

Year 6

Mathematics

Non-Negotiables

- Compare and order numbers up to 10,000,000.
- Identify common factors, common multiples and prime numbers.
- Round any whole number to a required degree of accuracy.

Multiply:

- 4-digits by 1-digit/ 2-digit

Divide:

- 4-digits by 1-digit
- Add and subtract fractions with different denominators and mixed numbers.
- Multiply simple pairs of proper fractions, writing the answer in the simplest form.
- Divide proper fractions by whole numbers.
- Calculate percentage of a whole number

The following 3 pages suggest a planning outline for delivering the non-negotiables in classrooms..
There should be some element of teaching of these each day.

Year 6 Arithmetic Non-Negotiables	
Autumn Term	
1st Half Term	2nd Half Term
<ul style="list-style-type: none"> Count on/back from a given number in steps of 10/100/1000/10000 up to at least 1,000,000 Count on/back in whole numbers, fraction and decimal sequences through zero to include negative numbers (e.g. 2.5 or $1\frac{1}{4}$) Find 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number Read, write, partition, order and compare numbers to at least 1,000,000 Round any number to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000 (e.g. round 5 digit number to the nearest 10,000) Order and compare numbers including integers, decimals and negative numbers Read, write, order, partition and compare decimal numbers up to 3dp Round decimals with 1 and 2dp to the nearest whole number and to 1dp Multiply and divide mentally drawing upon known facts and/or using place value Multiply and divide any whole and decimal number by 10, 100 and 1000 giving answers up to 2dp Mentally add and subtract tenths and one-digit whole numbers and tenths Add/subtract mentally a 5-digit number and 4- digit numbers (e.g. $15,345 + 2300$ and $12,462 - 2300$) Count on/back with positive and negative numbers, including through zero Count on/back in fraction and decimal sequences Find factors and factor pairs of each number to 100 Find complements to 100, 1000, 10,000 and to £1.00, £5.00 and £10.00 	<ul style="list-style-type: none"> Count on/back from a given number in steps of 10/100/1000/10000 to 1,000,000 and beyond Count on/back in whole numbers, fraction and decimal sequences through zero to include negative numbers? (e.g. 2.5 or $1\frac{1}{4}$) Find 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number Read, write, partition, order and compare numbers to 1,000,000 and beyond? Round any number to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000 (e.g. round 5 digit number to the nearest 10,000; 6 digit number to the nearest 100,000) Order and compare numbers including integers, decimals and negative numbers Read, write, order, partition and compare decimal numbers up to 3dp Round decimals with 3dp to the nearest whole number or to one or two decimal places Multiply and divide drawing upon known facts and/or using place value Multiply and divide any whole and decimal number by 10, 100 and 1000 giving answers up to 2dp Mentally add and subtract tenths and one-digit whole numbers and tenths Add/subtract mentally a 5-digit number and 4- digit numbers (e.g. $15,345 + 2300$ and $12,462 - 2300$) Continue a linear number sequence with positive and negative numbers, decimal and proper fractions including through zero Find factors and factor pairs of each number to 100 Convert units of measurement (km and m; cm and m; cm and mm; gram and km, ml and l and time) Find complements to 100, 1000, 10,000 and to £5.00, £10.00 and £20.00

Year 6
Arithmetic
Non-Negotiables

Spring Term

1st Half Term

- Count on/back from a given number in steps of 10/100/1000/10000 to 1,000,000 and beyond
- Count on/back in whole numbers, fraction and decimal sequences through zero to include negative numbers (e.g. 2.5 or $1\frac{1}{4}$)
- Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number
- Read, write, partition, order and compare numbers to 5,000,000
- Round any number to 5,000,000 and beyond to the nearest 10, 100, 1000, 10,000 and 100,000 (e.g. round any 6 digit number to the nearest hundred thousand and 7-digit number to the nearest million)
- Order and compare numbers including integers, decimals and negative numbers
- Read, write, order, partition and compare decimal numbers up to 3dp
- Round decimals with 3dp to the nearest whole number or to one or two decimal places
- Multiply and divide drawing upon known facts and/or using place value
- Multiply and divide any whole and decimal number by 10, 100 and 1000 giving answers up to 3dp
- Add/subtract mentally a 5-digit number and 4-digit numbers (e.g. $15,345 + 2300$ and $12,462 - 2300$)
- Mentally add and subtract tenths and 1-digit whole numbers and tenths
- Perform mental calculations with larger numbers and mental calculations which include at least 2 different operations (e.g. addition and multiplication)
- Continue a linear number sequence with positive and negative numbers, decimal and proper fractions including through zero
- Find factors and factor pairs of each number to 100
- Convert units of measurement (km and m; cm and m; cm and mm; gram and km, ml and L and time)
- Find complements to 100, 1000, 10,000 and to £5.00, £10.00 and £20.00

2nd Half Term

- Count on/back from a given number in steps of 10/100/1000/10000 to 1,000,000 and beyond
- Count on/back in whole numbers, fraction and decimal sequences through zero to include negative numbers (e.g. 2.5 or $1\frac{1}{4}$)
- Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number
- Read, write, partition, order and compare numbers to 5,000,000 and beyond
- Round any number to 5,000,000 and beyond to the nearest 10, 100, 1000, 10,000 and 100,000 (e.g. round any 6 digit number to the nearest hundred thousand and 7-digit number to the nearest million)
- Order and compare numbers including integers, decimals and negative numbers
- Read, write, order, partition and compare decimal numbers up to 3dp
- Round decimals with 3dp to the nearest whole number or to one or two decimal places
- Multiply and divide drawing upon known facts and/or using place value
- Multiply and divide any whole and decimal number by 10, 100 and 1000 giving answers up to 3dp
- Perform mental calculations with larger numbers and mental calculations which include at least 2 different operations (e.g. addition and multiplication)
- Continue a linear number sequence with positive and negative numbers, decimal and proper fractions including through zero
- Find factors and factor pairs of each number to 100
- Convert units of measurement using decimal notation up to 3dp (km and m; cm and m; cm and mm; gram and km, ml and l and time)
- Find complements to 1000, 10,000 and to £10.00, £20.00 and £50

