Blk 1	Place Value	Place Value	Place Value
Au Block 2	Addition and Subtraction Fact Families Complete the number sentences.  □ + □ = 7 7 = □ + □ □ + □ = 7 7 = □ + □	Addition and Subtraction Fact Families  Using the inverse Can you use the inverse operation to check 5 + 12 = 17?  How many possible inverse calculations are there? Comparing number sentences How can we use the following representation to prove 5 + 3 = 4 + 4? 	Addition and subtraction Adding 3 digit numbers and tens Complete the bar model.  Two digit and three digit numbers   

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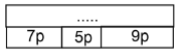
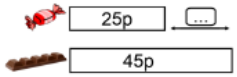
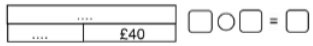
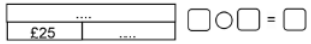
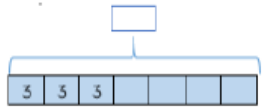
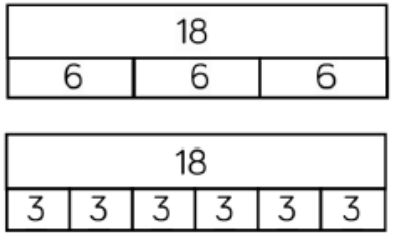
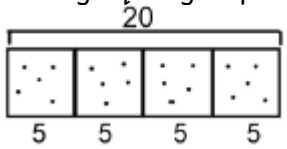
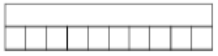
Au Block 3	Geometry	Measurement: Money Counting money Complete the bar models.  Finding the difference  Two step problems Rachel has £33 in her money bank, and gets £40 more. Fill in the bar model to show her total.  She then buys a top for £25. Complete the bar model to show how much she has left.  	Multiplication and division Multipling by 3, 4 and 8 There are 7 tricycles in the playground. How many wheels are there altogether? Compete the bar model to find the answer.  Dividing by 3, 4 and 8 Which bar model matches the problem? 
Au Blk 4	Place Value Within 20	Multiplication and Division	
Spr Block 1	Addition and Subtraction	Multiplication and Division Making equal groups  Dividing by 10 Apples can be sold in packs of 10 How many packs can be made below? When 30 apples are sold in packs of 10, ___ packs of apples can be made. Can you show this in a bar model? 	Multiplication and Division

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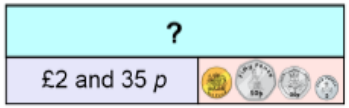
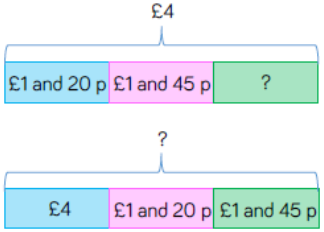
Spr Block 2	Place Value to 50	Statistics	Measurement: Money Adding money Represent the bar model with a calculation and solve it.  Giving Change Sam goes to the shop with £4 He buys a book for £1 and 20 p and a pencil that costs £1 and 45 p. How much change does he get? Which bar model represents the problem? 
Spr Blk 3	Length and height	Properties of shape	Statistics

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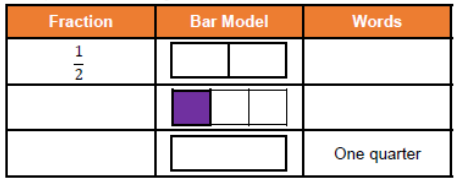
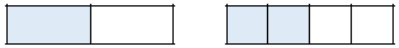
Spr Block 4	Weight and Volume	Fractions Unit and non-unit fractions Complete the missing information.  Equivalence of $\frac{1}{2}$ and $\frac{1}{4}$ Using two identical strips of paper, explore what happens when you fold the strips into two equal pieces and four equal pieces. Compare on of the two equal pieces with two of the four equal pieces.  Count in fractions 	Length and perimeter

Fraction	Bar Model	Words
$\frac{1}{2}$		
		One quarter

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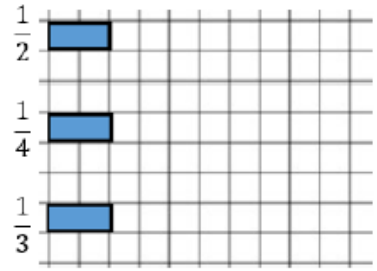
Spr Block 5		Length and Height	Fractions Making the whole Here are four fractions of four different bars. Can you draw the whole bar for each?  Tenths as decimals Write the fractions and decimals shown.

