



St Antony's RC Primary School Calculation Policy



Maths Calculation Policy 2022

Mission Statement

St. Antony's School is part of the Roman Catholic community of the Holy Family, where Jesus Christ is our inspiration as we raise standards and aspirations for all of our children.

INCLUSION STATEMENT

In this school, we are educating our children to:

- know who they are - a special and unique gift from God
- know why they are here - we all have a purpose and responsibility to look after God's world
- work hard and aim high for their future- find and use their God given talents to be what God intended them to be.

We are a Catholic community, in a modern society, where everyone is equal. The most loving and merciful Jesus Christ is our role model, and He welcomed everyone. All children are welcome in our school, and they and their families become part of our St. Antony's family. We will love and nurture them, and do our best to help them, on their faith and learning journeys, to become what God wants them to be.

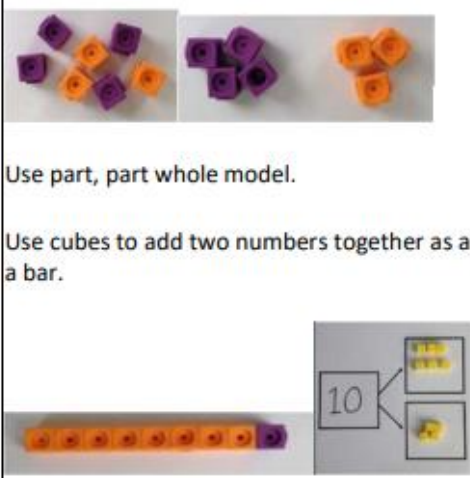
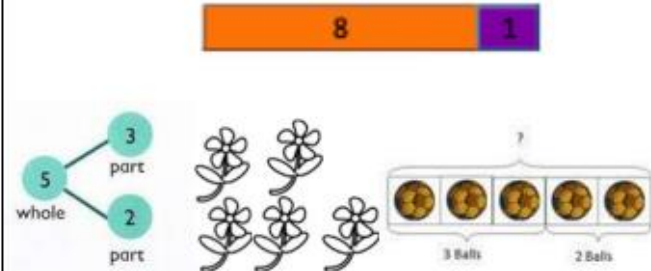


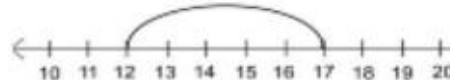
Adopted by Governors:(signed on hard copy)

Date:

Review date:.....

Addition Year 1

Year 1 Addition

Objective / Strategy	Concrete	Pictorial	Abstract
<p>Combining two parts to make a whole: part-whole model</p>	 <p>Use part, part whole model.</p> <p>Use cubes to add two numbers together as a group or in a bar.</p>	<p>Use pictures to add two numbers together as a group or in a bar.</p> 	<p>$8=5+3$ $5+3=8$</p>  <p>Use the part part whole diagram as shown above to move into the abstract.</p> <p>Include missing number questions to support varied fluency:</p> <p>$8=?+3$ $5+?=8$</p>
<p>Starting at the bigger number and counting on</p>	 <p>Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.</p>	 <p>$12 + 5 = 17$</p> <p>Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p>	<p>$5 + 12 = 17$</p> <p>Place the larger number in your head and count on the smaller number to find your answer.</p>

Regrouping to make 10.

This is an essential skill for column addition later.

Represent & use number bonds and related subtraction facts within 20



$$6 + 5 = 11$$

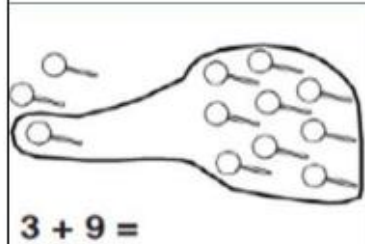
Start with the bigger number and use the smaller number to make 10.



Use ten frames.

