Wansbeck Primary School

Gold Star Challenge

Gold Star Challenges

These are challenges that are aimed at children targeted greater depth/ children who have shown a good understanding of their learning and we want to deepen it further.

These are not just problem solving and reasoning problems, these are problems that will allow children to showcase and further stretch their understanding of the main task.

These should be carefully crafted and meaningful tasks to challenge our children. They can be open-ended, allow them to analyse work, correct errors, further explain problems and don't always have a clear or obvious starting point on how to approach the task.

They are separate to the main task (which covers reasoning and problem solving tasks for all children to be challenged by) and are coloured yellow.

Gold Star Challenge

What we are looking for in a Gold Star Challenge

- Ask students to create real-world stories for "naked number" problems.
- Include a prompt that asks students to represent the information another way (with a picture, in a table, a graph, an equation, with a context).
- Use a task "out of sequence" before students have memorized a rule or have practiced a procedure that can be routinely applied.
- Eliminate components of the task that confine student thinking or provide too much scaffolding.
- Create opportunities for repeated reasoning or pattern finding
- Create a prompt that asks students to write about the meaning of the mathematics concept.
- Add a prompt that asks students to make note of a pattern or to make a mathematical conjecture and to test their conjecture.
- Include a prompt that requires students to make a generalisation.
- Include a prompt that requires students to compare solution paths or mathematical relationships and write about the relationship between strategies or concepts.
- Select numbers carefully so students are more inclined to note relationships between quantities (e.g., two tables can be used to think about the solutions to the four, six, or eight tables).

KS1

Spot the mistake / Which is correct?	**True or false**	**What comes next?**	**Do, then explain**	**Make up an example, create a question, calculation connections**
950, 975, 1000, 1250 What is wrong with this sequence of numbers?	31 is a multiple of 2?	46 – 10 = 36 36 – 10 = 26 26 – 10 = 16	37, 13, 73, 33, 3 If you wrote these numbers in order, starting with the smallest, which would be third? Explain how you ordered the numbers.	Create numbers where the ones digit is one less than the tens digit. What is the largest / smallest number?

Possible answer A number rounded to the nearest ten is 40. What is the smallest possible number it could be?	**What do you notice?** Round 3997 to the nearest 1000. Round it to the nearest 100. What do you notice?	**Continue the pattern** $\frac{1}{2} + \frac{1}{2} = 1$ $1\frac{1}{2} + \frac{1}{2} = 2$ $2\frac{1}{2} + \frac{1}{2} = 3$ Continue the pattern	**Missing numbers, symbols, information** Put the correct symbol in < or > in each box 32 ☐ 31	**Working backwards / use the inverse / undoing / unpicking** A film lasting 60 minutes finished at 5pm. At what time did it start?
Hard and easy questions Which questions are easy / hard? 210 – 70 50 ÷4 12 x 4	**What else do you know / use a fact** Half of a sum of money = £24. Make up some other statements	**Fact families** Put 19, 15 and 4 in the boxes to make the number sentences correct □ = □ - □ □ = □ + □	**Convince me / prove it / generalising / explaining thinking** If you add an even number to another even number you get an answer which is even. Convince me.	**Another and another** Write a number which lies between 30 and 50. And another…and another…
Always, sometimes, never Is it always, sometimes or never true that when you fold a square in half you get a rectangle?	**Making links** I have 30p in my pocket in 5p coins. How many coins do I have?	**Ordering** Put these answers in the correct order starting with the smallest 2 x 3, 13 + 7, 12 ÷ 6	**What's the same? What's different?** What is the same and different about these three 2D shapes? 	**Odd one out** Which is the odd one out in this trio? ½ 2/4 ¼
Testing conditions A square has sides of a whole number of centimetres. Which of the following measurements could represent its perimeter? 8cm 18cm 24cm 25cm	**Make an estimate / size of an answer** Can you work out how each estimate might have been made? 93 – 34 = ? 60 61 56	**Complete the pattern** 1 x 10 = 10 10 x 10 = 100 2 x 10 = 20 20 x 10 = 200 3 x 10 = 30 30 x 10 = 300	**Can you find?** Can you find the smallest number that can be added to or subtracted from 23 to make it exactly divisible by 5?	**The answer is…** The answer is 72, what is the question?

Other possibilities	**Visualising**	**Application**	**Write more statements**
One face of a 3D shape looks like this:  What could the shape be? Are there any other possibilities?	In your head picture a rectangle that is twice as long as it is wide. What could its measurements be?	Draw two lines whose lengths differ by 4cm	One battery weights the same as 60 paperclips. One pencil sharpener weights the same as 20 paperclips. Write down some things you know.

Year 1

Number and place value

Spot the mistake:	**True or False?**	**What comes next?**	**Do, then explain**
5,6,8,9 What is wrong with this sequence of numbers?	I start at 2 and count in twos. I will say 9	10+1 = 11 11+1= 12 12+1 = 13	Look at the objects. (in a collection). Are there more of one type than another? How can you find out?

Addition, subtraction, multiplication and division

Continue the pattern 10 + 8 = 18 11 + 7 = 18 Can you make up a similar pattern for the number 17? How would this pattern look if it included subtraction? **Missing numbers** 9 + ☐ = 10 10 - ☐ = 9 What number goes in the missing box?	**Working backwards** Through practical games on number tracks and lines ask questions such as "where have you landed?" and "what numbers would you need to throw to land on other given numbers?" **What do you notice?** 11 – 1 = 10 11 – 10 = 1 Can you make up some other number sentences like this involving 3 different numbers	**Fact families** Which four number sentences link these numbers? 12, 15, 3 **What else do you know?** If you know this: 12 – 9 = 3 what other facts do you know? **Missing symbols** Write the missing symbols (+ - =) in these number sentences: 17 ☐ ☐ 20 18 ☐ ☐ 2	**Convince me** In my head I have two odd numbers with a difference of 2. What could they be? Convince me **Missing numbers** Fill in the missing numbers (using a range of practical resources to support) 12 + ☐ = 19 20 - ☐ = 3
Making an estimate Pick (from a selection of number sentences) the ones where the answer is 8 or 9. **Is it true that?** Is it true that 3+4 = 4 + 3?	**Making links** If one teddy has two apples, how many apples will three teddies have? Here are 10 LEGO people. If 2 people fit into the train carriage, how many carriages do we need?	(Practical) If we put two pencils in each pencil pot how many pencils will we need?	**Spot the mistake** Use a puppet to count but make some deliberate mistakes. e.g. 2 4 5 6 10 9 8 6 See if the pupils can spot the deliberate mistake and correct the puppet

Fractions

What do you notice?	**True or false?** Sharing 8 apples between 4 children means each child has 1 apple.

