

Addition and Subtraction: Stage 5

Addition and Subtraction		Knowledge Organiser		
Key Vocabulary	Addition	Subtraction		
Add	Place Value Grid: $3274 + 5601 = 8875$	Place Value Grid: $35\ 727 - 6313 = 29\ 414$		
Total				
Make			TTh	2 ten thousands left
Plus			Th	5 thousands - 6 thousands cannot be done. Exchange ten thousand for ten thousands becoming 15 thousands - 6 thousands = 9 thousands
Sum			H	7 hundreds - 3 hundreds = 4 hundreds
More			T	2 tens - 1 ten = 1 ten
Altogether	O	7 ones - 3 ones = 4 ones		
Difference	Column Method	Column Method		
Subtract	Starting with the ones, add each column in turn. Regroup tens, hundreds, thousands, ten thousands and/or as required.	Starting with the ones, subtract each column in turn. Exchange tens, hundreds, thousands and/or ten thousands as required.		
Less				
Minus				
Take away				
Column addition				
Column subtraction				
Estimate				
Inverse operation				
Number facts				
Place value				
Complex				

Addition and Subtraction		Knowledge Organiser
Estimate and Approximate	Inverse Operations	
Rounding to Estimate	Use the inverse to check:	
$41\ 635 + 7386 = 49\ 021$	$53\ 476 - 32\ 732 = 20\ 744$	To check $53\ 476 - 32\ 732 = 20\ 744$ use $32\ 732 + 20\ 744 = 53\ 476$
Round to ten:	Start with a number, subtract 409 and double. I end with 6264. To find the starting number use the inverse: halve, then add 409. Half of 6264 = 3132. $3132 + 409 = 3541$. The starting number was 3541.	
$41\ 630 + 7380 = 49\ 010$	Multistep Problems	
$41\ 630 + 7390 = 49\ 020$	Using a Bar Model	
$41\ 640 + 7390 = 49\ 030$	The sum of two numbers is 25 567. The difference is 1875.	
Rounding is not as accurate when both numbers are rounded up. A better estimate comes from "rounding" one down and one up.		
Estimating on a Number Line	Subtract 1875 from 25 567 = 23 692. Halve 23 692 to find smaller number = 11 846. Add 1875 to find larger number = 13 721.	
The arrow is about $\frac{3}{4}$ of the way across the line so it is 40 000.		
	$\text{£}3.75 + \text{£}8.49 = \text{£}12.24$	
	$\text{£}20.00 - \text{£}12.24 = \text{£}7.76$	

Multiplication and Division: Stage 5

Multiplication and Division		Knowledge Organiser	
Key Vocabulary	Factors	Prime Numbers	
multiply	A factor is a number that divides into another number exactly, without leaving a remainder.		
groups of			
lots of			<p>A common factor is a factor of 2 or more numbers.</p>
times			
divide			
share			
remainder			
factor	Squared² and Cubed³ Numbers		Related Calculations
multiple			$8 \times 9 = 72$ $9 \times 8 = 72$ $80 \times 9 = 720$ $90 \times 8 = 720$
product			$72 \div 9 = 8$ $72 \div 8 = 9$ $720 \div 9 = 80$ $720 \div 8 = 90$
	$2^2 = 4$ $2^3 = 8$ $2 \times 2 = 4$ $2 \times 2 \times 2 = 8$		
	$5^2 = 25$ $5^3 = 125$ $5 \times 5 = 25$ $5 \times 5 \times 5 = 125$		

Multiplication and Division		Knowledge Organiser
Short Multiplication	Long Multiplication	
$2543 \times 7 = 17\ 801$ <p>Remember to move any regrouped digits into the next column. After the next multiplication, add the regrouped number to the answer.</p>	$2543 \times 67 = 170\ 381$ <p>Before multiplying by the number in the tens column, remember to use zero as a placeholder because the 6 in 67 is 6 tens (60).</p>	
Division	Short Division	
$136 \div 4 = 34$ 	 $15 \div 4 = 3$ remainder 3 Remember to regroup any remainders and move them into the next column.	 $28 \div 5 = 5$ remainder 3 If your calculation has a remainder, remember to record it in the answer using the letter r.