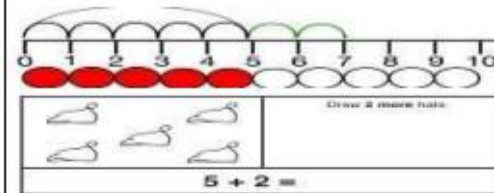
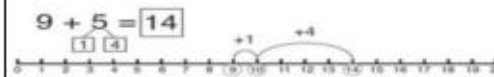


2 more than 5.



$$3 + 9 =$$

Use pictures or a number line. Regroup or partition the smaller number using the part, part whole model to make 10.



$$7 + 4 = 11$$

If I am at seven, how many more do I need to make 10? How many more do I add on now?


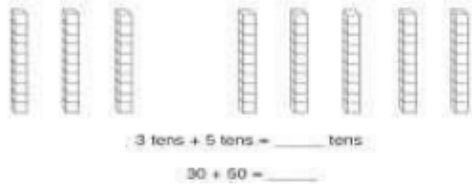
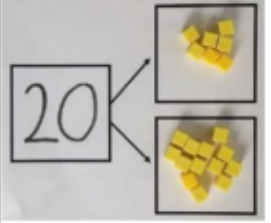
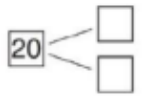
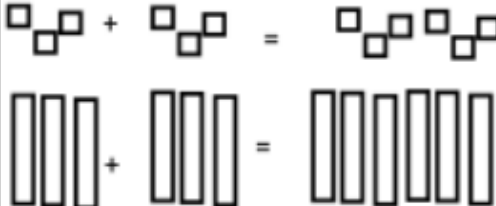
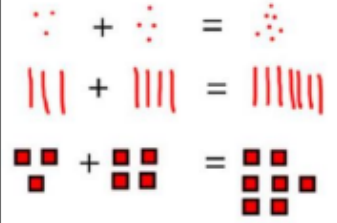
Include missing number questions:



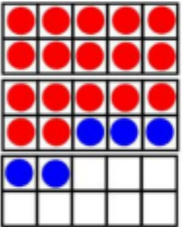
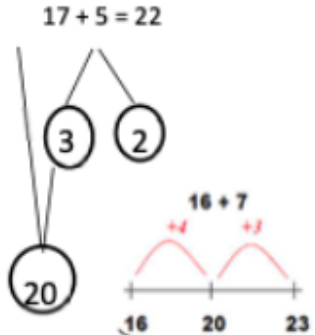

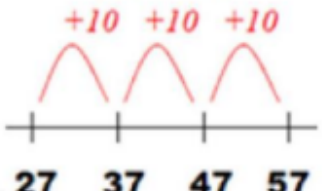
$$8 = ? + 3 \quad 5 + ? = 8$$


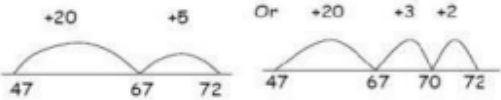
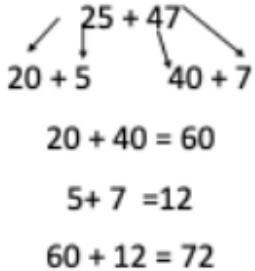

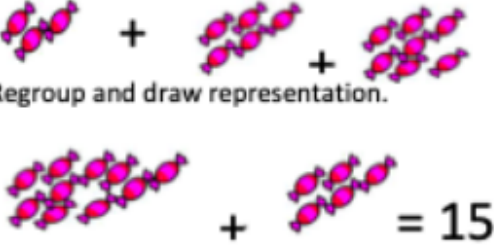
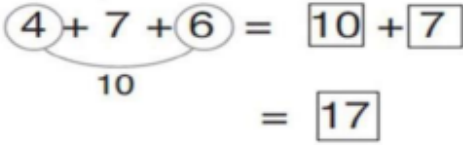
Emphasis should be on the language

'1 more than 5 is equal to 6.' '2 more than 5 is 7.'
'8 is 3 more than 5.'