**Year 6
Arithmetic
Non-Negotiables**

Summer Term

1st Half Term

- Count on/back from a given number in steps of 10/100/1000/10000 to 1,000,000 and beyond
- Count on/back in whole numbers, fraction and decimal sequences through zero to include negative numbers (e.g. 2.5 or $1\frac{1}{4}$)
- Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number
- Read, write, partition, order and compare numbers to 10,000,000
- Round any 6 digit number to the nearest hundred thousand and 7-digit number to the nearest million.
- Round any number to 10,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000 (e.g. round any 6 digit number to the nearest hundred thousand and 7-digit number to the nearest million)
- Order and compare numbers including integers, decimals and negative numbers
- Read, write, order, partition and compare decimal numbers up to 3dp
- Round decimals with 3dp to the nearest whole number or to one or two decimal places
- Multiply and divide any whole and decimal number by 10, 100 and 1000 giving answers up to 3dp
- Perform mental calculations with larger numbers and mental calculations which include at least 2 different operations (e.g. addition and multiplication)
- Continue a linear number sequence with positive and negative numbers, decimal and proper fractions including through zero
- Find factors and factor pairs of each number to 100
- Convert units of measurement using decimal notation up to 3dp (km and m; cm and m; cm and mm; gram and km, ml and L and time)
- Find complements to 1000, 10,000 and to £10.00, £20.00 £50 and £100

2nd Half Term

- Count on/back from a given number in steps of 10/100/1000/10000 to 1,000,000 and beyond
- Count on/back in whole numbers, fraction and decimal sequences through zero to include negative numbers (e.g. 2.5 or $1\frac{1}{4}$)
- Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more or less than a given number
- Read, write, partition, order and compare numbers to 10,000,000
- Round any number to 10,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000 (e.g. round any 6 digit number to the nearest hundred thousand and 7-digit number to the nearest million)
- Order and compare numbers including integers, decimals and negative numbers
- Read, write, order, partition and compare decimal numbers up to 3dp
- Round decimals with 3dp to the nearest whole number or to one or two decimal places
- Multiply and divide any whole and decimal number by 10, 100 and 1000 giving answers up to 3dp
- Perform mental calculations with larger numbers and mental calculations which include at least 2 different operations (e.g. addition and multiplication)
- Continue a linear number sequence with positive and negative numbers, decimal and proper fractions including through zero
- Find factors and factor pairs of numbers to 100
- Convert units of measurement using decimal notation up to 3dp (km and m; cm and m; cm and mm; gram and km, ml and l and time)
- Find complements to 1000, 10,000 and to £10.00, £20.00 £50 and £100

YEAR 6: AUTUMN 1: Overview and Teaching Steps

WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6
1 Place Value	1 Four Rules	1 Multiplication & Division	1 Geometry	1 Addition & Subtraction	2 Multiplication & Division
Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit.	-Perform mental calculations, including with mixed operations and large numbers. -Use knowledge of the order of operations to carry out calculations involving the four operations.	Identify common factors, common multiples and prime numbers.	Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.	Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.	Perform mental calculations, including mixed numbers and large numbers.
<ul style="list-style-type: none"> ➤ Revise reading and writing numbers up to 1,000,000 ➤ Read numbers up to 10,000,000 in numerals ➤ Write numbers up to 10,000,000 in numerals ➤ Recognise the value of each digit up to 10,000,000 ➤ Know and use the terms: ones, tens, hundreds, ten thousands, hundred thousand, million and ten million correctly ➤ Partition any number up to 10,000,000 showing the value of each digit 	<p>Mentally:</p> <ul style="list-style-type: none"> ➤ Use all 4 operations ➤ Calculate a problem using at least 2 operations ➤ Calculate 2-step problems ➤ Explain the order to solve calculations ➤ Solve calculations in correct order 	<ul style="list-style-type: none"> ➤ Know the common factors of any two given numbers ➤ Know the common multiples of any two given numbers ➤ Know all prime numbers. 	<ul style="list-style-type: none"> ➤ Classify triangles in terms of their properties ➤ Know that an equilateral triangle has three angles of 60° and three equal sides ➤ Know that an isosceles triangle has two sides which are equal and two angles which are equal ➤ Describe a right angled triangle according to its properties ➤ Know that angles in a triangle always total 180° ➤ Describe a square and a rectangle according to their properties ➤ Know the properties of: parallelogram, rhombus and trapezium ➤ Know that interior angles in a quadrilateral total 360° ➤ Accurately measure angles in any shape ➤ Accurately calculate missing angles in triangles and quadrilaterals on a line and at a point ➤ Sort and classify shapes according to similarities and differences 	<ul style="list-style-type: none"> ➤ Explain why an answer is or is not reasonable using estimation and rounding. ➤ Estimate an answer to a problem before calculating (being able to justify estimation). 	<ul style="list-style-type: none"> ➤ Use a range of numbers to multiply and divide.