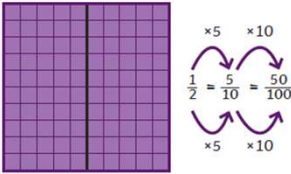
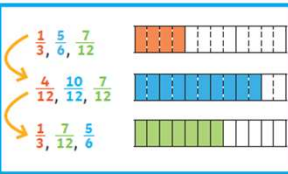
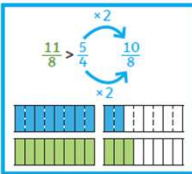

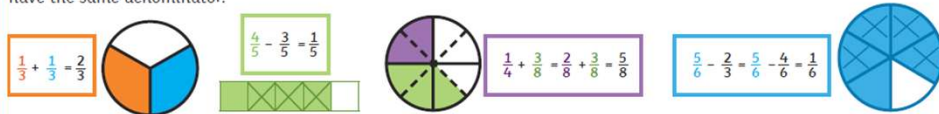
Four Operations: Stage

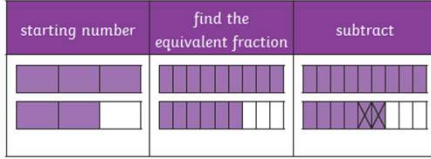
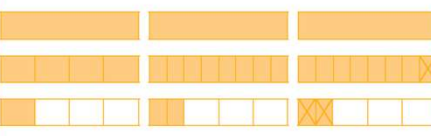
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Four Operations		Knowledge Organiser																																																
Key Vocabulary Add Total Make Plus Sum More Altogether Difference Leave Subtract Difference between Less Minus Take away Mentally, Orally Column Addition Column Subtraction Estimate Inverse operation Solve problems Number facts Place Value Complex	Add and Subtract Whole Numbers																																																	
	Column Method																																																	
	<table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td></td><td>4</td><td>5</td><td>8</td><td>6</td><td>4</td></tr> <tr><td>+</td><td>2</td><td>3</td><td>4</td><td>9</td><td>7</td></tr> <tr><td></td><td>6</td><td>9</td><td>3</td><td>6</td><td>1</td></tr> <tr><td></td><td></td><td>1</td><td>1</td><td>1</td><td></td></tr> </table>		4	5	8	6	4	+	2	3	4	9	7		6	9	3	6	1			1	1	1		Starting with the ones, add each column in turn. Regroup tens, hundreds, thousands, ten thousands as required.	<table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td></td><td>3</td><td>5</td><td>7</td><td>13</td><td>12</td></tr> <tr><td>-</td><td></td><td>3</td><td>4</td><td>7</td><td>6</td></tr> <tr><td></td><td>3</td><td>2</td><td>2</td><td>6</td><td>6</td></tr> </table>		3	5	7	13	12	-		3	4	7	6		3	2	2	6	6	Starting with the ones, subtract each column in turn. Exchange tens, hundreds, thousands and/or ten thousands as required.				
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	Multiply up to 4-digit by 2-digit		Order of Operations																																															
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Four Operations		Knowledge Organiser																																											
Short Division Start from the left. <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td></td><td>4</td><td>4</td><td>0</td><td>5</td></tr> <tr><td>12</td><td>5</td><td>2</td><td>8</td><td>6</td><td>0</td></tr> </table> $5 \div 12 = 0 \text{ r}5$ $52 \div 12 = 4 \text{ r}4$ $48 \div 12 = 4$ $6 \div 12 = 0 \text{ r}6$		4	4	0	5	12	5	2	8	6	0	Common Factors Factors of 48 <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>8</td><td>12</td><td>16</td><td>24</td><td>48</td></tr> </table> Factors of 30 <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>1</td><td>2</td><td>3</td><td>5</td><td>6</td><td>10</td><td>15</td><td>30</td></tr> </table> Common factors: 1, 2, 3, 6	1	2	3	4	6	8	12	16	24	48	1	2	3	5	6	10	15	30	Common Multiples Multiples of 3 <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>3</td><td>...</td><td>18</td><td>21</td><td>24</td><td>...</td><td>39</td><td>42</td></tr> </table> Multiples of 7 <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>7</td><td>14</td><td>21</td><td>28</td><td>35</td><td>42</td></tr> </table> Common multiples: 21, 42...	3	...	18	21	24	...	39	42	7	14	21	28	35	42
		4	4	0	5																																								
12	5	2	8	6	0																																								
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		1	2	0	r	3																																							
14	1	6	8	3																																									
	1	4	0	0																																									
		2	8	3																																									
		2	8	0																																									
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Mental Calculations and Estimation Order of calculations: $50 \times 34 \times 2 = 50 \times 2 \times 34 = 100 \times 34 = 3400$ Money: $\pounds 8.99 + \pounds 3.49 = \pounds 12.48$ Use $\pounds 9 + \pounds 3.50 = \pounds 12.50$ and subtract 2p Estimate on a number line <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>-8</td><td>0</td><td>8</td><td>16</td><td>20</td><td>24</td></tr> </table> Subdivide line to estimate: 17	-8	0	8	16	20	24	Reason from Known Facts $90 \div 10 = 9$ so $90 \div 20 = 4.5$ and $90 \div 5 = 18$ $16 \times 9 = 144$ so $1.6 \times 9 = 14.4$ $4352 \div 17 = 256$ so $256 \times 18 = 4352 + 256 = 4608$ $3786 + 2850 = 6636$ so $4786 + 2850 = 7636$ and $2786 + 3850 = 6636$ and $8636 - 3786 = 4850$																																						
-8	0	8	16	20	24																																								