Choose a number of counters. Place them onto 2 plates so that there is the same number on each half. When can you do this and when can't you? What do you notice?	

Geometry

What's the same, what's different?	**True or false?**	**Working backwards**	**Other possibilities**
Find a rectangle and a triangle in this set of shapes. Tell me one thing that's the same about them. Tell me one thing that is different about them.	All 2-D shapes have at least 4 sides **Visualising** Put some shapes in a bag. Find me a shape that has more than three edges.	The shape below was turned three quarter of a full turn and ended up looking like this.  What did it look like when it started? (practical)	Can you find shapes that can go with the set with this label? "Have straight sides"

Measurement

Top tips	**Explain thinking**	**Application**	**Possibilities**
How do you know that this (object) is heavier / longer / taller than this one? Explain how you know.	Ask pupils to reason and make statements about to the order of daily routines in school e.g. daily timetable e.g. we go to PE **after** we go to lunch. Is this true or false? What do we do before break time? etc.	(Can be practical) Which two pieces of string are the same length as this book?	Ella has two silver coins. How much money might she have?

Year 2

Number and place value

Spot the mistake: 45,40,35,25 What is wrong with this sequence of numbers?	**True or False?** I start at 3 and count in threes. I will say 13?	**What comes next?** 41+5=46 46+5=51 51+5=56	**Do, then explain** Show the value of the digit 2 in these numbers? 32 27 92 Explain how you know.
Make up an example Create numbers where the ones digit is one less than the tens digit. What is the largest/smallest number?		**Do, then explain** 37 13 73 33 3 If you wrote these numbers in order starting with the smallest, which number would be third? Explain how you ordered the numbers.	

Addition, subtraction, multiplication and division

Continue the pattern 90 = 100 – 10 80 = 100 – 20 Can you make up a similar pattern starting with the numbers 74, 26 and 100?	**Missing numbers** 91 + □ = 100 100 - □ = 89 What number goes in the missing box?	**True or false?** Are these number sentences true or false?73 + 40 = 113 98 – 18 = 70 46 + 77 = 123 92 – 67 = 35 Give your reasons.	**Hard and easy questions** Which questions are easy / hard? 23 + 10 = 93 + 10 = 54 + 9 = 54 + 1 = Explain why you think the hard questions are hard?
Other possibilities □ □ □ + = 14 What single digit numbers could go in the boxes? How many different ways can you do this?	**Fact families** Which four number sentences link these numbers? 100, 67, 33	**What else do you know?** If you know this: 87 = 100 – 13 what other facts do you know?	**Missing symbols** Write the missing symbols (+ - =) in these number sentences: 80 □ 20 □ 100 100 □ 70 □ 30 87 □ 13 □ 100

Convince me What digits could go in the boxes? 7 ☐ - 2 ☐ = 46 Try to find all of the possible answers. How do you know you have got them all? Convince me	**Making an estimate** Which of these number sentences have the answer that is between 50 and 60 74 - 13 55 + 17 87 – 34	**Always, sometimes, never** Is it always, sometimes or never true that if you add three numbers less than 10 the answer will be an odd number	**Missing numbers** 10 = 5 x ☐ What number could be written in the box?
Making links I have 30p in my pocket in 5p coins. How many coins do I have?	**Making links** Write the multiplication number sentences to describe this array X X X X X X What do you notice? Write the division sentences.	**Prove It** Which four number sentences link these numbers? 3, 5, 15? Prove it.	
True or false? When you count up in tens starting at 5 there will always be 5 ones.		**Use the inverse** Use the inverse to check if the following calculations are correct: 12 ÷ 3 = 4 3 x 5 = 14	

Fractions

Spot the mistake 7, 7 $\frac{1}{2}$, 8, 9, 10 8 $\frac{1}{2}$, 8, 7, 6 $\frac{1}{2}$, … and correct it	**What comes next?** 5 $\frac{1}{2}$, 6 $\frac{1}{2}$, 7 $\frac{1}{2}$, …., …. 9 $\frac{1}{2}$, 9, 8 $\frac{1}{2}$, ……, …..	**What do you notice?** $\frac{1}{4}$ of 4 = 1 $\frac{1}{4}$ of 8 = 2	**True or false?** Half of 20cm = 5cm $\frac{3}{4}$ of 12cm = 9cm

		$\frac{1}{4}$ of 12 = 3 Continue the pattern What do you notice?	
Odd one out. Which is the odd one out in this trio: $\frac{1}{2}$ $\frac{2}{4}$ $\frac{1}{4}$ Why?	**What do you notice?** Find $\frac{1}{2}$ of 8. Find $\frac{2}{4}$ of 8 What do you notice?	**Ordering** Put these fractions in the correct order, starting with the smallest. $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{3}$	

Geometry

What comes next?  Explain why	**Visualising** In your head picture a rectangle that is twice as long as it is wide. What could its measurements be?	**Always, sometimes, never** Is it always, sometimes or never true that when you fold a square in half you get a rectangle.	**Other possibilities** Can you find shapes that can go with the set with this label? "Have straight sides and all sides are the same length"
Working backwards If I face forwards and turn three quarter turns clockwise then a quarter turn anti-clockwise describe my finishing position.		**What's the same, what's different?** Pick up and look at these 3-D shapes. 	

	Do they all have straight edges and flat faces? What is the same and what is different about these shapes?

Measurement

Top tips Put these measurements in order starting with the smallest. 75 grammes 85 grammes 100 grammes Explain your thinking	**Position the symbols** Place the correct symbol between the measurements > or < 36cm ☐ 63cm 130ml ☐ 103ml Explain your thinking	**Undoing** The film finishes two hours after it starts. It finishes at 4.30. What time did it start? Draw the clock at the start and the finish of the film.	**Explain thinking** The time is 3:15pm. Kate says that in two hours she will be at her football game which starts at 4:15. Is Kate right? Explain why.
Application (Practical) Draw two lines whose lengths differ by 4cm.	**Possibilities** How many different ways can you make 63p using only 20p, 10p and 1p coins?	**Working backwards** Draw hands on the clock faces to show when break started and when it finished 15 minutes later at 10:35.	**The answer is ….** 3 hours What is the question?
What do you notice? What do you notice? 1 hour = 60 minutes $\frac{1}{2}$ hour = 30 minutes $\frac{1}{4}$ hour = 15 minutes			

Write down some more time facts like these	

Statistics

True or false? (Looking at a simple pictogram) "More people travel to work in a car than on a bicycle". **Is this true or false?**	**Convince me.** Make up you own 'true/false' statement about the pictogram
Create a questions Pupils ask (and answer) questions about different statistical representations using key vocabulary relevant to the objectives.	**What's the same, what's different?** Pupils identify similarities and differences between different representations and explain them to each other