YEAR 6 : AUTUMN 2: Overview and Teaching Steps

WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6
1 Fractions	2 Fractions Percentages	2 Geometry	1 Measures	2 Measures	Consolidate and Assess
Compare and order fractions, including fractions >1 . Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.	Recall and use equivalences between simple fractions, decimals and percentages, including different contexts	Draw 2D shapes using given dimensions and angles.	-Calculate, estimate and compare volume of cubes and cuboids using standard units, including cm^3 and m^3 , and extending to other units such as mm^3 and km^3 . -Convert between miles & km.	Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to three decimal places.	Start this week by revising the learning covered in the Autumn term so as to ensure pupils are fluent and secure with their basic skills.
<ul style="list-style-type: none"> ➤ Order fractions in ascending and descending order. ➤ Simplify fractions 	<ul style="list-style-type: none"> ➤ Revise that $1/10$ can be represented as 0.1 and use this to solve problems. ➤ Revise that $1/4$, $3/4$ can be represented as 0.25 or 0.75 and use this to solve problems. ➤ Revise all the decimal equivalent fractional values where the denominator is 3, 4, 5, 6, 8 or 10 and use to solve problems. ➤ Link this to percentages so that pupils can move between equivalent fractions, decimals and percentages 	<ul style="list-style-type: none"> ➤ Draw a square accurately having been given the length of a side ➤ Draw a rectangle accurately having been given the length and breadth ➤ Draw an equilateral triangle accurately having been given the length of a side ➤ Draw an isosceles triangle accurately having been given the length of the base ➤ Draw a triangle to a given set of angles and sides ➤ Draw pentagons and hexagons to given criteria 	<ul style="list-style-type: none"> ➤ Estimate volume of shapes and check for accuracy ➤ Know the formula for converting m:km ➤ Use the formula to calculate distances ➤ Use a conversion graph 	<ul style="list-style-type: none"> ➤ Use, add and subtract positive and negative integers for measures such as temperature and money ➤ Convert large numbers of cm into m; ml into l; g into kg; minutes into hours 	<p>Use a simple assessment process to check on pupils' confidence and consistency in using the learning outlined in the Autumn term.</p> <p>Analyse the results and use information to help focus the intervention sessions, as needed, for the following term.</p>

YEAR 6: SPRING 1: Overview and Teaching Steps

WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6
2 Place Value	3 Geometry	3 Measures	3 Fractions	3 Multiplication & Division	4 Multiplication & Division
Use negative numbers in context and calculate intervals across zero	<ul style="list-style-type: none"> - Describe positions on the full coordinate grid, all four quadrants - Draw and translate simple shapes on the coordinate plane and reflect them in the axes 	Solve problems involving the calculation and conversion of units of measure, using decimal notation to three decimal places where appropriate.	Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.	Multiply multi-digit numbers up to 4-digits by a 2-digit whole number using the formal written method of long multiplication.	<ul style="list-style-type: none"> - Divide numbers up to 4-digits by a 2-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. - Divide numbers up to 4-digits by a 2-digit number using the formal written method of short division, where appropriate, interpreting remainders according to the context.
<ul style="list-style-type: none"> ➤ Interpret intervals and differences in context, e.g. temperature ➤ Calculate intervals from -100 to 100 	<ul style="list-style-type: none"> ➤ Read coordinates in all four quadrants ➤ Plot points using coordinates in all four quadrants ➤ Create shapes by plotting points in all four quadrants ➤ Use four quadrants of the grid to draw different shapes ➤ Reflect a shape in any of the axes and re-plot ➤ Translate a shape into any of the quadrants or across quadrants 	<ul style="list-style-type: none"> ➤ Use decimal notation to 3dp to solve calculations with measures ➤ Use other compound units for speed such as miles per hour and apply knowledge in science 	<ul style="list-style-type: none"> ➤ Work out the common denominator for a pair of fractions with different denominators. ➤ Add two fractions with different denominators. ➤ Add more than two fractions with different denominators. ➤ Subtract one fraction from another with different denominators. ➤ Subtract one mixed number from another where there are different denominators. 	<ul style="list-style-type: none"> ➤ Use formal method of multiplication of $\text{ThHTU} \times \text{TU}$ 	<ul style="list-style-type: none"> ➤ Divide any number with 4-digits by a 2-digit number without a remainder. ➤ Divide any number with 4-digits by a 2-digit number with a remainder. ➤ Use rounding to express answers as whole numbers. ➤ Know when an answer has to be a whole number and a remainder is not appropriate. ➤ Use a formal method to divide any number with 4-digits by a 2-digit number without a remainder. ➤ Use a formal method to divide any number with 4-digits by a 2-digit number with a remainder.

YEAR 6 : SPRING 2: Overview and Teaching Steps

WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6
2 Addition & Subtraction	1 Ratio & Proportion	4 Geometry	4 Measures	1 Statistics	Consolidate and Assess
Use knowledge of the order of operations to carry out calculations involving the four operations.	<p>-Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.</p> <p>-Solve problems involving the calculation of percentages of whole numbers or measures such as 15% of 360 and the use of percentages for comparison.</p>	Recognise, describe and build simple 3D shapes, including making nets.	Recognise when it is possible to use the formulae for area & volume of shapes.	<p>Interpret and construct:</p> <ul style="list-style-type: none"> - pie charts - line graphs <p>and use these to solve problems</p>	<p>Start this week by revising the learning covered in the Autumn and Spring terms so as to ensure pupils are fluent and secure with their basic skills.</p> <p>Use a simple assessment process to check on pupils' confidence and consistency in using the learning outlined in the Autumn and Spring terms.</p> <p>Analyse the results and use information to help focus the intervention sessions, as needed, for the following term.</p>
<ul style="list-style-type: none"> ➤ Explain the order to solve calculations ➤ Solve calculations in correct order 	<ul style="list-style-type: none"> ➤ Understand that quantities change at the same rate. ➤ Find equivalent ratios. ➤ Solve problems involving similar shapes or quantities where the scale factor is known or can be found. ➤ Recognise 50% as being half of original value. ➤ Recognise 25% as being quarter of original value. ➤ Recognise 75% as being three-quarters of original value. ➤ Recognise 10% as being one-tenth of original value. ➤ Know that to find 1% you divide by 100 ➤ Find 25%, 50%, 75% of any given value ➤ Find 5%, 10%, 20%, 50% etc. of a given value. ➤ Find % of a given value. 	<ul style="list-style-type: none"> ➤ Know what the net for a cube looks like ➤ Create a cube from a net ➤ Make a net to create a cube ➤ Know what the net for a cuboid looks like ➤ Create a cuboid from a net ➤ Make a net to create a cuboid ➤ Make a net to create a square based pyramid ➤ Make a net to create a triangular based pyramid 	<ul style="list-style-type: none"> ➤ Know when to apply a given formula to find the area of a shape ➤ Know when to apply a given formula to find the volume of a shape 	<ul style="list-style-type: none"> ➤ Know what a pie chart is ➤ Read a simple pie chart with segments that are divisible by 10 ➤ Use information from pie chart to solve a problem ➤ Construct a pie chart from a set of given information with data in multiples of 6 or 12 ➤ Use knowledge of angles to measure segments of pie charts accurately ➤ Interpret information from line graphs to answer questions ➤ Know how to read scales on line graphs ➤ Draw own line graphs with range of scales 	