Fractions: Stage 5

Fractions		Knowledge Organiser	
Key Vocabulary	Equivalent Fractions	Compare and Order Fractions	
numerator	To find equivalent fractions, we multiply or divide the numerator and denominator by the same number.	We can compare and order fractions by using common denominators.	
denominator			
unit fraction			
non-unit fraction			
whole			
equivalent	Mixed Numbers	Improper Fractions	
mixed number	Mixed numbers contain a whole number and a fraction. 	An improper fraction has a numerator which is greater than or equal to the denominator. $\frac{5}{3}$	
improper fraction	Convert an Improper Fraction to a Mixed Number	Convert a Mixed Number to an Improper Fraction	
simplest form	$9 \div 4 = 2r1$ $\frac{9}{4} = 2\frac{1}{4}$ Divide the numerator by the denominator. This shows you the whole number and the fraction.	Multiply the whole by the denominator to make an improper fraction. $2\frac{5}{6} = \frac{12}{6} + \frac{5}{6} = \frac{17}{6}$ Add the fractions together.	
multiple			
common denominator	Adding and Subtracting Fractions		
common numerator	To add or subtract fractions with denominators that are multiples of the same number, we must change one fraction to have the same denominator.		
			

Fractions		Knowledge Organiser	
Add Fractions Where the Total is Greater Than 1		Subtract from a Mixed Number	
$\frac{1}{2} + \frac{3}{4} + \frac{5}{8} = \frac{4}{8} + \frac{6}{8} + \frac{5}{8} = \frac{15}{8} = 1\frac{7}{8}$		$1\frac{2}{3} - \frac{2}{9} = 1\frac{6}{9} - \frac{2}{9} = 1\frac{4}{9}$	
Add Mixed Numbers		starting number find the equivalent fraction subtract	
$1\frac{1}{4} + \frac{3}{8} = 1\frac{2}{8} + \frac{3}{8} = 1 + \frac{5}{8} = 1\frac{5}{8}$			
$1\frac{1}{4} + \frac{3}{8} = \frac{5}{4} + \frac{3}{8} = \frac{10}{8} + \frac{3}{8} = \frac{13}{8} = 1\frac{5}{8}$		Subtract Two Mixed Numbers	
Multiply Unit Fractions by an Integer	Multiply Non-Unit Fractions by an Integer	$2\frac{3}{4} - 1\frac{5}{8} = 1\frac{1}{8}$	
$\frac{1}{3} \times 5 = \frac{5}{3}$	$2 \times \frac{4}{9} = \frac{8}{9}$	$2 - 1 = 1$ $\frac{3}{4} - \frac{5}{8} = \frac{1}{8}$	
Multiply Mixed Numbers by Integers		Subtract from a Mixed Number - Breaking the Whole	
Convert to an improper fraction and multiply the numerator by the integer.		$2\frac{1}{4} - \frac{3}{8} = 2\frac{2}{8} - \frac{3}{8} = 1\frac{10}{8} - \frac{3}{8} = 1\frac{7}{8}$	
$2\frac{1}{4} \times 2 = \frac{9}{4} \times 2 = \frac{18}{4} = 4\frac{2}{4} = 4\frac{1}{2}$			
Use repeated addition.			
$2\frac{1}{4} \times 2 = 2\frac{1}{4} + 2\frac{1}{4} = 4\frac{2}{4} = 4\frac{1}{2}$			