Addition Year 2

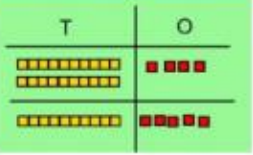

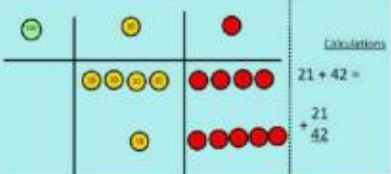
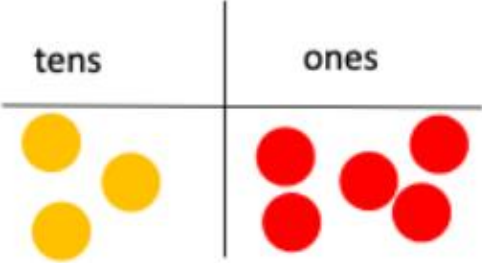
Year 2 Addition			
Objective /Strategy	Concrete	Pictorial	Abstract
Adding multiples of ten	$50 = 30 + 20$ 	 3 tens + 5 tens = _____ tens $30 + 50 = \underline{\quad}$	$20 + 30 = 50$ $70 = 50 + 20$ $40 + \square = 60$
	Model using dienes and bead strings	Use representations for base ten.	
Use known number facts Part, part whole	 Children explore ways of making numbers within 20	 $\square + \square = 20$ $20 - \square = \square$ $\square + \square = 20$ $20 - \square = \square$	Explore commutativity of addition by swapping the addends to build a fact family. Explore the concept of the inverse relationship of addition and subtractions and use this to check calculations. $\square + 1 = 16$ $16 - 1 = \square$ $1 + \square = 16$ $16 - \square = 1$
Using known facts		 Children draw representations of H,T and O	$3 + 4 = 7$ <i>leads to</i> $30 + 40 = 70$ <i>leads to</i> $300 + 400 = 700$

<p>Bar model</p>	 <p>$3+4=7$</p>	 <p>$7 + 3 = 10$</p>	<table border="1" data-bbox="1563 124 1966 220"> <tr> <td>23</td> <td>25</td> </tr> <tr> <td colspan="2">?</td> </tr> </table> <p>$23 + 25 = 48$</p>	23	25	?	
23	25						
?							
<p>Add a 2-digit number and ones</p>	 <p>$17 + 5 = 22$</p> <p>Use ten frame to make 'magic ten'</p> <p>Children explore the pattern. $17 + 5 = 22$ $27 + 5 = 32$</p>	<p>Use part part whole and number line to model.</p>  <p>$17 + 5 = 22$</p> <p>$16 + 7 = 23$</p>	<p>$17 + 5 = 22$ Explore related facts</p> <p>$17 + 5 = 22$ $5 + 17 = 22$ $22 - 17 = 5$ $22 - 5 = 17$</p> <table border="1" data-bbox="1749 568 2024 727"> <tr> <td colspan="2">2 2</td> </tr> <tr> <td>17</td> <td>5</td> </tr> </table> <p>Lead into recording in column format, to reinforce place value and prepare children for formal written methods with larger values.</p>	2 2		17	5
2 2							
17	5						
<p>Add a 2-digit number and tens</p>	 <p>$25+10=35$</p> <p>Explore that the ones digit does not change</p>	<p>$27 + 30$</p>  <p>$27 + 10 = 37$ $37 + 10 = 47$ $47 + 10 = 57$</p>	<p>$27 + 10 = 37$ $27 + 20 = 47$ $27 + \square = 57$</p>				

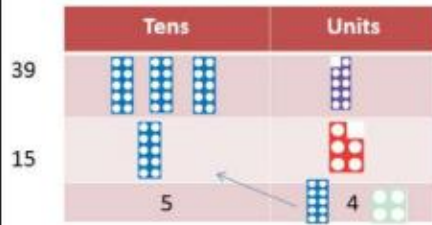
<p>Add two 2-digit numbers</p>	 <p>Model using dienes , place value counters and numicon</p>	 <p>Use number line and bridge ten using part whole if necessary.</p>	 <p>Lead into recording in column format, to reinforce place value and prepare children for formal written methods with larger values.</p>
			<p>Lead into recording in column format, to reinforce place value and prepare children for formal written methods with larger values.</p>
<p>Add three 1-digit numbers</p>	 <p>Combine to make 10 first if possible, or bridge 10 then add third digit</p>	 <p>Regroup and draw representation.</p>	 <p>Combine the two numbers that make/ bridge ten then add on the third.</p>