YEAR 6: SUMMER 1: Overview and Teaching Steps

WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6
3 Place Value	3 Addition & Subtraction	4 Fractions	5 Geometry	1 Algebra	6 Measures
Round any whole number to the required degree of accuracy	Consolidate all learning in relation to the four operations using formal efficient methods at all times	Multiply simple pairs of proper fractions, writing the answer in the simplest form.	Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.	-Express missing number problems algebraically. -Use simple formulae. -Generate and describe linear number sequences.	-Recognise that shapes with the same areas can have different perimeters and vice versa. -Calculate the area of parallelograms and triangles. -Recognise when it is possible to use formulae for area & volume of shapes.
<ul style="list-style-type: none"> ➤ Round any 4 digit number to the nearest 1000 ➤ Round any 5 digit number to the nearest 10,000 ➤ Round any 6 digit number to the nearest 100,000 ➤ Round any 7 digit number to the nearest 1,000,000 	<ul style="list-style-type: none"> ➤ Solve problems involving numbers up to 10,000,000 ➤ Identify the best way to check answers ➤ Justify the reasonableness of the answer within the context 	<ul style="list-style-type: none"> ➤ Multiply a whole number with a fraction ➤ Multiply a whole number with a fraction and express the answer in its simplest form ➤ Multiply two simple fractions and express the answer in its simplest form ➤ Work out how to multiply two improper fractions and express the answer in its simplest form 	<ul style="list-style-type: none"> ➤ Given two angles in a triangle, calculate the missing angle ➤ Given information about angles in a quadrilateral, calculate missing angles ➤ Calculate missing angles in parallelogram, rhombus and trapezium from calculating diagonally ➤ opposite angles ➤ Calculate missing angles on a line ➤ Calculate missing angles where they are opposite 	<ul style="list-style-type: none"> ➤ Write known rules algebraically. ➤ Work out equations involving missing amounts, e.g. If $2x-1=9$, what is x? ➤ Work out calculations when given value of 2 letters, e.g. What is $2a+3b$ if $a=2$ and $b=5$ ➤ Use rules algebraically for known relationships, e.g. $p=4s$ for finding the perimeter of a square or $\text{Area} = \frac{1}{2}bh$ ➤ Continue a linear number sequence involving positive and negative numbers ➤ Continue a linear number sequence involving fractions. ➤ Continue a linear number sequence involving decimal fractions 	<ul style="list-style-type: none"> ➤ Draw shapes with same area with different perimeters ➤ Solve problems involving area and perimeter ➤ Know formula for calculating area of triangle ➤ Calculate area of triangles ➤ Know formula for calculating area of parallelogram ➤ Calculate area of parallelograms

YEAR 6 : SUMMER 2: Overview and Teaching Steps

WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6
2 Algebra	4 Addition & Subtraction	5 Fractions	2 Statistics	6 Geometry	Consolidate and Assess
<p>-Find pairs of numbers that satisfy number sentences with two unknowns.</p> <p>-Enumerate all possibilities of combinations of two variables.</p>	<p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</p>	<p>-Divide proper fractions by whole numbers.</p> <p>-Use written division methods where the answer has up to two decimal places.</p> <p>-Associate a fraction with division to calculate decimal fraction equivalents, for simple fractions</p>	<p>Calculate and interpret the mean as an average</p>	<p>Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.</p>	<p>Start this week by revising the learning covered in Year 6 so as to ensure pupils are fluent and secure with their basic skills.</p>
<p>➤ Use known facts to calculate, if $17 + x + y = 42$, use known number facts to calculate possible values for x and y.</p> <p>➤ Use known facts to complete a table, e.g. 'The brown string is 9cm less than 2 times as long as the yellow string'. So... if $y=5$, $s=?$</p>	<p>Revise:</p> <p>➤ Using all 4 operations</p> <p>➤ Calculating a problem using at least 2 operations</p> <p>➤ Calculating 2-step problems</p> <p>➤ Explaining the order to solve calculations</p> <p>➤ Solving calculations in correct order</p>	<p>➤ Divide a proper fraction by a whole number.</p> <p>➤ Divide a proper fraction by a whole number and give the answer in its simplest form.</p> <p>➤ Know that $1/10$ can be represented as 0.1</p> <p>➤ Know that $1/5$ can be represented as 0.2</p> <p>➤ Know that $1/4$ can be represented as 0.25</p> <p>➤ Know that $1/2$ can be represented as 0.5</p> <p>➤ Know that $3/4$ can be represented as 0.75</p> <p>➤ Calculate decimal fraction equivalent for all fractional values where the denominator is 3, 4, 5, 6, 8 or 10</p>	<p>➤ Know the term mean is the average</p> <p>➤ Find the mean of a given set of numbers</p>	<p>➤ Know that the line across the centre of a circle is known as the diameter</p> <p>➤ Know that the distance from the centre of a circle to the arc of the circle is the radius</p> <p>➤ Know the distance around the outside of the circle is called the circumference</p> <p>➤ Know the diameter of the circle is twice the radius</p>	<p>Use a simple assessment process to check on pupils' confidence and consistency in using the learning outlined in Year 6.</p> <p>Analyse the results and use information to help focus the intervention sessions, as needed, for the following term.</p>

Autumn 2: Week 2: Pre-Learning Task

The pre-learning task below could be used to assess pupils' starting points within this objective. It needs to be completed by all/ or some of the pupils in advance of the main teaching.