Fractions: Stage 6

Fractions		Knowledge Organiser		
Key Vocabulary	Simplify Fractions	Compare and Order Fractions		
numerator	<p>Factors of 9: 1, 3, 9</p> <p>Factors of 12: 1, 2, 3, 4, 6, 12</p>	Use the Common Denominator		
denominator		<p>Multiples of 5: 5, 10, 15</p> <p>Multiples of 3: 3, 6, 9, 12, 15</p>	Use the Common Numerator	
proper fraction			<p>Multiples of 5: 5, 10, 15</p> <p>Multiples of 10: 10, 20</p>	
improper fraction				
factor				
highest common multiple				
lowest common multiple				
equivalents				
common numerator				
common denominator				
decimal equivalent				
simplify				
simplest form				
mixed number				
whole number				
mixed number				

Fractions		Knowledge Organiser
Adding and Subtracting Proper Fractions	Adding and Subtracting Mixed Numbers	
Same Denominators	Add or subtract the whole numbers and fractions separately.	
	$2\frac{2}{5} + 1\frac{3}{10}$ $2 + 1 = 3$ $\frac{2}{5} + \frac{3}{10} = \frac{4}{10} + \frac{3}{10} = \frac{7}{10}$ $3 + \frac{7}{10} = 3\frac{7}{10}$	$2\frac{1}{2} - 1\frac{1}{4}$ $2 - 1 = 1$ $\frac{1}{2} - \frac{1}{4} = \frac{2}{4} - \frac{1}{4} = \frac{1}{4}$ $1 + \frac{1}{4} = 1\frac{1}{4}$
Different Denominators	Convert the mixed numbers to improper fractions.	
$\frac{2}{7} + \frac{3}{5}$ Multiples of 7: 7, 14, 21, 28, 35 Multiples of 5: 5, 10, 15, 20, 25, 30, 35 $\frac{2}{7} = \frac{10}{35}, \frac{3}{5} = \frac{21}{35}$ $\frac{10}{35} + \frac{21}{35} = \frac{31}{35}$	$2\frac{2}{5} + 1\frac{3}{10}$ $2\frac{2}{5} = \frac{12}{5}$ $1\frac{3}{10} = \frac{13}{10}$ $\frac{12}{5} + \frac{13}{10} = \frac{24}{10} + \frac{13}{10} = \frac{37}{10}$ $\frac{37}{10} = 3\frac{7}{10}$	$2\frac{1}{2} - 1\frac{1}{4}$ $2\frac{1}{2} = \frac{5}{2}$ $1\frac{1}{4} = \frac{5}{4}$ $\frac{5}{2} - \frac{5}{4} = \frac{10}{4} - \frac{5}{4} = \frac{5}{4}$ $\frac{5}{4} = 1\frac{1}{4}$
Multiplying Proper Fractions	Dividing Fractions by Whole Numbers	
Multiplying Fractions by Fractions	$\frac{2}{5} \div 2 = \frac{2}{5} \times \frac{1}{2} = \frac{2}{10} = \frac{1}{5}$ Multiplication and division are the inverse of one another so: $\div 2$ is the same as $\times \frac{1}{2}$ $\frac{2}{5} \times \frac{1}{2} = \frac{2}{10}$	
Multiplying Fractions by Whole Numbers		

Number and Place Value: Stage 5

Number and Place Value		Knowledge Organiser														
Key Vocabulary	Compare and Order															
millions	equals	greater than	less than													
thousands	$26 + 38 = 8 \times 8$	$23\ 873 > 8256$	$901\ 198 < 1\ 091\ 098$													
hundreds	Both calculations have the value 64.	The number on the left has 2 ten thousands and the number on the right has 0 ten thousands.	The number on the right has 1 million and the number on the left has 0 millions.													
tens	smallest	898	6735	6835												
ones			7019	9002												
zero				11 235												
place value				greatest												
greater than	Negative Numbers															
less than																
order	Counting in Powers of 10															
round	Counting in 10s	Counting in 100s														
rounded	<table border="1"> <tr> <td>365</td> <td>375</td> <td>385</td> <td>395</td> <td>405</td> <td>415</td> </tr> </table>	365	375	385	395	405	415	<table border="1"> <tr> <td>2841</td> <td>2941</td> <td>3041</td> <td>3141</td> <td>3241</td> <td>3341</td> </tr> </table>			2841	2941	3041	3141	3241	3341
365	375	385	395	405	415											
2841	2941	3041	3141	3241	3341											
negative number	The tens increase until 9 tens becomes one more hundred and 0 tens.	The hundreds increase until 9 hundreds becomes one more thousand and 0 hundreds.														
partition	Counting in 10 000s	Counting in 100 000s														
digit	<table border="1"> <tr> <td>276 109</td> <td>286 109</td> <td>296 109</td> <td>306 109</td> </tr> </table>	276 109	286 109	296 109	306 109	<table border="1"> <tr> <td>2 972 151</td> <td>3 072 151</td> <td>3 172 151</td> <td>3 272 151</td> </tr> </table>			2 972 151	3 072 151	3 172 151	3 272 151				
276 109	286 109	296 109	306 109													
2 972 151	3 072 151	3 172 151	3 272 151													
interval	The ten thousands increase until 9 ten thousands become one more hundred thousand and 0 ten thousands.	The hundred thousands increase until 9 hundred thousands becomes one more million and 0 hundred thousands.														
sequence																
linear sequence																