KS2

Spot the mistake / Which is correct? 950, 975, 1000, 1250 What is wrong with this sequence of numbers?	**True or false** 38 is a multiple of 8?	**What comes next?** 936 – 10 = 926 926 – 10 = 916 916 – 10 = 906	**Do, then explain** 37, 13, 73, 33, 3 If you wrote these numbers in order, starting with the smallest, which would be third? Explain how you ordered the numbers.	**Make up an example, create a question, calculation connections** Create numbers where the ones digit is one less than the tens digit. What is the largest / smallest number?
Possible answer A number rounded to the nearest ten is 540. What is the smallest possible number it could be?	**What do you notice?** Round 343997 to the nearest 1000. Round it to the nearest 10000. What do you notice?	**Continue the pattern** $\frac{11}{100} + \frac{89}{100} = 1$ $\frac{12}{100} + \frac{88}{100} = 1$ $\frac{13}{100} + \frac{87}{100} = 1$ Continue the pattern	**Missing numbers, symbols, information** Put the correct symbol in < or > in each box 3.03 □ 3.3	**Working backwards / use the inverse / undoing / unpicking** A film lasting 200 minutes finished at 17:45. At what time did it start?
Hard and easy questions Which questions are easy / hard? 213323 – 70 512 ÷4 32 x 12	**What else do you know / use a fact** 88% of a sum of money = £242. Make up some other statements	**Fact families** Put 19, 15 and 4 in the boxes to make the number sentences correct □ = □ - □ □ = □ + □	**Convince me / prove it / generalising / explaining thinking** Which capital letters have perpendicular and/or parallel lines? Convince me.	**Another and another** Write a decimal number (to two dp) which lined between ½ and ¾ And another…and another…
Always, sometimes, never Is it always, sometimes or never true that when you fold a square in half you get a rectangle?	**Making links** I have 30p in my pocket in 5p coins. How many coins do I have?	**Ordering** Put these numbers in the correct order starting with the smallest	**What's the same? What's different?** What is the same and different about these three 2D shapes?	**Odd one out** Which is the odd one out in this trio? $\frac{1}{2}$ $\frac{2}{4}$ $\frac{1}{4}$

		$\frac{7}{10}$ 0.73 $\frac{7}{100}$ 0.073 71%		
Testing conditions A square has sides of a whole number of centimetres. Which of the following measurements could represent its perimeter? 8cm 18cm 24cm 25cm	**Make an estimate / size of an answer** Circle the number that is the best estimate to 932.6 – 931.05 1.3 1.5 1.7 1.9	**Complete the pattern** $\frac{1}{10} = \frac{10}{100} = 0.1$ $\frac{2}{10} = \frac{20}{100} = ?$ $\frac{3}{10} = ? = 0.3$ $? = \frac{40}{100} = ?$	**Can you find?** Can you find the smallest number that can be added to or subtracted from 87.6 to make it exactly divisible by 8? By 17? By 18?	**The answer is…** The answer is 72%, what is the question?
Other possibilities One face of 3D shape looks like this:  What could the shape be? Are there any other possibilities?	**Visualising** In your head picture a rectangle that is twice as long as it is wide. What could its measurements be?	**Application** Draw two lines whose lengths differ by 4cm	**Write more statements** One battery weights the same as 60 paperclips. One pencil sharpener weights the same as 20 paperclips. Write down some things you know.	

Year 3

Number and place value

Spot the mistake: 50,100,115,200 What is wrong with this sequence of numbers?	**True or False?** 38 is a multiple of 8? **What comes next?** 936-10= 926 926 -10 = 916 916- 10= 906	**Make up an example** Create numbers where the digit sum is three. Eg 120, 300, 210 What is the largest/smallest number?	**Do, then explain** 835 535 538 388 508 If you wrote these numbers in order starting with the smallest, which number would be third? Explain how you ordered the numbers.	**Do, then explain** Show the value of the digit 3 in these numbers? 341 503 937 Explain how you know.

Addition, subtraction, multiplication and division

True or false? Are these number sentences true or false?597 + 7 = 614 804 – 70 = 744 768 + 140 = 908 Give your reasons.	**Hard and easy questions** Which questions are easy / hard? 323 + 10 = 393 + 10 = 454 - 100 = 954 - 120 = Explain why you think the hard questions are hard?	**Convince me** □□+□□+□□ The total is 201 Each missing digit is either a 9 or a 1. Write in the missing digits. Is there only one way of doing this or lots of ways? Convince me	**Making an estimate** Which of these number sentences have the answer that is between 50 and 60 174 - 119 333 – 276 932 - 871
Always, sometimes, never Is it always, sometimes or never true that if you subtract a multiple of 10 from any number the ones digit of that number stays the same. Is it always, sometimes or never true that when you add two numbers together you will get an even number	**Missing numbers** 24 = □ x □ Which pairs of numbers could be written in the boxes? **Making links** Cards come in packs of 4. How many packs do I need to buy to get 32 cards?	**Making links** 4 × 6 = 24 How does this fact help you to solve these calculations? 40 x 6 = 20 x 6 = 24 x 6 =	**Use a fact** 20 x 3 = 60. Use this fact to work out 21 x 3 = 22 x 3 = 23 x 3 = 24 x 3 =
Use the inverse Use the inverse to check if the following calculations are correct 23 x 4 = 82	**Prove It** What goes in the missing box?	**How close can you get?**	**True or false?** All the numbers in the two times table are even.

117 ÷ 9 = 14	<table><tr><td>x</td><td>?</td><td>?</td></tr><tr><td>4</td><td>80</td><td>12</td></tr></table> Prove it.	 Using the digits 2, 3 and 4 in the calculation above how close can you get to 100? What is the largest product? What is the smallest product?	There are no numbers in the three times table that are also in the two times table.
Size of an answer Will the answer to the following calculations be greater or less than 80 23 x 3= 32 x 3 = 42 x 3 = 36 x 2=			

Fractions

Spot the mistake six tenths, seven tenths, eight tenths, nine tenths, eleven tenths … and correct it.	**What comes next?** $\frac{6}{10}$, $\frac{7}{10}$, $\frac{8}{10}$, ……, …. $\frac{12}{10}$, $\frac{11}{10}$, ……, ……, ……	**What do you notice?** $\frac{1}{10}$ of 10 = 1 $\frac{2}{10}$ of 10 = 2 $\frac{3}{10}$ 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.	**True or false?** $\frac{2}{10}$ of 20cm = 2cm $\frac{4}{10}$ of 40cm = 4cm $\frac{3}{5}$ of 20cm = 12cm
Odd one out. Which is the odd one out in each of these trios $\frac{1}{2}$ $\frac{3}{6}$ $\frac{5}{8}$	**What do you notice?** Find $\frac{2}{5}$ of 10 Find $\frac{4}{10}$ of 10. What do you notice?	**Ordering** Put these fractions in the correct order, starting with the smallest.	**What do you notice?** $\frac{1}{10} + \frac{9}{10} = 1$