Name Autumn 2: Week 2

Objective: Fractions **Percentages:** Recall and use equivalences between simple fractions, decimals and percentages, including different contexts

Write the following fractions as decimals:			Write the following fractions or decimals as percentages:		
$\frac{4}{5}$			$\frac{1}{4}$		
$\frac{7}{10}$			0.23		
Write the following decimals as fractions (in their lowest form):			$\frac{7}{10}$		
0.2			0.16		
0.25			$\frac{3}{4}$		
0.75			0.25		
0.8			0.92		

Autumn 2: Week 2: Practice and Consolidation

Fractions: Percentages: Recall and use equivalences between simple fractions, decimals and percentages, including different contexts

Teaching Sequence	Oral and Mental Activities Examples:	Pencil and Paper Activities Examples:
<ul style="list-style-type: none"> ➤ Revise that $\frac{1}{10}$ can be represented as 0.1 and use this to solve problems. ➤ Revise that $\frac{1}{4}$, $\frac{3}{4}$ can be represented as 0.25 or 0.75 and use this to solve problems. ➤ Revise all the decimal equivalent fractional values where the denominator is 3, 4, 5, 6, 8 or 10 and use to solve problems. ➤ Link this to percentages so that pupils can move between equivalent fractions, decimals and percentages 	<ul style="list-style-type: none"> • Revise the equivalence between decimals and fractions. • Chant counting in tenths in both decimal and fractional forms. • Ensure pupils are confident in knowing that 50% is the same as $\frac{1}{2}$ and 0.5. • Similarly, that $\frac{1}{4}$ is the same as 0.25 and 25%. • Focus on the common fractions with denominators of 3, 4, 5, 6, 8 and 10. • Provide pupils with simple problems related to percentages. 	Write the following as fractions (in their lowest forms)
		0.25 0.3 0.7 0.75 0.4 0.6 0.15 0.85 0.72
		Write these fractions as decimals and as percentages:
		$\frac{2}{5}$ $\frac{5}{8}$ $\frac{7}{8}$ $\frac{1}{3}$ $\frac{4}{5}$ $\frac{9}{10}$ $\frac{3}{4}$ $\frac{3}{5}$ $\frac{1}{5}$
		Write the following percentages as fractions (to their lowest form):
		25% 75% 60% 70% 80% 16% 90% 55% 65%
		Solve these problems:
		Find 50% of £40.
		Find 40% of £50.
		Find 60% of 200gms
		Find 90% of £300
		Find 10% of £50
		Find 70% of £120
		Find 65% of 400m.
		Find 45% of 200 litres
		Find 15% of 400gms
		Find 45% of 800Km

Autumn 2: Week 2: Mastering this Objective – Deeper Understanding

Fractions: Percentages: Recall and use equivalences between simple fractions, decimals and percentages, including different contexts

Teaching Sequence

If pupils have mastered this objective they will be able to complete these activities independently:

- Revise that $1/10$ can be represented as 0.1 and use this to solve problems.
- Revise that $1/4$, $3/4$ can be represented as 0.25 or 0.75 and use this to solve problems.
- Revise all the decimal equivalent fractional values where the denominator is 3, 4, 5, 6, 8 or 10 and use to solve problems.
- Link this to percentages so that pupils can move between equivalent fractions, decimals and percentages

Give an example of a **fraction** that is greater than 1.1 but less than 1.5.

Give an example of a **decimal** that is more than $\frac{3}{4}$ but less than $\frac{7}{8}$.

Give an example of a **percentage** that is more than $\frac{2}{3}$ but less than $\frac{3}{4}$.

Give an example of a **fraction** that is more than 2.3 but less than 2.5.

True or False

- 25% of 23km is longer than 0.2 of 20km
- 20% of 4Km is longer than $\frac{7}{8}$ of 4Km
- 30% of 6Kg is heavier than 0.2 of 8Kg
- 50% of 15Kg is heavier than 0.25 of 8Kg
- 25% of £16 is more than 0.3 of £15
- 75% of £500 is more than 0.7 of £600
- 18% of £300 is more than 0.2 of £400

Circle the two decimals which are closest in value to each other.

0.9	0.09	0.99	0.1	0.01
0.1	0.09	0.5	0.35	0.23
0.2	0.08	0.15	0.11	0.19
1.23	1.27	1.29	1.3	1.35

Complete the following:

Decimal	Fraction	%
0.3		
	$\frac{7}{8}$	
		45
0.12		
	$\frac{3}{8}$	

Autumn 2: Week 2: Working at greater depth

Fractions: Percentages: Recall and use equivalences between simple fractions, decimals and percentages, including different contexts

Teaching Sequence

- Revise that $1/10$ can be represented as 0.1 and use this to solve problems.
- Revise that $1/4$, $3/4$ can be represented as 0.25 or 0.75 and use this to solve problems.
- Revise all the decimal equivalent fractional values where the denominator is 3, 4, 5, 6, 8 or 10 and use to solve problems.
- Link this to percentages so that pupils can move between equivalent fractions, decimals and percentages

Activities for pupils working at greater depth:

Blood in the Human Body

The human body contains 5 litres of blood. 45% of blood is made up of blood cells and 55% is made up of plasma. Work out the volume of blood cells and plasma we have.

On average, the heart beats 72 times in one minute. When exercising the heart beats 50% faster and when sleeping the heart beats 25% slower.

How many beats will the heart make if you exercise for 90 minutes and how many beats will it make if you are asleep for 6 hours?

If it takes approximately $\frac{1}{2}$ a minute for the 5 litres of blood to travel around your body, how much blood will have travelled around your body in 1 day?



Did I spend that much time?

As a Year 6 pupil you will have done many things over and over again in school. The table below gives you a percentage overview of some of these.

Activity	%
Break	16
Lining Up	1
Reading	5
Assembly	2
PE	3
Maths	20
English	25

If every school year has 40 weeks and every school day has 360 minutes and you will have been in school for 7 years (Reception to Year 6), work out the following:

How many minutes have you spent lining up?
 How many more minutes, every year, will you have spent reading than doing PE?
 How many minutes will you have spent doing Maths and English?
 How many more minutes did you spend at break rather than assembly?