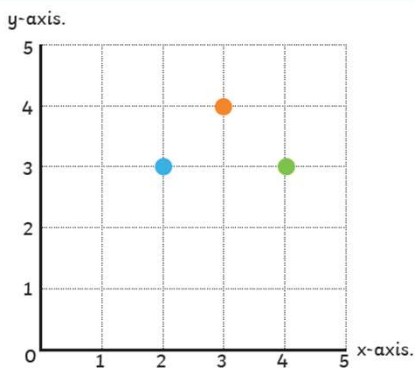

Number and Place Value		Knowledge Organiser																																																			
Numbers to One Million																																																					
926 471																																																					
<table border="1"> <thead> <tr> <th>Hundred Thousands</th> <th>Ten Thousands</th> <th>Thousands</th> <th>Hundreds</th> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td>9</td> <td>2</td> <td>6</td> <td>4</td> <td>7</td> <td>1</td> </tr> </tbody> </table>	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones	9	2	6	4	7	1																																									
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9	2	6	4	7	1																																																
<p>nine hundred and twenty-six thousand, four hundred and seventy-one</p>																																																					
Roman Numerals		Rounding																																																			
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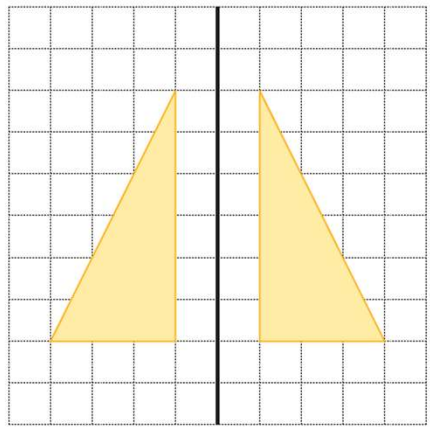
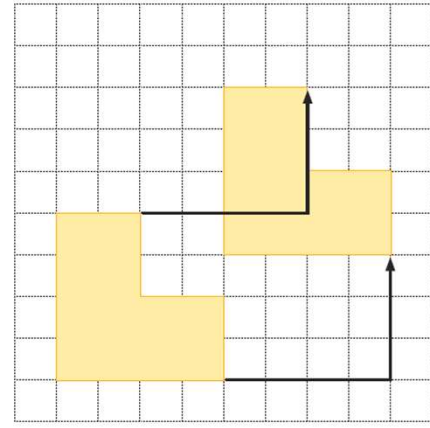
Number and Place Value: Stage 6

Number and Place Value		Knowledge Organiser		
Key Vocabulary	Compare and Order			
ten million	equals	greater than	less than	
millions	$26 + 38 = 8 \times 8$	$223\ 873 > 98\ 256$	$901\ 198 < 1\ 091\ 098$	
thousands	Both calculations have the value 64.	The number on the left has 2 hundred thousands and the number on the right has 0 hundred thousands.	The number on the right has 1 million and the number on the left has 0 millions.	
hundreds	smallest	81 782	127 352	127 835
tens			137 019	200 002
ones				greatest
zero	Negative Numbers			
place value	$3 - 8 = -5$		$-6 + 11 = 5$	
greater than				
less than				
order				
round				
rounded				
negative number				
partition				
digit				
interval				
sequence				
linear sequence				