$\frac{3}{9}$ $\frac{2}{6}$ $\frac{4}{9}$ Why?	Can you write any other similar statements?	$\frac{4}{8}$ $\frac{3}{4}$ $\frac{1}{4}$	$\frac{2}{10} + \frac{8}{10} = 1$ $\frac{3}{10} + \frac{7}{10} = 1$
Continue the pattern Can you make up a similar pattern for eighths? The answer is $\frac{5}{10}$, what is the question? (involving fractions / operations)	Give an example of a fraction that is less than a half. Now another example that no one else will think of. Explain how you know the fraction is less than a half. (draw an image) Ben put these fractions in order starting with the smallest. Are they in the correct order? One fifth, one seventh, one sixth		

Geometry

What's the same, what's different? What is the same and different about these three2-D shapes? 	**Visualising** I am thinking of a 3-dimensional shape which has faces that are triangles and squares. What could my shape be?	**Other possibilities** One face of a 3-D shape looks like this. What could it be? Are there any other possibilities?	**Always, sometimes, never** Is it always, sometimes or never that all sides of a hexagon are the same length.
Other possibilities Can you find shapes that can go with the set with this label? "Have straight sides that are different lengths."	**Convince me** Which capital letters have perpendicular and / or parallel lines? Convince me.	**Working backwards** If I make the two opposite sides of a square 5 cm longer the new lengths of those sides are 27cm. What was the size of my original square? What is the name and size of my new shape?	

Measurement

Top Tips Put these measurements in order starting with the largest. Half a litre Quarter of a litre 300 ml Explain your thinking	**Position the symbols** Place the correct symbol between the measurements > or < 306cm ▭ Half a metre 930 ml ▭ 1 litre Explain your thinking	**Undoing** A programme lasting 45 minutes finishes at 5.20. At what time did it start? Draw the clock at the start and finish time.	**Explain thinking** Salha says that 100 minutes is the same as 1 hour. Is Salha right? Explain why.
Write more statements (You may choose to consider this practically) If there are 630ml of water in a jug. How much water do you need to add to end up with a litre of water? What if there was 450 ml to start with? Make up some more questions like this	**Testing conditions** A square has sides of a whole number of centimetres. Which of the following measurements could represent its perimeter?8cm 18cm 24cm 25cm	**Possibilities** I bought a book which cost between £9 and £10 and I paid with a ten pound note. My change was between 50p and £1 and was all in silver coins. What price could I have paid?	**Working backwards** Tom's bus journeytakes half an hour. He arrives at his destination at 9:25. At what time did his bus leave? 9:05 8:55 8:45
The answer is …. 25 minutes What is the question?		**What do you notice?** 1 minute = 60 seconds 2 minutes = 120 seconds Continue the pattern Write down some more time facts like these.	

Statistics

True or false? (Looking at a bar chart) "Twice as many people like strawberry than lime". **Is this true or false?**	**What's the same, what's different?** Pupils identify similarities and differences between different representations and explain them to each other	**Create a questions** Pupils ask (and answer) questions about different statistical representations using key vocabulary relevant to the objective

Convince me. Make up your own 'true/false' statement about the bar chart.		

Algebra

Connected Calculations

Put the numbers 3, 12, 36 in the boxes to make the number sentences correct.

□ = □ x □

□ = □ ÷ □

Year 4

Number and place value

Spot the mistake: 950, 975,1000,1250 What is wrong with this sequence of numbers?	**True or False?** 324 is a multiple of 9?	**What comes next?** 6706+ 1000= 7706 7706 + 1000 = 8706 8706 + 1000 = 9706	**Do, then explain** 5035 5053 5350 5530 5503 If you wrote these numbers in order starting with the largest, which number would be third? Explain how you ordered the numbers.
Do, then explain Show the value of the digit 4 in these numbers? 3041 4321 5497 Explain how you know.	**Make up an example** Create four digit numbers where the digit sum is four and the tens digit is one. Eg 1210, 2110, 3010 What is the largest/smallest number?	**Possible answers** A number rounded to the nearest ten is 540. What is the smallest possible number it could be?	**What do you notice?** Round 296 to the nearest 10. Round it to the nearest 100. What do you notice? Can you suggest other numbers like this?

Addition, subtraction, multiplication and division

True or false? Are these number sentences true or false?6.7 + 0.4 = 6.11 8.1 – 0.9 = 7.2 Give your reasons.	**Use a fact** 63 ÷ 9 = 7 Use this fact to work out 126 ÷ 9 = 252 ÷ 7 =	**Convince me** ☐ - 666 = 8☐5 What is the largest possible number that will go in the rectangular box? What is the smallest? Convince me	**Making an estimate** Which of these number sentences have the answer that is between 550 and 600 1174 - 611

			3330 – 2779 9326 - 8777
Always, sometimes, never Is it always sometimes or never true that the difference between two odd numbers is odd.	**Making links** Eggs are bought in boxes of 12. I need 140 eggs; how many boxes will I need to buy?	**Missing numbers** 72 = ■ ■ Which pairs of numbers could be written in the boxes?	**Use the inverse** Use the inverse to check if the following calculations are correct: 23 x 4 = 92 117 ÷ 9 = 14
Hard and easy questions Which questions are easy / hard? 13323 - 70 = 12893 + 300 = 19354 - 500 = 19954 + 100 = Explain why you think the hard questions are hard?	**Making links** How can you use factor pairs to solve this calculation? 13 x 12 (13 x 3 x 4, 13 x 3 x 2 x 2, 13 x 2 x 6)	**How close can you get?** ■■■ x 7 Using the digits 3, 4 and 6 in the calculation above how close can you get to 4500? What is the largest product? What is the smallest product?	**Always, sometimes, never?** Is it always, sometimes or never true that an even number that is divisible by 3 is also divisible by 6. Is it always, sometimes or never true that the sum of four even numbers is divisible by 4.
Prove It What goes in the missing box? 6 ■ x 4 = 512 Prove it.	**Size of an answer** Will the answer to the following calculations be greater or less than 300 152 x 2= 78 x 3 = 87 x 3 = 4 x 74 =	**Another and another** Write a decimal numbers (to one decimal place) which lies between a half and three quarters? … and another, … and another,	