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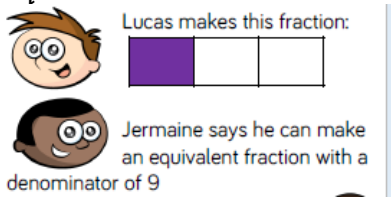
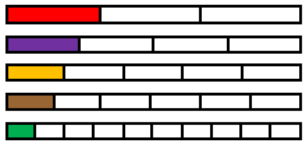
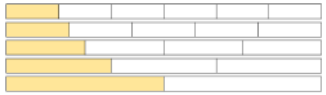
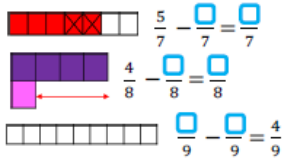
Su Blk 1	Multiplication and Division	Position and Direction	Fractions Equivalent Fractions  Comparing fractions Using the fraction strips below, use the >, < or = symbol to compare the fractions.  Ordering Fractions Split strips of paper into halves, thirds, quarters, fifths and sixths and colour in one part of each strip. Now order the strips from smallest to largest.  When the numerators are the same, the _____ the denominator, the _____ the fraction. Subtracting fractions 
Su Blk 2	Fractions		Time
Su Blk 3	Position and Direction	Time	Properties of shapes
Su Blk 4	Place Value	Mass, capacity and temperature	Mass and capacity

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Su Blk 5	Money		
Su Blk 6	Time		

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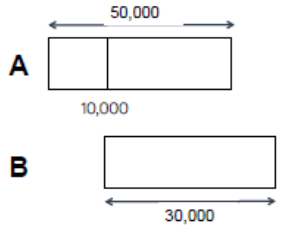
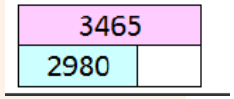
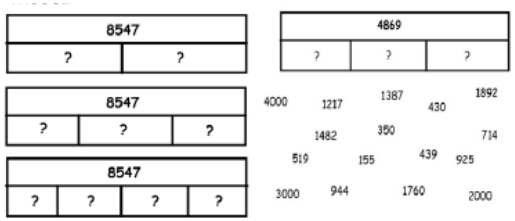
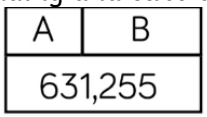
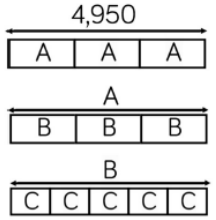
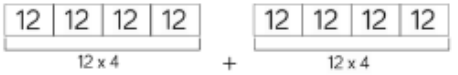
	Year 4	Year 5	Year 6
Au Block 1	Place Value	Place Value	Place Value Comparing and ordering numbers Kayleigh draws bar model A. Her teacher asks her to draw another where the total is 30,000 
Au Block 2	Additioand subtraction Finding missing numbers 	Addition and Subtraction Multi-step Problems 	Four Operations Adding and subtracting integers  Short Division  Reason from known facts 

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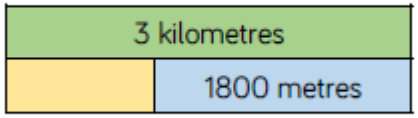
Au Block 3

Measurement

Converting kilometres and metres

Complete the bar model.