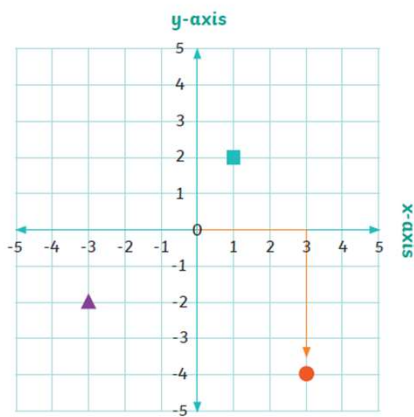
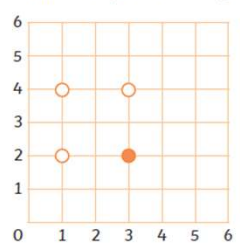
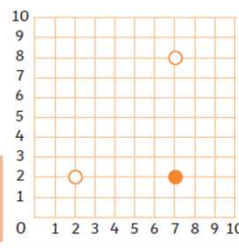
Number and Place Value		Knowledge Organiser						
Numbers to Ten Million								
3 926 471								
Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds				
3	9	2	6	4				
				Tens				
				7				
				Ones				
				1				
three million, nine hundred and twenty-six thousand, four hundred and seventy-one								
<table border="1" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">3 926 471</td> <td style="width: 50%;"></td> </tr> <tr> <td style="text-align: center;">3 926 000</td> <td style="text-align: center;">471</td> </tr> </table>					3 926 471		3 926 000	471
3 926 471								
3 926 000	471							
Round Any Number								
Rounding to the nearest 1000		Rounding to the nearest 100 000						
2000 ← 2499	2500 → 3000	200 000 ← 249 999	250 000 → 300 000					
round down	round up	round down	round up					
Rounding to the nearest 10 000		Rounding to the nearest 1 000 000						
20 000 ← 24 999	25 000 → 30 000	2 000 000 ← 2 499 999	2 500 000 → 3 000 000					
round down	round up	round down	round up					


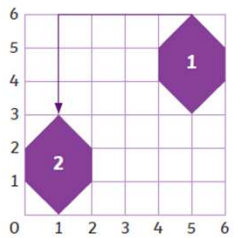

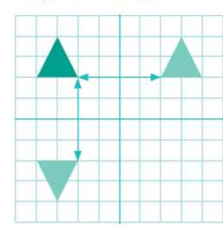
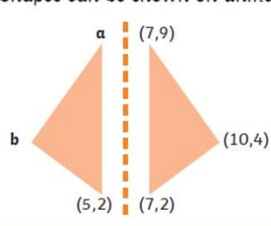
Position and Direction: Stage 5

Position and Direction		Knowledge Organiser	
Key Vocabulary			
coordinate		Coordinates are a useful way to locate a position on a map or grid.	
quadrant		The numbers across the horizontal line of the grid are on the x-axis .	
x-axis		The numbers on the vertical line of the grid are on the y-axis .	
y-axis		We always read or write the number on the x-axis before the y-axis.	
reflection		The x and y position are written in brackets with a comma.	
mirror line		The coordinate of the orange spot is (3, 4) .	
translation			
horizontal			To help you remember which point to read or write first, simply remember to move 'along the corridor and up the stairs'.
vertical			In other words, move on the x-axis and then move on the y-axis .

Position and Direction		Knowledge Organiser
Reflection	Translation	
<p>A shape is reflected when it is flipped over a mirror line.</p> <p>The reflected image is congruent to the original. This means that the measurements of the sides and angles have not changed.</p> <p>Each point of the reflected shape is the same distance from the mirror line as the original shape.</p>	<p>In maths, translation means moving an object on a grid. The object is moved without changing the size, turning or reflecting it.</p> <p>When translating an object on a grid, it can move up or down, left or right.</p>	
		

Position and Direction: Stage 6

Position and Direction		Knowledge Organiser	
<p>Key Vocabulary</p> <p>translate</p> <p>translation</p> <p>reflect</p> <p>reflection</p> <p>up</p> <p>down</p> <p>right</p> <p>left</p> <p>coordinates</p> <p>quadrant</p> <p>x-axis</p> <p>y-axis</p> <p>horizontal</p> <p>vertical</p>		<p>Four Quadrants</p> <p>Coordinates can use positive and negative numbers. Whether positive or negative, the x-axis coordinate is written first, followed by the y-axis coordinate.</p>  <p>● (3,-4) ■ (1,2) ▲ (-3,-2)</p> <p>Look at the circle. It is 3 units along the x-axis and 4 down the y-axis. Its coordinates are (3,-4).</p>	
		<p>Completing Shapes</p> <p>Using the properties of a shape, a polygon can be completed on a grid.</p> <p>To make a square, think of the square's properties.</p>  <p>All of a square's sides are the same length. If the completed sides are 2 units in length, the missing point must complete two more sides of 2 units.</p> <p>To make a right-angled triangle, think of the triangle's properties.</p>  <p>A right-angled triangle should have three sides with one 90° angle.</p>	