Addition Year 3

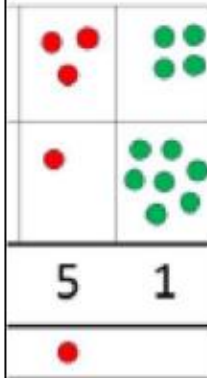
Year 3 Addition

Objective /Strategy	Concrete	Pictorial	Abstract
<p>Column Addition—no regrouping (friendly numbers)</p> <p>Add two or three 2 or 3digit numbers.</p>	<p>Dienes or numicon</p>  <p>Add together the ones first, then the tens.</p>   <p>Move to using place value counters</p>	<p>Children move to drawing the counters using a tens and one frame.</p> 	$\begin{array}{r} 223 \\ + 114 \\ \hline 337 \end{array}$ <p>Add the ones first, then the tens, then the hundreds.</p>

Column Addition with regrouping.



Exchange ten ones for a ten. Model using numicon and place value counters.

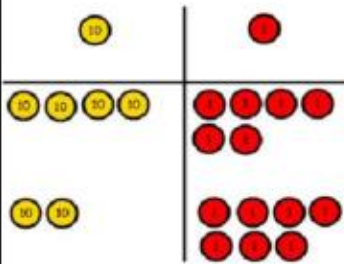


Children can draw a representation of the grid to further support their understanding, carrying the ten underneath the line

$$34 + 17$$

$$\begin{array}{r}
 20 + 5 \\
 40 + 8 \\
 \hline
 60 + 13 = 73 \\
 \hline
 \end{array}
 \qquad
 \begin{array}{r}
 536 \\
 + 85 \\
 \hline
 621 \\
 11
 \end{array}$$

Start by partitioning the numbers before formal column to show the exchange.



$$46 + 27 = 73$$

Estimate the answers to questions and use inverse operations to check answers



Estimating $98 + 17 = ?$ $100 + 20 = 120$

Use number lines to illustrate estimation.



Building up known facts and using them to illustrate the inverse and to check answers:

$$98 + 18 = 116$$

$$116 - 18 = 98$$

$$18 + 98 = 116$$

$$116 - 98 = 18$$

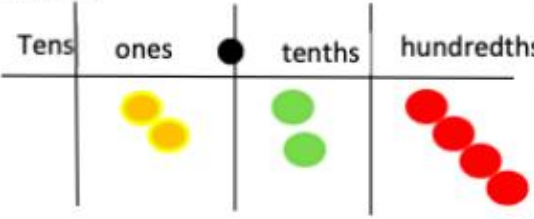
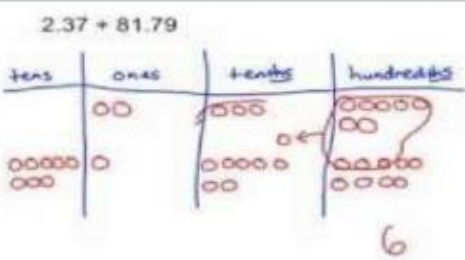
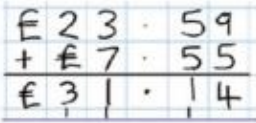
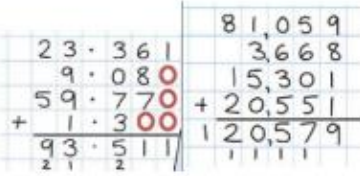