Complete the pattern by filling in the blank cells in this table:

1/10	2/10	3/10	
10	20		40

100	100		100
0.1		0.3	

Fractions

Spot the mistake sixty tenths, seventy tenths, eighty tenths, ninety tenths, twenty tenths … and correct it.	**What comes next?** $\frac{83}{100}, \frac{82}{100}, \frac{81}{100}$, ….., ….., ….. $\frac{31}{100}, \frac{41}{100}, \frac{51}{100},$	**What do you notice?** $\frac{1}{10}$ of 100 = 10 $\frac{1}{100}$ of 100 = 1 $\frac{2}{10}$ of 100 = 20 $\frac{2}{100}$ of 100 = 2 How can you use this to work out $\frac{6}{10}$ of 200? $\frac{6}{100}$ of 200?	**True or false?** $\frac{1}{20}$ of a metre= 20cm $\frac{4}{100}$ of 2 metres = 40cm
Missing symbol Put the correct symbol < or > in each box 3.03 ☐ 3.33 0.37 ☐ 0.32	What needs to be added to 3.23 to give 3.53? What needs to be added to 3.16 to give 3.2?	**Do, then explain** Circle each decimal which when rounded to the nearest whole number is 5. 5.3 5.7 5.2 5.8 Explain your reasoning	**Top tips** Explain how to round numbers to one decimal place?
Odd one out. Which is the odd one out in each of these trios $\frac{3}{4}$ $\frac{9}{12}$ $\frac{4}{6}$ $\frac{9}{12}$ $\frac{10}{15}$ $\frac{2}{3}$ Why?	**What do you notice?** Find $\frac{4}{6}$ of 24 Find $\frac{2}{3}$ of 24 What do you notice? Can you write any other similar statements?	**Ordering** Put these numbers in the correct order, starting with the smallest. $\frac{1}{4}$ 0.75 $\frac{5}{10}$	**What do you notice?** $\frac{5}{5} - \frac{1}{5} = \frac{4}{5}$ $\frac{4}{5} - \frac{1}{5} = \frac{3}{5}$

		Explain your thinking	

Give an example
Give an example of a fraction that is more than a half but less than a whole.
Now another example that no one else will think of.

Explain how you know the fraction is more than a half but less than a whole. (draw an image)

The answer is 3/5, what is the question?

Undoing

I divide a number by 100 and the answer is 0.3. What number did I start with?

Another and another

Write down a number with one decimal place which when multiplied by 10 gives an answer between 120 and 130.

… and another, … and another, …

Continue the pattern

Can you make up a similar pattern for addition?

What do you notice?

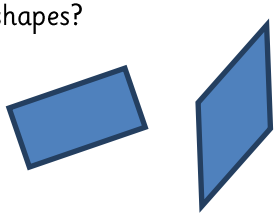
$\frac{11}{100} + \frac{89}{100} = 1$

$\frac{12}{100} + \frac{88}{100} = 1$

$\frac{13}{100} + \frac{87}{100} = 1$

Continue the pattern for the next five number sentences

Geometry

What's the same, what's different? What is the same and what is different about the <u>diagonals</u> of these 2-D shapes? 	**Visualising** Imagine a square cut along the diagonal to make two triangles. Describe the triangles. Join the triangles on different sides to make new shapes. Describe them. (you could sketch them) Are any of the shapes symmetrical? Convince me.	**Other possibilities** Can you draw a non-right angled triangle with a line of symmetry? Are there other possibilities.	**Always, sometimes, never** Is it always, sometimes or never true that the two diagonals of a rectangle meet at right angles.

Other possibilities Can you show or draw a polygon that fits both of these criteria? What do you look for? "Has exactly two equal sides." "Has exactly two parallel sides."	**Convince me** Ayub says that he can draw a right angled triangle which has another angle which is obtuse. Is he right? Explain why.	**Working backwards** Here are the co-ordinates of corners of a rectangle which has width of 5. (7, 3) and (27, 3) What are the other two co-ordinates?	

Measurement

Top Tips Put these amounts in order starting with the largest. Half of three litres Quarter of two litres 300 ml Explain your thinking	**Position the symbols** Place the correct symbols between the measurements > or < £23.61 2326p 2623p Explain your thinking	**Undoing** Imran's swimming lesson lasts 50 mins and it takes 15 mins to change and get ready for the lesson. What time does Imran need to arrive if his lesson finishes at 6.15pm?	**Explain thinking** The time is 10:35 am. Jack says that the time is closer to 11:00am than to 10:00am. Is Jack right? Explain why
Write more statements One battery weighs the same as 60 paperclips; One pencil sharpener weighs the same as 20 paperclips. Write down some more things you know. How many pencil sharpeners weigh the same as a battery?	**Testing conditions** If the width of a rectangle is 3 metres less than the length and the perimeter is between 20 and 30 metres, what could the dimensions of the rectangle lobe? Convince me.	**Possibilities** Adult tickets cost £8 and Children's tickets cost £4. How many adult and children's tickets could I buy for £100 exactly? Can you find more than one way of doing this?	**Always, sometimes, never** If you double the area of a rectangle, you double the perimeter.
Working backwards Put these times of the day in order, starting with the earliest time. A: Quarter to four in the afternoon		**The answer is ….**	**What do you notice?**

B: 07:56 C: six minutes to nine in the evening D: 14:36	225 metres What is the question?	 What do you notice? 1:00pm = 13:00 2:00pm = 14:00 Continue the pattern

Statistics

True or false? (Looking at a graph showing how the class sunflower is growing over time) "Our sunflower grew the fastest in July". **Is this true or false?** **Convince me.** Make up your own 'true/false' statement about the graph.	**What's the same, what's different?** Pupils identify similarities and differences between different representations and explain them to each other	**Create a question** Pupils ask (and answer) questions about different statistical representations using key vocabulary relevant to the objectives.

Algebra

Connected Calculations Put the numbers 7.2, 8, 0.9 in the boxes to make the number sentences correct.	**Undoing** If the longer length of a rectangle is 13cm and the perimeter is 36cm, what is the length of the shorter side?

□ = □ x □ □ = □ ÷ □	Explain how you got your answer.

Year 5

Number and place value

Spot the mistake: 177,000 , 187,000 , 197,000 , 217,000 What is wrong with this sequence of numbers?	**True or False?** When I count in 10's I will say the number 10,100?	**What comes next?** 646,000-10,000= 636,000 636,000 –10,000 = 626,000 626,000- 10,000 = 616,000	**Possible answers** A number rounded to the nearest thousand is 76,000 What is the largest possible number it could be?