Position and Direction		Knowledge Organiser	
<p>Translation</p> <p>A shape is translated when it is moved without being rotated or resized. Every point of the shape moves the same distance and in the same direction.</p>  <p>Shape 1 has been translated 4 units left and 3 units down.</p> 		<p>Reflections</p> <p>A shape is reflected when it is flipped over a line which acts as a mirror. Every point on the original shape is the same distance from the mirror line as the same point on the reflected shape. The original triangle has been reflected in the x-axis and in the y-axis.</p>  	
<p>Missing Coordinates</p> <p>Shapes can be shown on unmarked grids.</p>  <p>Point a is in the same position along the x-axis as (5,2) and in the same position on the y-axis as (7,9).</p> <p>Point a (5,9)</p> <p>Point b is in the same position on the y-axis as (10,4). Both triangles will have the same width. The width of the right-hand triangle is 3. This means that the width of the left-hand triangle is also 3.</p> <p>Point b (2,4)</p>			

Properties of Shape: Stage 5

Properties of Shape		Knowledge Organiser			
Key Vocabulary	Regular and Irregular Polygons	Properties of 3D Shapes			
angle	<table border="1"> <thead> <tr> <th>Regular</th> <th>Irregular</th> </tr> </thead> <tr> <td></td> <td></td> </tr> </table>	Regular	Irregular		
Regular		Irregular			

A polygon is any two-dimensional shape formed with straight lines.



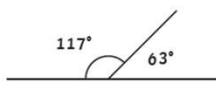
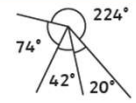
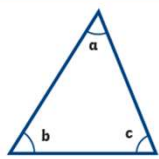
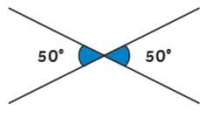
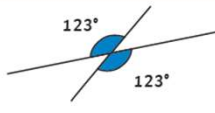
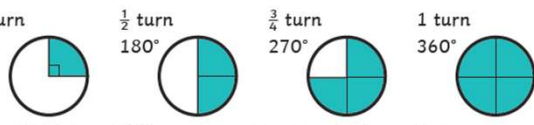
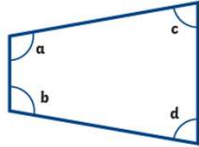
In a regular polygon, all the sides and angles are equal.

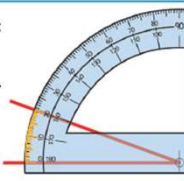
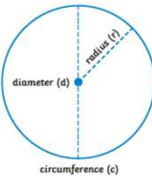
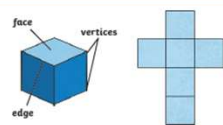











In an irregular polygon, the sides and angles are not equal.

 | Name | Surfaces | | Edges | | Vertices | Picture | |----------------------|----------|--------|-------|--------|----------|---------| | | Flat | Curved | Flat | Curved | | | | cube | 6 | 0 | 12 | 0 | 8 | | | cuboid | 6 | 0 | 12 | 0 | 8 | | | square-based pyramid | 5 | 0 | 8 | 0 | 5 | | | tetrahedron | 4 | 0 | 6 | 0 | 4 | | | triangular prism | 5 | 0 | 9 | 0 | 6 | | | pentagonal prism | 7 | 0 | 15 | 0 | 10 | | | hexagonal prism | 8 | 0 | 18 | 0 | 12 | | | octagonal prism | 10 | 0 | 24 | 0 | 16 | | | octahedron | 8 | 0 | 12 | 0 | 6 | | | || right angle | **Representations** Cube models can be drawn as 2D representations using different elevations. A shape net is a 2D drawing of an unfolded 3D shape. When you are drawing or reasoning about shape nets, think carefully about where the edges of the faces meet. Shape net of a tetrahedron. | A cone has an apex. This is because a vertex is the point where two straight edges meet and a cone has no straight edges. | |
| acute | horizontal vertical parallel perpendicular polygon regular irregular two-dimensional three-dimensional flat face curved surface edge curved edge vertex apex |