St Antony's RC Primary School Calculation Policy





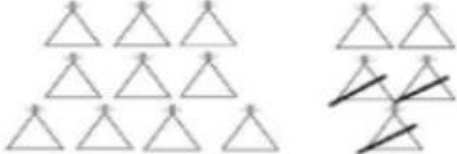


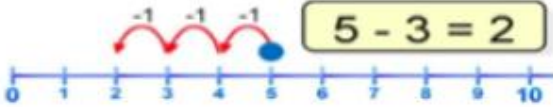
Addition Year 4-6

Years 4 – 6 Addition																																																																
Objective /Strategy	Concrete	Pictorial	Abstract																																																													
Years 4 – 6 Estimate and use inverse operations to check answers to a calculation	As per Year 3																																																															
Y4—add numbers with up to 4 digits	<p>Children continue to use dienes or place value counters to add, exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand.</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Hundreds</th> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Hundreds	Tens	Ones							<table border="1" style="width: 100%; text-align: center;"> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>1</td> <td>5</td> <td>1</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Draw representations using place value grid.</p>									7	1	5	1					<table border="1" style="width: 100%; text-align: center;"> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>3</td> <td>5</td> <td>1</td> <td>7</td> <td></td> </tr> <tr> <td>+</td> <td></td> <td>3</td> <td>9</td> <td>6</td> <td></td> </tr> <tr> <td></td> <td colspan="5"><hr/></td> </tr> <tr> <td></td> <td>3</td> <td>9</td> <td>1</td> <td>3</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Continue from previous work to carry hundreds as well as tens. Relate to money and measures.</p>								3	5	1	7		+		3	9	6			<hr/>						3	9	1	3							
Hundreds	Tens	Ones																																																														
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<p>Y5—add numbers with more than 4 digits.</p> <p>Add decimals with 2 decimal places, including money.</p>	<p>As year 4</p>  <p>Introduce decimal place value counters and model exchange for addition.</p>		$\begin{array}{r} 72.8 \\ + 54.6 \\ \hline 127.4 \\ 11 \end{array}$ 
<p>Y6—add several numbers of increasing complexity, including adding money, measure and decimals with different numbers of decimal points.</p>	<p>As Y5</p>	<p>As Y5</p>	<p>insert zeros for place holders.</p> 

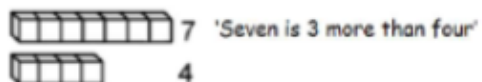
Subtraction Year 1

Year 1 Subtraction

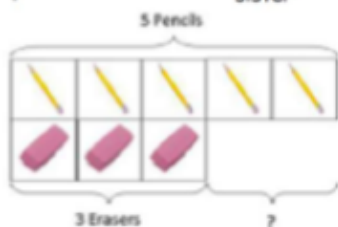
Objective /Strategy	Concrete	Pictorial	Abstract
Taking away ones	<p>Use physical objects, counters, cubes etc to show how objects can be taken away.</p> <p>$4 - 2 = 2$</p>  <p>$6 - 4 = 2$</p> 	<p>Cross out drawn objects to show what has been taken away.</p>  <p>$15 - 3 = 12$</p>	<p>$7 - 4 = 3$</p> <p>$16 - 9 = 7$</p>
Counting back	<p>Move objects away from the group, counting backwards.</p>  <p>Move the beads along the bead string as you count backwards.</p> 	 <p>$5 - 3 = 2$</p> <p>Count back in ones using a number line.</p>	<p>Put 13 in your head, count back 4. What number are you at?</p>

Find the Difference

Compare objects and amounts

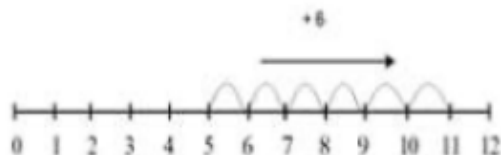


'I am 2 years older than my sister'



Lay objects to represent bar model.

Count on using a number line to find the difference.

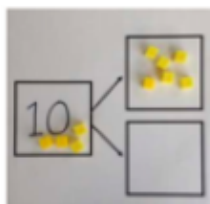


Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister?

Represent and use number bonds and related subtraction facts within 20

Including subtracting zero

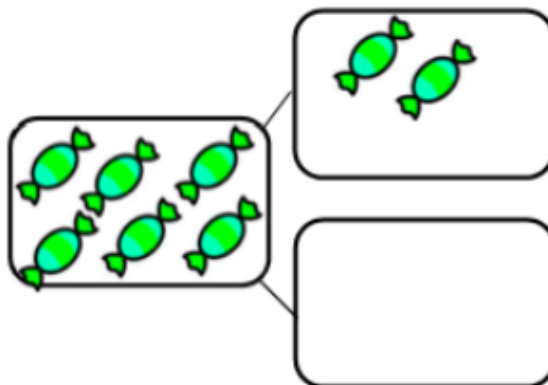
Part Part Whole model



Link to addition. Use PPW model to model the inverse.