Do, then explain Show the value of the digit 5 in these numbers? 350,114 567,432 985,376 Explain how you know.	**Make up an example Give further examples** Create six digit numbers where the digit sum is five and the thousands digit is two. Eg 3,002,000 2,102,000 What is the largest/smallest number?	**Do, then explain** 747,014 774,014 747,017 774,077 744,444 If you wrote these numbers in order starting with the smallest, which number would be third? Explain how you ordered the numbers.

Addition, subtraction, multiplication and division

True or false? Are these number sentences true or false?6.17 + 0.4 = 6.57 8.12 – 0.9 = 8.3 Give your reasons.	**Hard and easy questions** Which questions are easy / hard? 213,323 - 70 = 512,893 + 300 = 819,354 - 500 = 319,954 + 100 = Explain why you think the hard questions are hard? 	**Convince me**  + 1,475 = 6  24 What numbers go in the boxes? What different answers are there? Convince me	**Making an estimate** Which of these number sentences have the answer that is between 0.5 and 0.6 11.74 - 11.18 33.3 – 32.71

Always, sometimes, never Is it always, sometimes or never true that the sum of four even numbers is divisible by 4.	**Missing numbers** 6 x 0.9 = x 0.03 6 x 0.04 = 0.008□ Which numbers could be written in the boxes?	**Making links** Apples weigh about 170 g each. How many apples would you expect to get in a 2 kg bag?	**Making links** 7 x 8 = 56 How can you use this fact to solve these calculations? 0.7 x 0.8 = 5.6 ÷ 8 =

Use a fact 3 x 75 = 225 Use this fact to work out 450 ÷ 6 = 225 ÷ 0.6 = To multiply by 25 you multiply by 100 and then divide by 4. Use this strategy to solve 48 x 25 78 x 25 4.6 x 25	**Prove It** What goes in the missing box? 12□ 2 ÷ 6 = 212 14□ 4 ÷ 7 = 212 22□ 3 ÷ 7 = 321 r 6 323 x □ 1 = 13243	**Always, sometimes, never?** Is it always, sometimes or never true that multiplying a number always makes it bigger? Is it always, sometimes or never true that prime numbers are odd? Is it always, sometimes or never true that when you multiply a whole number by 9, the sum of its digits is also a multiple of 9? Is it always, sometimes or never true that a square number has an even number of factors?	**Use the inverse** Use the inverse to check if the following calculations are correct: 4321 x 12 = 51852 507 ÷ 9 = 4563 **Size of an answer** The product of a two digit and three digit number is approximately 6500. What could the numbers be?

Fractions

Spot the mistake 0.088, 0.089, 1.0	**Missing symbol** Put the correct symbol < or > in each box	**What do you notice?** One tenth of £41	**True or false?** 0.1 of a kilometre is 1m. 0.2 of 2 kilometres is 2m.

What comes next?

1.173, 1.183, 1.193

What needs to be added to 3.63 to give 3.13?
What needs to be added to 4.652 to give 4.1?

4.627 ☐ 4.06

12.317 ☐ 12.31

Odd one out.
Which is the odd one out in each of these collections of 4 fractions

$\frac{6}{10}$ $\frac{3}{5}$ $\frac{18}{20}$ $\frac{9}{15}$

$\frac{30}{100}$ $\frac{3}{10}$ $\frac{6}{20}$ $\frac{3}{9}$

Why?

One hundredth of £41

One thousandth of £41

Continue the pattern

What do you notice?

0.085 + 0.015 = 0.1

0.075 + 0.025 = 0.1

0.065 + 0.035 = 0.1

Continue the pattern for the next five number sentences

0.3 of 3 Kilometres is 3m
0.25 of 3m is 500cm.

$\frac{2}{5}$ of £2 is 20p

Ordering

Put these numbers in the correct order, starting with the largest.

$\frac{7}{10}$, 0.73, $\frac{7}{100}$, 0.073 71%

Explain your thinking

Which is more:

20% of 200 or 25% of 180?

Explain your reasoning.

What do you notice?
Find $\frac{30}{100}$ of 200
Find $\frac{3}{10}$ of 200
What do you notice?
Can you write any other similar statements?

Complete the pattern

$\frac{71}{100}$	$\frac{??}{100}$	$\frac{??}{100}$	$\frac{??}{100}$
0.71	0.81	???	???

Complete the table.

Top tips
Explain how to round decimal numbers to one decimal place?

Do, then explain
Circle each decimal which when rounded to one decimal place is 6.2.
6.32 6.23 6.27 6.17
Explain your reasoning

Another and another Write a fraction with a denominator of one hundred which has a value of more than 0.75?
… and another, … and another,

Write down a number with two decimal places which when multiplied by 100 gives an answer between 33 and 38.

… and another, … and another, …

Give your top tips for multiplying fractions.

Give an example of a fraction that is more than three quarters.
Now another example that no one else will think of.
Explain how you know the fraction is more than three quarters.

Imran put these fractions in order starting with the smallest.
Are they in the correct order?
Two fifths, three tenths, four twentieths
How do you know?

Undoing

I divide a number by 100 and the answer is 0.33 What number did I start with?

What's the question

The answer is $1\frac{2}{5}$, what is the question

The answer is $2\frac{1}{4}$, what is the question

What do you notice?

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

$\frac{4}{4}$ and $\frac{1}{4} = \frac{5}{4} = 1\frac{1}{4}$

$\frac{5}{4}$ and $\frac{1}{4} = \frac{6}{4} = 1\frac{1}{2}$

Continue the pattern up to the total of 2.

Can you make up a similar pattern for subtraction?

Continue the pattern

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

$\frac{1}{4} \times 4 =$

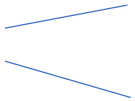
$\frac{1}{4} \times 5 =$

Continue the pattern for five more number sentences. How many steps will it take to get to 3?

$\frac{5}{3}$ of 24 = 40

Write a similar sentence where the answer is 56.

Geometry

What's the same, what's different? What is the same and what is different about the net of a cube and the net of a cuboid?	**Visualising** I look at a large cube which is made up of smaller cubes.  If the larger cube is made up of between 50 and 200 smaller cubes what might it look like?	**Other possibilities** Here is one angle of an isosceles triangle. You will need to measure the angle accurately. What could the other angles of the triangle be? Are there any other possibilities? 	**Always, sometimes, never** Is it always, sometimes or never true that the number of lines of reflective symmetry in a regular polygon is equal to the number of its sides n.
Other possibilities A rectangular field has a perimeter between 14 and 20 metres . What could its dimensions be?	**Convince me** What is the angle between the hands of a clock at four o clock? At what other times is the angle between the hands the same? Convince me	**Working backwards** A square is translated 3 squares down and one square to the right. Three of the coordinates of the translated square are: (3, 6) (8, 11) (8, 6) What are the co-ordinates of the original square?	