Statistics

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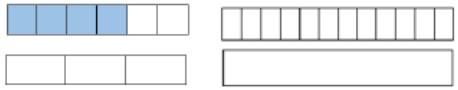
Fractions

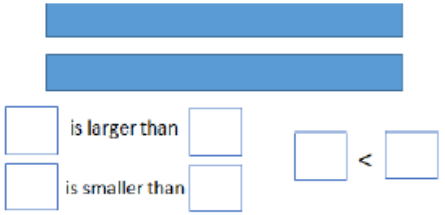
Simplifying fractions

Use the bar models to simplify the fractions.
Make sure your bar model has fewer equal parts than the original fraction.



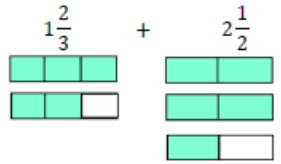
Comparing and ordering fractions

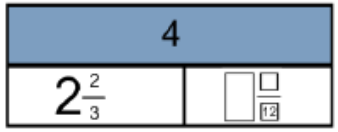
Use the bar models to show $\frac{1}{4}$ and $\frac{2}{3}$ then complete the sentences.



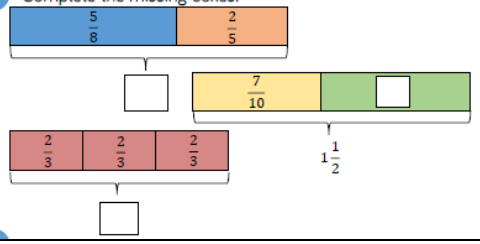
Adding and subtracting fractions

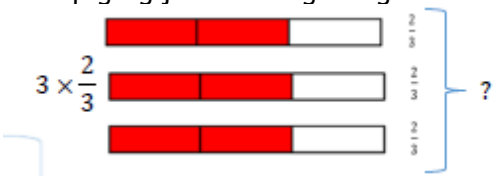
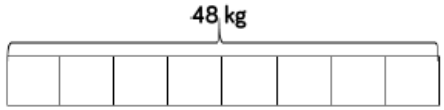
Can you split the bar models so each fraction has the same denominator?





1 Complete the missing boxes.



			Multiplying fractions by integers  Dividing fractions by integers Lee has $\frac{2}{5}$ of a chocolate bar. He shares it with his friend. How much chocolate do they get each? Fractions of amount  Finding the whole Sam has spent $\frac{2}{3}$ of his money. He spent £60, how much did he have to start with?
Au Blk 4	Multiplication and Division	Multiplication and Division	Position and Direction
Au Blk 5		Perimeter and Area	

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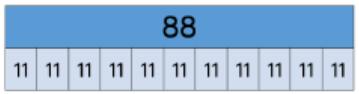
Spr Block 1	Multiplication and Division 11 and 12 times table Sarah used a bar model to show 88 ÷ 11. Explain Sarah's mistake.  Can you represent 88 ÷ 11 using a bar model correctly?	Multiplication and Division	Decimals Division to solve problems A box of chocolates costs 4 times as much as a chocolate bar. Together they cost £7.55

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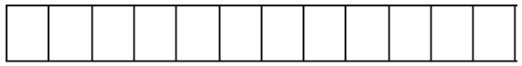
Spr
Block 2

Fractions

Equivalent Fractions

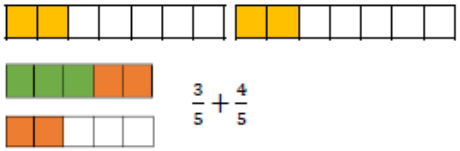
Using the diagram, complete the fractions.



$\frac{1}{4} = \frac{\square}{12}$ $\frac{1}{\square} = \frac{3}{6}$ $\frac{3}{4} = \frac{\square}{8}$ $\frac{5}{12} = \frac{\square}{24}$

Adding fractions

Use the models to add the fractions:

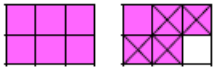


$\frac{3}{5} + \frac{4}{5}$

Subtracting fractions

Use the bar models to subtract the fractions.