Autumn 2: Week 2: Assessment


The grid below helps to identify the journey pupils make towards mastering this objective. It can be used by the teacher to keep an on-going check on progress or more likely placed in the pupils' books so that they can keep their own checks.

Fractions: Percentages: Recall and use equivalences between simple fractions, decimals and percentages, including different contexts

Me

My
Teacher

Can you find the percentage of a given amount?		
Can you work out what the percentage of a given fraction or decimal fraction is?		
Do you remember and understand the term 'percent'?		
Can you represent fractions with denominators of 2, 3, 4, 5, 6, 8 or 10 as decimal fractions?		
Can you solve problems by finding 0.1, 0.25, 0.5 and 0.75 of given amounts?		
Do you remember that $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ can be represented as 0.25, 0.5 and 0.75 respectively?		
Do you remember that $\frac{1}{10}$ can be represented as 0.1?		



Spring 2: Week 4: Pre-Learning Task

The pre-learning task below could be used to assess pupils' starting points within this objective. It needs to be completed by all/ or some of the pupils in advance of the main teaching.

Name _____ Spring 2: Week 4

Objective: Measures

Recognise when it is possible to use the formulae for area & volume of shapes.



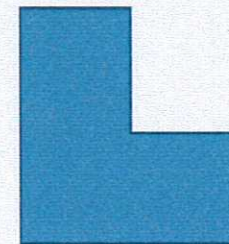
Take 16 lego bricks of the same size, as shown, and create 3 different cuboids.

Draw 3 different right angled triangles with an area of 20 sq. cm.

Which of these shapes has the biggest area?:



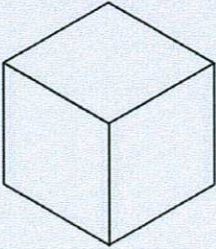
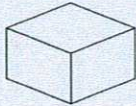
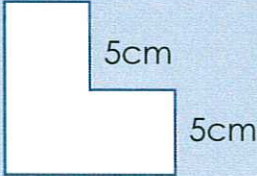
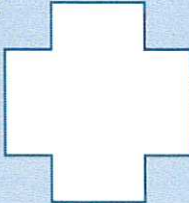
- Rectangle 12 x 8 cm
- Rectangle 10 x 9 cm
- Square with side of 8cm
- Right-angled triangle with vertical side 9cm and a base of 15 cm

The L shape is 10 cm tall and has a base of 12cm The stem of the L shape is 5 cm.
What is its area?



Spring 2: Week 4: Practice and Consolidation

Measures: Recognise when it is possible to use the formulae for area & volume of shapes.

Teaching Sequence	Oral and Mental Activities Examples:	Pencil and Paper Activities Examples:
<p>➤ Know when to apply a given formula to find the area of a shape</p> <p>➤ Know when to apply a given formula to find the volume of a shape</p>	<ul style="list-style-type: none"> Start by reminding pupils about the formula that can be applied when finding the area of given regular 2D shapes. Then move on to consider the volume of given regular 3D shapes. Move on to explain how the area of irregular 2D shapes can be measured if the shape can be divided up to make smaller rectangles; squares or triangle shapes pieces. Similarly, the volume of an irregular 3D shape can be found by looking for cubes and cuboids within the irregular shape. Remind pupils of cubed and square symbols. 	<p>Find the area of the following shapes:</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>Rectangles that are: 10cms x 5cm 12cms x 6cm 20m x 5m 25m x 6m</p> </div> <div style="text-align: center;">  <p>Right-angled triangles that are: Vertical 5cm x base of 10cm Vertical 10cm x base of 10cm Vertical 8cm x base of 10cm Vertical 12cm x base of 15cm</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 10px;"> <div style="text-align: center;">  <p>Find the volume of cubes: With side 5cm. With side 10cm. With side 2m With side 15cm With side 20cm</p> </div> <div style="text-align: center;">  <p>Find volume of cuboids: 10 x 5 x 4cm 8 x 6 x 4cm 12 x 8 x 10 metres</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 10px;"> <div style="text-align: center;"> <p>Find the area of these 2 shapes:</p>  </div> <div style="text-align: center;">  <p>Started as a 5 x 5cm square. Had 4, 1x1cm corners taken off.</p> </div> </div>

Spring 2: Week 4: Mastering this Objective – Deeper Understanding

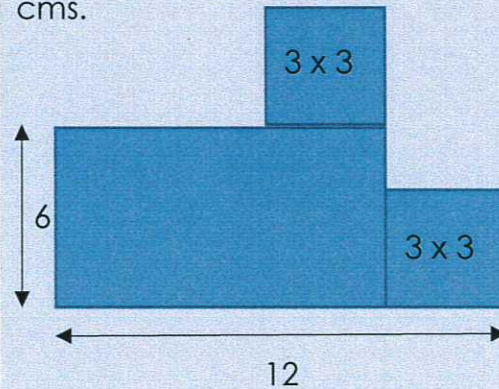
Measures: Recognise when it is possible to use the formulae for area & volume of shapes.