Measurement

Top Tips
Put these amounts in order starting with the largest. 130000cm^2 1.2 m^2 13 m^2
Explain your thinking

Undoing
A school play ends at 6.45pm. The play lasted 2 hours and 35 minutes. What time did it start?

Always, sometimes, never
When you cut off a piece of a shape you reduce its area and perimeter.

The answer is ….

0.3km

What is the question?

Other possibilities
(links with geometry, shape and space)
A cuboid is made up of 36 smaller cubes.

If the cuboid has the length of two of its sides the same what could the dimensions be?
Convince me

Write more statements
Mr Smith needs to fill buckets of water. A large bucket holds 6 litres and a small bucket holds 4 litres.

If a jug holds 250 ml and a bottle holds 500 ml suggest some ways of using the jug and bottle to fill the buckets.

Testing conditions
Shape A is a rectangle that is 4m long and 3m wide.
Shape B is a square with sides 3m.
The rectangles and squares are put together side by side to make a path which has perimeter between 20 and 30 m.
For example

Can you draw some other arrangements where the perimeter is between 20 and 30 metres?

Working backwards
Put these lengths of time in order starting with the longest time.

105 minutes
1 hour 51 minutes
6360 seconds

What do you notice?

What do you notice?

1 minute = 60 seconds

60 minutes =  seconds

Fill in the missing number of seconds

down some more time facts like this.

Statistics

True or false? (Looking at a train timetable) "If I want to get to Exeter by 4 o'clock this afternoon, I will need to get to Taunton station before midday". **Is this true or false?** **Convince me.** Make up your own 'true/false' statement about a journey using the timetable.	**Create a questions** Pupils ask (and answer) questions about different statistical representations using key vocabulary relevant to the objectives.	**What's the same, what's different?** Pupils identify similarities and differences between different representations and explain them to each other

Algebra

Connected Calculations The number sentence below represents the angles in degrees of an isosceles triangle. A + B + C = 180 degrees A and B are equal and are multiples of 5. Give an example of what the 3 angles could be. Write down 3 more examples	**Undoing** The perimeter of a rectangular garden is between 40 and 50 metres. What could the dimensions of the garden be?

Year 6

Number and place value

Spot the mistake: -80 , -40 , 10 , 50	**True or False?**	**True or False?**	**Do, then explain**

What is wrong with this sequence of numbers?	When I count backwards in 50s from 10 I will say -200	The temperature is -3. It gets 2 degrees warmer. The new temperature is -5?	Show the value of the digit 6 in these numbers? 6,787,555 95,467,754 Explain how you know.
Do, then explain Find out the populations in five countries. Order the populations starting with the largest. Explain how you ordered the countries and their populations.	**Make up an example** Create seven digit numbers where the digit sum is six and the tens of thousands digit is two. Eg 4,020,000 What is the largest/smallest number?	**Possible answers** Two numbers each with two decimal places round to 23.1 to one decimal place. The total of the numbers is 46.2. What could the numbers be?	**What do you notice?** Give an example of a six digit number which rounds to the same number when rounded to the nearest 10,000 and 100,000

Addition, subtraction, multiplication and division

True or false? Are these number sentences true or false? 6.32 + ☐ = 8 ☐ = 1.68 Give your reasons.	**Hard and easy questions** Which questions are easy / hard? 213,323 - 70 = 512,893 + 37 = 8,193.54 - 5.9 = Explain why you think the hard questions are hard?	**Missing symbols** Write the missing signs (+ - x ÷) in this number sentence: 6 ○ 12.3 = 61.9 ○ 11.9 **What else do you know?** If you know this: 86.7 + 13.3 = 100 what other facts do you know?	**Convince me** Three four-digit numbers total 12,435. What could they be? Convince me
Making an estimate Circle the number that is the best estimate to 932.6 - 931.05 1.3 1.5 1.7 1.9			**Can you find?** Can you find the smallest number that can be added to or subtracted from 87.6 to make it exactly divisible by 8/7/18?
Making links	**Always, sometimes, never**	**Missing numbers**	**Use a fact**

0.7 x 8 = 5.6 How can you use this fact to solve these calculations? 0.7 x 0.08 = 0.56 ÷ 8 =	Is it always, sometimes or never true that the sum of two consecutive triangular numbers is a square number	2.4 ÷ 0.3 = ☐ x 1.25 Which number could be written in the box?	12 x 1.1 = 13.2 Use this fact to work out 15.4 ÷ 1.1 = 27.5 ÷ 1.1 =
Use the inverse Use the inverse to check if the following calculations are correct: 2,346 x 46 = 332,796 27.74 ÷ 19 = 1.46 **Size of an answer** The product of a single digit number and a number with two decimal places is 21.34 What could the numbers be?	**Prove It** What goes in the missing box? 18☐ 4 ÷ 12 = 157 38☐ 5 ÷ 18 = 212.5 33☐ 2 ÷ 8 = 421.5 38 x ☐ .7 = 178.6	**Always, sometimes, never?** Is it always, sometimes or never true that dividing a whole number by a half makes the answer twice as big. Is it always, sometimes or never true that when you square an even number, the result is divisible by 4 Is it always, sometimes or never true that multiples of 7 are 1 more or 1 less than prime numbers.	

Fractions

Spot the mistake Identify and explain mistakes when counting in more complex fractional steps	**What do you notice?** One thousandth of my money is 31p. How much do I have?	**True or false?** 25% of 23km is longer than 0.2 of 20km. Convince me.	What needs to be added to 6.543 to give 7? What needs to be added to 3.582 to give 5?
Circle the two decimals which are closest in value to each other. 0.9 0.09 0.99 0.1 0.01	**Do, then explain** Write the answer of each calculation rounded to the nearest whole number 75.7 × 59	**What's the same, what's different?** … when you round numbers to one decimal place and two decimal places?	**Odd one out**. Which is the odd one out in each of these collections of 4 fractions $\frac{3}{4}$ $\frac{9}{12}$ $\frac{26}{36}$ $\frac{18}{24}$

7734 ÷ 60
772.4 × 9.7
20.34 × (7.9 – 5.4)

$\frac{4}{20}$ $\frac{1}{5}$ $\frac{6}{25}$ $\frac{6}{30}$

Why?

What do you notice?

$\frac{8}{5}$ of 25 = 40

$\frac{5}{4}$ of 16 = 20

$\frac{7}{6}$ of 36 - 42

Can you write similar statements?

Complete the pattern

$\frac{1}{8}$	$\frac{2}{8}$	$\frac{3}{8}$	$\frac{4}{8}$
0.375	???	???	???

Complete the table.