Properties of Shape		Knowledge Organiser	
Identifying Angles			
<p>Acute Angles</p> <p>Any angle that measures less than 90° is called an acute angle.</p>	<p>Obtuse Angles</p> <p>Any angle that measures greater than 90° and less than 180° is called an obtuse angle.</p>	<p>Reflex Angles</p> <p>Any angle that measures greater than 180° is called a reflex angle.</p>	
<p>Angles on a straight line always total 180°.</p>	<p>Angles around a point always total 360°.</p>	<p>Measuring and Drawing Angles</p> <p>To measure angles, we use a protractor. Look carefully at how the numbers on the scale count from 0° to 180° in both directions.</p>	
<p>Multiples of 90° can be used as descriptions of a turn.</p> <p>$\frac{1}{4}$ turn - 90° $\frac{1}{2}$ turn - 180° $\frac{3}{4}$ turn - 270° 1 turn - 360°</p>			
Using Properties of Rectangles			
		<p>$6\text{cm} + 2\text{cm} = 8\text{cm}$</p> <p>$7\text{cm} + 6\text{cm} = 13\text{cm}$</p>	

Properties of Shape: Stage 6

Properties of Shapes		Knowledge Organiser		
Key Vocabulary angle right angle acute obtuse reflex protractor horizontal vertical parallel perpendicular polygon regular irregular two-dimensional three-dimensional flat face curved surface edge curved edge vertex vertices apex radius diameter circumference	Angle Types		Reflex Angles Any angle that measures greater than 180° is called a reflex angle.	
	 Acute Angles Any angle that measures less than 90° is called an acute angle.	 Obtuse Angles Any angle that measures greater than 90° and less than 180° is called an obtuse angle.		
	Calculating Angles		Angles in a Triangle	
	 Angles on a straight line always total 180°.	 Angles around a point always total 360°.	 $a + b + c = 180^\circ$	
	 Opposite angles that share a vertex are equal.		Angles in a Quadrilateral	
 Multiples of 90° can be used as descriptions of a turn.	 $a + b + c + d = 360^\circ$			

Properties of Shapes		Knowledge Organiser	
Using a Protractor Place the cross or circle at the point of the angle you are measuring. Read from the zero on the outer scale of your protractor. Count the degree lines carefully.			
Parts of Circles A circle is a 2D shape. The perimeter of a circle is called the circumference (c). The distance across the circle, passing through the centre, is called the diameter (d). The distance from the centre of the circle to the circumference is called the radius (r). $r \times 2 = d$ $\frac{d}{2} = r$			
Nets of 3D Shapes  A shape net shows which 2D shapes can be folded and joined to make a 3D shape. When you are drawing a net, or solving a problem involving a shape net, think carefully about where the edges of the faces meet.		Angles in Regular Polygons As the number of sides of a polygon increases by one, the total of the interior angles increases by 180°. When n = number of sides, this formula can be used to find the size of each angle in a regular polygon : $\text{Sum of Interior Angles} = (n - 2) \times 180^\circ$ $\text{Each Angle} = \frac{(n - 2) \times 180^\circ}{n}$	
		 Pentagon n = 5 $(5 - 2) \times 180^\circ = 540^\circ$ $540^\circ \div 5 = 108^\circ$	 Hexagon n = 6 $(6 - 2) \times 180^\circ = 720^\circ$ $720^\circ \div 6 = 120^\circ$
Properties of 3D Shapes 3D shapes have three dimensions – length, width and depth . A polyhedron is a 3D shape with flat faces. Spheres, cylinders and cones are not polyhedrons as they have curved surfaces.			
Cube  6 square faces 12 edges 8 vertices	Tetrahedron  4 triangular faces 6 edges 4 vertices	Sphere  1 curved surface 0 edges 0 vertices	
Cuboid  6 faces 12 edges 8 vertices	Octahedron  8 faces 12 edges 6 vertices	Triangular prism  5 faces 9 edges 6 vertices	
Square-based pyramid  5 faces 8 edges 5 vertices	Cone  1 circular face 1 curved surface 1 curved edge 1 apex	Cylinder  2 circular faces 1 curved surface 2 curved edges 0 vertices	