Teaching Sequence

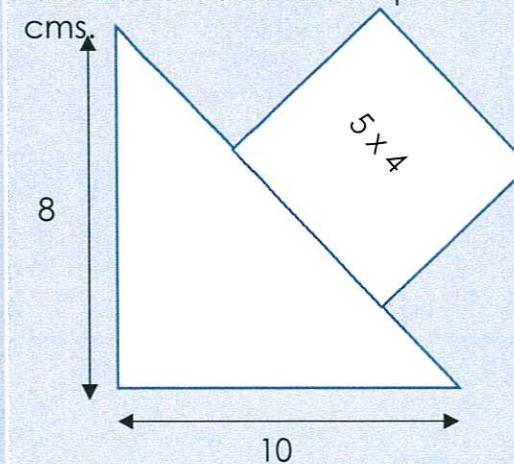
- Know when to apply a given formula to find the area of a shape
- Know when to apply a given formula to find the volume of a shape

If pupils have mastered this objective they will be able to complete these activities independently:

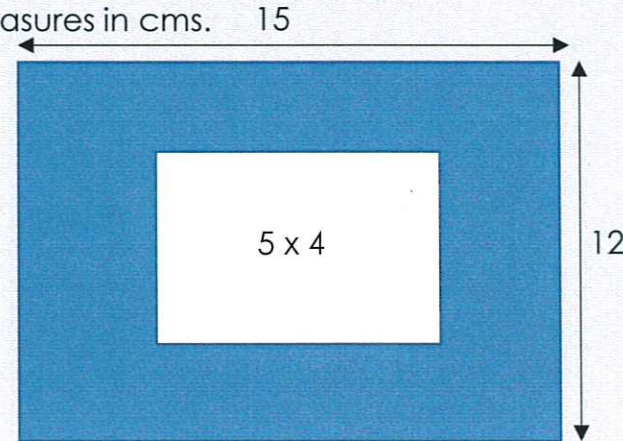
Find the area of this shape: All measures in cms.



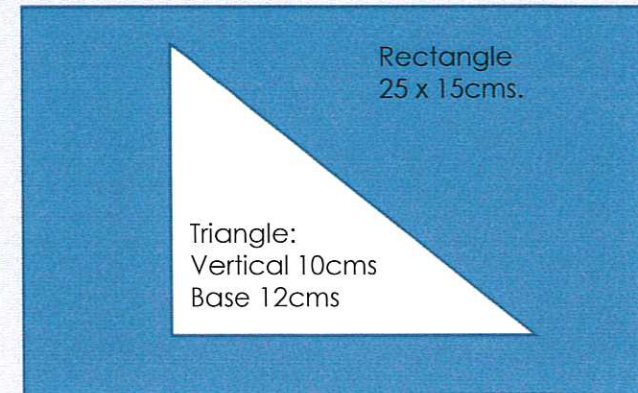
Find the area of this shape: All measures in cms.



Find the area of the darker part: All measures in cms.



Find the area of the darker part: All measures in cms.



Spring 2: Week 4: Working at greater depth

Measures: Recognise when it is possible to use the formulae for area & volume of shapes.

Teaching Sequence	Activities for pupils working at greater depth:	
<p>➤ Know when to apply a given formula to find the area of a shape</p> <p>➤ Know when to apply a given formula to find the volume of a shape</p>	<p>Which has the greater volume?</p> <p>Philip and Harriet were arguing about the volume of two hotels. Phil says the first has a greater volume. It has a base of 10m x 15m and has 17 floors, each being 3metres high. Harriet says the second hotel has the greater volume. It has 26 floors with each floor being 3 metres high but has a base of 8m x 6m. Which of the two is correct? Give your reasons and show your workings.</p>	<p>Farmer Problem</p> <p>A framer has a very large field which he needs to divide up to accommodate his sheep; cows and horses.</p> <p>The field is 50 metres x 72 metres. Each of the animals must have an area of at least 1000 sq. metres.</p> <p>Show at least one way that the large field can be divided up to ensure there is enough space for the animals and also work out how much perimeter fencing the farmer will need.</p>
	<p>Garage Flooring</p> <p>A rectangular garage measures 7 x 5 metres. And there is a passageway leading to the house. The passageway is 1 metre x 5 metres.</p> <p>The owner wants to put a special flooring down which costs £6.50 per sq. metre. The passageway will also have the same flooring.</p> <p>How much will it cost to cover the area?</p>	<p>Create you own</p> <p>Create 3 different L shapes (2D) with each having an area of 36 sq. cm</p> <p>Create 3 different X shapes (2D) with each having an area of 48 sq. cm</p> <p>Create 2 different irregular shapes each with an area of 40 sq. cm</p>

Spring 2: Week 4: Assessment

The grid below helps to identify the journey pupils make towards mastering this objective. It can be used by the teacher to keep an on-going check on progress or more likely placed in the pupils' books so that they can keep their own checks.

Measures: Recognise when it is possible to use the formulae for area & volume of shapes.

	Me	My Teacher
Do you know when it is possible to apply a formula to work the volume of an irregular 3D shape?		
Do you know when it is possible to apply a formula to work the area of an irregular 2D shape?		
Can you tell someone how to work out the volume of a cuboid?		
Can you tell someone how to work out the volume of a cube?		
Can you tell someone how to work out the area of a right-angled triangle?		
Can you tell someone how to work out the area of a rectangle?		
Can you tell someone how to work out the area of a square?		



Summer 1: Week 2: Pre-Learning Task

The pre-learning task below could be used to assess pupils' starting points within this objective. It needs to be completed by all/ or some of the pupils in advance of the main teaching.

Name _____

Summer 2: Week 2

Objective:
Addition,
Subtraction

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Country A has a population of 1,234,897; and Country B a population of 2,786,123. How many more live in Country B than in country A?

At a factory 4,967,123 Smarties are produced each week. How many will be produced after 3 weeks?

Voyager spacecraft made three journeys into space. The first journey was 1,567,987Km; the second 3,456,094Km and the third 3,675,912. How much further did Voyager travel on the longest journey compared to the shortest journey?

If 1,768,235 books are produced over 5 days at a printers, how many books are produced each day?

In Wales it is claimed that 667,894 speak Welsh as their first language. The population of Wales is 3,065,476. How many people who live in Wales do not have Welsh as their first language?

A new style vehicle can travel for 85,125Km but has to change its electrical system 5 times during the journey. How far does it travel with each electrical system?

The total attendance at City's matches this season was 4,986,012; they played 24 matches in total. What was the average attendance at each match?

700,876 attended theatre productions in London last year. 223,457 were male. How many females attended? If each ticket cost an average of £5.50, how much money was taken altogether?