Another and another Write a unit fraction which has a value of less than 0.5?
… and another, … and another, …

Ordering

Which is larger, $\frac{1}{3}$ or $\frac{2}{5}$?
Explain how you know.

Put the following amounts in order, starting with the largest.

23%, $\frac{5}{8}$, $\frac{3}{5}$, 0.8

Give an example of a **fraction** that is greater than 1.1 and less than 1.5.
Now another example that no one will think of. Explain how you know.
Sam put these fractions in order starting with the smallest. Are they in the correct order?
Thirty three fifths Twenty three thirds Forty five sevenths
How do you know?

Continue the pattern

$\frac{1}{3} \div 2 = \frac{1}{6}$
$\frac{1}{6} \div 2 = \frac{1}{12}$
$\frac{1}{12} \div 2 = \frac{1}{24}$

What do you notice?
$\frac{1}{2} \times \frac{1}{4} =$

The answer is $\frac{1}{8}$, what is the question (involving fractions / operations)

Give your top tips for dividing fractions.

True or false?

In all of the numbers below, the digit 6 is worth <u>more than</u> 6 hundredths.
3.6 3.063 3.006 6.23 7.761 3.076
Is this true or false? Change some numbers so that it is true.

Another and another

Write down two fractions which have a difference of $1\frac{2}{?}$ and another, … and another, …

Another and another

Write down 2 fractions with a total of $3\frac{3}{5}$.
… and another, … and another, …

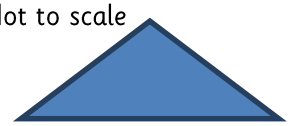
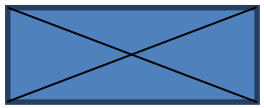
Undoing

I multiply a number with three decimal places by a multiple of 10. The answer is approximately 3.21

What was my number and what did I multiply buy?

When I divide a number by 1,000 the resulting number has the digit 6 in the ones and tenths and the other digits are 3 and 2 in the tens and hundreds columns. What could my number have been?

Geometry

What's the same, what's different? What is the same and what is different about the nets of a triangular prism and a square based pyramid?	**Visualising** Jess has 24 cubes which she builds to make a cuboid. Write the dimensions of cuboids that she could make. List all the possibilities.	**Other possibilities** If one angle of an isosceles triangle is 36 degrees. What could the triangle look like – draw it. Are there other possibilities . Draw a net for a cuboid that has a volume of 24 cm^3.	**Always, sometimes, never** Is it always, sometimes or never true that, in a polyhedron, the number of vertices plus the number of faces equals the number of edges.
Other possibilities Not to scale  The angle at the top of this isosceles triangle is 110 degrees. What are the other angles in the triangle?	**Convince me**  One angle at the point where the diagonals of a rectangle meet is 36 degrees.	**Working backwards** Two triangles have the following co-ordinates: Triangle A: (3, 5) (7, 5) (4, 7) Triangle B: (3, 1) (7, 1) (4, 3)	

	What could the other angles be? Convince me	Describe the translation of triangle A to B and then from B to A.	

Measurement

Top Tips Put these amounts in order starting with the largest. 100 cm^3 1000000 mm^3 1 m^3 Explain your thinking	**Undoing** A film lasting 200 minutes finished at 17:45. At what time did it start?	**Other possibilities** (links with geometry, shape and space) A cuboid has a volume between 200 and 250 cm cubed. Each edge is at least 4cm long. List four possibilities for the dimensions of the cuboid..	**Write more statements** Chen, Megan and Sam have parcels. Megan's parcel weighs 1.2kg and Chen's parcel is 1500g and Sam's parcel is half the weight of Megan's parcel. Write down some other statements about the parcels. How much heavier is Megan's parcel than Chen's parcel?
Testing conditions A square has the perimeter of 12 cm. When 4 squares are put together, the perimeter of the new shape can be calculated. For example:  What arrangements will give the maximum perimeter?	**Always, sometimes, never** The area of a triangle is half the area of the rectangle that encloses it: 	**The answer is ….** 24 metres cubed What is the question?	**What do you notice?** 8 km = 5 miles 16km = ☐ miles 4 km = ☐ miles Fill in the missing number of miles. Write down some more facts connecting kilometres and miles.

Statistics

True or false?	**Is this true or false?**	**What's the same, what's different?**

(Looking at a pie chart) "More than twice the number of people say their favourite type of T.V. programme is soaps than any other"	**Convince me.** Make up your own 'true/false' statement about the pie chart.	Pupils identify similarities and differences between different representations and explain them to each other
Create a questions Make up a set of five numbers with a mean of 2.7	**Missing information** The mean score in six test papers in a spelling test of 20 questions is 15. Five of the scores were 13 12 17 18 16 What was the missing score?	

Algebra

Connected Calculations

p and q each stand for whole numbers.

p + q = 1000 and p is 150 greater than q.

Work out the values of p and q.

Generalising

Write a formula for the 10th, 100th and nth terms of the sequences below.

4, 8, 12, 16 .....

0.4, 0.8, 1.2, 1.6, ...

Undoing

The diagram below represents two rectangular fields that are next to each other.

Field A	Field B

Field A is twice as long as field B but their widths are the same and are 7.6 metres. If the perimeter of the small field is 23m what is the perimeter of the entire shape containing both fields?

If y stands for a number complete the table below

y	$3y$	$3y + 1$
25		
		28

What is the largest value of y if the greatest number in the table was 163?

Ratio and proportion

What else do you know? In a flower bed a gardener plants 3 red bulbs for every 4 white bulbs. How many red and white bulbs might he plant? If she has 100 white bulbs, how many red bulbs does she need to buy? If she has 75 red bulbs, how many white bulbs does she need to buy? If she wants to plant 140 bulbs altogether, how many of each colour should she buy?	**Do, then explain** Purple paint is made from read and blue paint in the ratio of 3:5. To make 40 litres of purple paint how much would I need of each colour? Explain your thinking	**What else do you know?** 88% of a sum of money = £242. Make up some other statements. Write real life problems for your number sentences.
Undoing I think of a number and then reduce it by 15%. The number I end up with is 306. What was my original number?	**Working backwards** In a sale where everything is reduced by 15% I paid the following prices for three items. £255, £850, £4.25 What was the original selling price?	**Unpicking** A recipe needs to include three times as much apple than peach. The total weight of apples and peaches in a recipe is 700 grammes. How much apple do I need?
Other possibilities A 50 seater coach travels to the match. Most of the seats are taken. Junior tickets cost £13 and Adult tickets cost £23. The only people on the coach are Juniors and Adults. The total amount paid for tickets is approximately £900 How many people on the coach were adults and how many were juniors?		