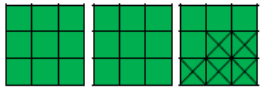
$\frac{6}{7} - \frac{2}{7}$



$\frac{11}{6} - \frac{\square}{6} = \frac{\square}{6}$

$\frac{13}{5} - \frac{\square}{5} = \frac{\square}{5}$

Use cubes to build a model to show $3 - \frac{5}{9} = 2\frac{4}{9}$

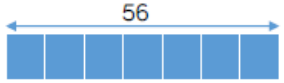


Could you build the cubes in a tower to subtract?

Fractions of a quantity

Use a bar model to help you represent and find:

$\frac{1}{7}$ of $56 = 56 \div \square$



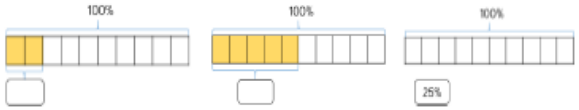
a. $\frac{2}{7}$ of 56 b. $\frac{3}{7}$ of 56 c. $\frac{4}{7}$ of 56 d. $\frac{4}{7}$ of 28

Calculate Quantities

Decimals and Percentages

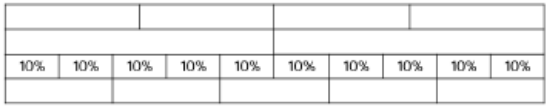
Understanding percentages

Record the percentages shown.



Equivalent fraction, decimal and percentages

Use the bar models to convert the fractions into a percentage and a decimal.



$\frac{1}{2}$ is equivalent to ____ & ____ $\frac{1}{4}$ is equivalent to ____ & ____

$\frac{3}{10}$ is equivalent to ____ & ____ $\frac{1}{5}$ is equivalent to ____ & ____

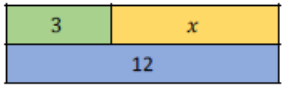
Algebra

One step equations

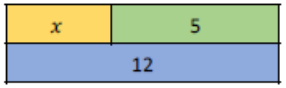
Match each equation to the correct bar model then solve.

$x + 5 = 12$

$3x = 12$



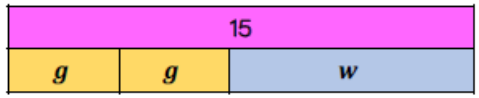
$12 = 3 + x$



Enumerate possibilities

$2g + w = 15$

Write down all the possible values for g and w, show each of them in a bar model.



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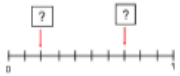
	Use the counters and bar models to calculate the whole: There are ____ counters in one part. $\frac{1}{4}$ = ____ counters $\frac{2}{4}$ = ____ counters $\frac{3}{4}$ = ____ counters $\frac{4}{4}$ or 1 whole = ____ counters There are 7 counters in one part. $\frac{1}{4}$ = ____ counters $\frac{2}{4}$ = ____ counters $\frac{3}{4}$ = ____ counters $\frac{4}{4}$ or 1 whole = ____ counters		
Spr Block 3	Decimals Tenths as decimals Write the numbers shown as fractions and decimals.  		Converting Units

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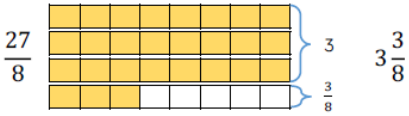
Spr
Block 2

Area

Fractions

Converting between mixed numbers

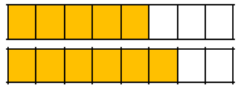
Steve converts the improper fraction $\frac{27}{8}$ into a mixed number using bar models.