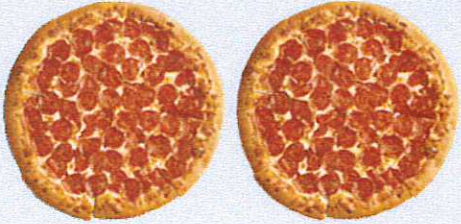
Summer 2: Week 2: Practice and Consolidation

Addition & Subtraction: Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Teaching Sequence	Oral and Mental Activities Examples:	Pencil and Paper Activities Examples:
<p>Revise:</p> <ul style="list-style-type: none"> ➤ Using all 4 operations ➤ Calculating a problem using at least 2 operations ➤ Calculating 2-step problems ➤ Explaining the order to solve calculations ➤ Solving calculations in correct order 	<ul style="list-style-type: none"> • As with Summer 1 Week 2 • The main focus in this unit is to ensure pupils are secure in their ability to tackle problems, looking for key words and also reading the problem carefully before attempting to solve it. • In addition it is an opportunity to see again how effectively pupils are applying their basic skills, in context. • Hopefully no one will be hampered in their problem solving through their lack of fluency in basic number. • Help pupils to work out reasonableness as a check to find out whether their answer is plausible. 	<p>Rosso's Pizza sells small, medium, and large pizzas. Last week, they sold 74 small pizzas. They sold 9 more medium pizzas than large pizzas. Altogether they sold 189 pizzas. How many large pizzas did they sell?</p> <p>Alfie bought 7 football and space heroes stickers with his pocket money. The football stickers cost 8p and the space heroes stickers cost 5p. If Alfie spent exactly 47p, how many of each type of sticker did he buy?</p> <p>A popular singer earns £45,000 for each appearance she makes on a tour. If she performs for 6 days, which of these totals is closest to the amount of money she is likely to make?</p> <p>£450,000 £4,500,000 £300,000 or £250,000</p> <p>A cake shop mixes 6.4Kg of cake mixture for cup cakes every single minute. How much cake mixture will they have made in 30 minutes?</p> <p>If they make 10 cup cakes from 100grms of the mixture. How many cup cakes will they have produced in 10 minutes? Cup cakes cost £1 for 3; how much money will the cake shop make every 10 minutes?</p>

Summer 2: Week 2: Mastering this Objective – Deeper Understanding

Addition & Subtraction: Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Teaching Sequence	If pupils have mastered this objective they will be able to complete these activities independently:	
<p>Revise:</p> <ul style="list-style-type: none"> ➤ Using all 4 operations ➤ Calculating a problem using at least 2 operations ➤ Calculating 2-step problems ➤ Explaining the order to solve calculations ➤ Solving calculations in correct order 	<p>Jonathon has 15 friends arriving for a party, He has exactly 4 litres of cola to share amongst everyone. He pours exactly the same amount into all 16 glasses. How much cola will each person receive?</p> <p>He also bought 10 pizzas to share between the 16 of them. If each pizza has already been sliced into 6 pieces, how many pieces will everyone receive? Will there be any left over?</p>	<p>Rosso's Pizza sells small, medium, and large pizzas.</p> <p>Last month, they sold 174 small pizzas. They sold 90 more medium pizzas than large pizzas. Altogether they sold 704 pizzas. A small pizza costs £3; a medium costs £4 and a large costs £5. How much money did they collect through the month?</p>
	<p>Rosso's Pizza sells small, medium, and large pizzas.</p> <p>Last month, they sold 274 small pizzas. They sold 90 more medium pizzas than large pizzas. Altogether they sold 904 pizzas. A small pizza costs £3; a medium costs £4 and a large costs £5. How much money did they collect through the month? If they increased the cost by 10% how much money would they make then? If costs £1.20 to produce the small pizzas; £1.40 to produce the medium one and £1.50 to produce the large one. How much profit did they make? How much profit would they make if they were able to cut the costs by 20%?</p>	

Summer 2: Week 2: Working at greater depth

Addition & Subtraction: Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Teaching Sequence

Revise:

- Using all 4 operations
- Calculating a problem using at least 2 operations
- Calculating 2-step problems
- Explaining the order to solve calculations
- Solving calculations in correct order

Activities for pupils working at greater depth:

Viking Problem

A Viking Lord needed to defend his settlement. He had an army of 305 Vikings at his disposal. He needed to get them to England, the cheapest possible way. He could hire as many of the 5 different longboats that he needed.

Length of Longboat	Number of boats available	Number of Vikings that it could take	Cost of hiring 1 longboat (in Viking coins)
10m	3	25	250
8m	4	20	200
6m	6	15	180
4m	8	12	156
3m	15	10	150

This table shows the cost per Viking on each boat

Type of Longboat	Cost per Viking
10m	10 Viking coins
8m	10 Viking Coins
6m	12 Viking coins
4m	13 Viking coins
3m	15 Viking coins

Work out how he could transport 305 men to England in the cheapest possible way. Start by creating a table showing:

- Type of longboat
- Number hired
- Total carried
- Cost

The population of the United Kingdom has increased to 65,100,000 in 2016.

The population increases by 10% each year. How many people will be living in the United Kingdom in 2024? Show your answers on this table:

Year	Population
2016	65,100,000
2017	
2018	
2019	
2020	
2021	
2022	
2023	
2024	

Summer 2: Week 2: Assessment (As with Summer 1 Week 2)

The grid below helps to identify the journey pupils make towards mastering this objective. It can be used by the teacher to keep an on-going check on progress or more likely placed in the pupils' books so that they can keep their own checks.

Addition & Subtraction: Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Me

My
Teacher

Do you, as a matter of course, check the reasonableness of your answer?

Can you solve word problems with mixed operations with numbers up to 10,000,000?

Can you solve word problems involving division with numbers up to 10,000,000?

Can you solve word problems involving multiplication with numbers up to 10,000,000?

Can you solve word problems involving subtraction with numbers up to 10,000,000?

Can you solve word problems involving addition with numbers up to 10,000,000?

Do you work out an approximate answer before tackling a problem?

Do you consistently read problems carefully and look for key words before attempting to solve it?