Use Steve's method to convert $\frac{38}{8}$, $\frac{27}{6}$, $\frac{47}{7}$ and $\frac{32}{4}$

Compare and order

Use bar models to compare $\frac{5}{8}$ and $\frac{3}{4}$

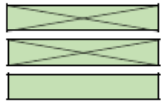


Add and subtract fractions

Here is a bar model to calculate $\frac{3}{5}+\frac{4}{5}$

$\frac{3}{5}+\frac{4}{5}=\frac{7}{5}=1\frac{2}{5}$

Here is a bar model to calculate $3\frac{5}{8}-2\frac{1}{4}$

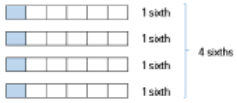


$\frac{5}{8}-\frac{1}{4}=\frac{5}{8}-\frac{2}{8}=\frac{3}{8}$

$3-2=1$

Multiplying by an integer

Work out $\frac{1}{6}\times 4$ by counting in sixths.



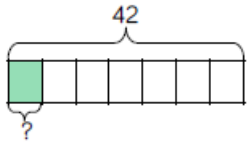
$\frac{1}{6}\times 4=\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=\frac{4}{6}=\frac{2}{3}$

Use this method to work out:

$\frac{1}{3}\times 2$ $\quad$ $\frac{1}{5}\times 3$ $\quad$ $\frac{1}{10}\times 6$

Fraction of amount

Find $\frac{1}{7}$ of 42

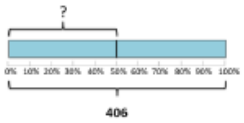


Percentages

Percenatge of amount

Find 50% of 406

50% is equal to a half so we can divide by 2 to find 50%



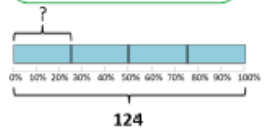
Calculations

$50\% = \frac{1}{2}$

$406 \div 2 = 203$

Use this to find 25% of 124

Which fraction is 124 equivalent to?



Missing values

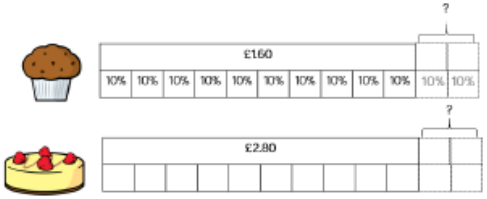
If 7 is 10% of a number, what is the number?

Use the bar model to help you.

Increase and decrease

Janet is increasing the prices in her café by 20%

Calculate the percentage increase for the following items:



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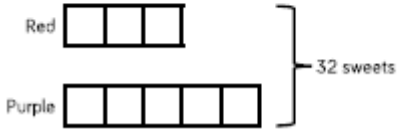
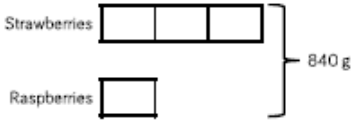
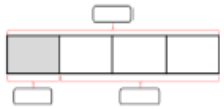
Spr Blk 5			Perimeter, area and volume
Spr Blk 6			Ratio Calculating ratio Emily has a packet of sweets. For every 3 red sweets there are 5 purple sweets. If there are 32 sweets in the packet in total, how many of each colour are there? You can use a bar model to help you.  Ratio and proportion problems A smoothie contains three times as many strawberries as raspberries. The combined weight of the strawberries and raspberries is 840 g. What weight of strawberries is needed? 
Su Blk 1	Decimals	Decimals	Properties of shape
Su Blk 2	Money Four operations Emma has £48. She spends one quarter of her money. How much does she have left? Use the bar model to help. 	Properties of shape	

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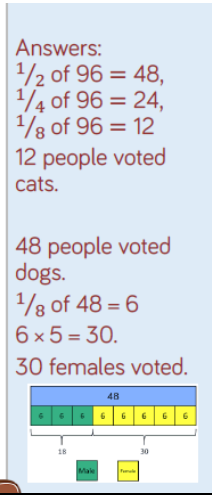
Su Blk 3	Time	Position and Direction	Statistics Interpreting pie charts 96 people took part in this survey. How many people voted for cats? $^3/_8$ of the people who voted for dogs were male. How many females voted for dogs? What other information can you gather from the pie chart? 
Su Blk 4	Statistics	Converting Units	
Su Blk 5	Properties of shape	Volume	
Su Blk6	Position and Direction		

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