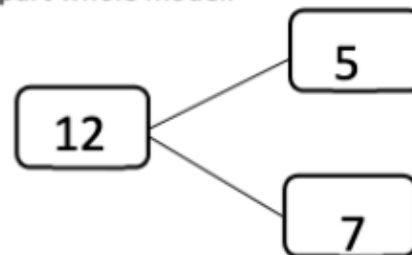
If 10 is the whole and 6 is one of the parts, what is the other part?

$$10 - 6 = 4$$



Use pictorial representations to show the part.

Move to using numbers within the part whole model.



Include missing number problems:

$$12 - ? = 5$$

$$7 = 12 - ?$$

Make 10

$$14 - 9$$



Make 14 on the ten frame. Take 4 away to make ten, then take one more away so that you have taken 5.

Bar model

Including the inverse operations



$$5 - 2 = 3$$



$$13 - 7$$

Jump back 3 first, then another 4. Use ten as the stopping point.



16-8

How many do we take off first to get to 10? How many left to take off?

8	2
---	---

$$10 = 8 + 2$$



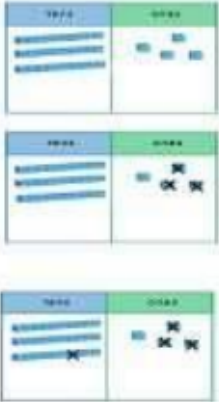

$$10 = 2 + 8$$

$$10 - 2 = 8$$

$$10 - 8 = 2$$

Subtraction Year 2

Year 2 Subtraction

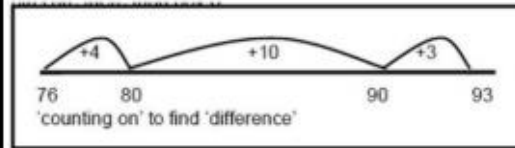
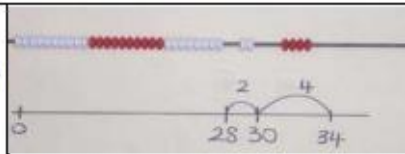
Objective/Strategy	Concrete	Pictorial	Abstract
Regroup a ten into ten ones	 <p>Use a PV chart to show how to change a ten into ten ones, use the term 'take and make'</p>	 $20 - 4 =$	$20 - 4 = 16$
Partitioning to subtract without regrouping. 'Friendly numbers'	 $34 - 13 = 21$ <p>Use Dienes to show how to partition the number when subtracting without regrouping.</p>	Children draw representations of Dienes and cross off.  $43 - 21 = 22$	$43 - 21 = 22$

Make ten strategy

Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.

$$34 - 28$$

Use a bead bar or bead strings to model counting to next ten and the rest.




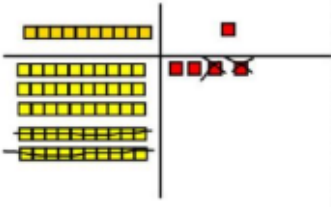
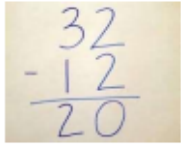


Use a number line to count on to next ten and then the rest.

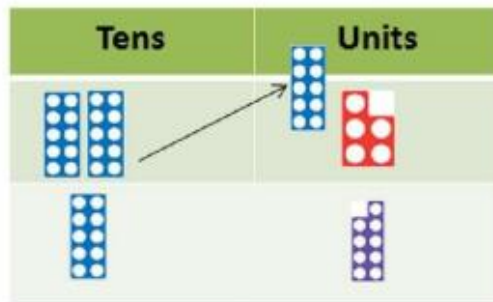
$$93 - 76 = 17$$

Subtraction Year 3

Year 3 Subtraction

Objective/Strategy	Concrete	Pictorial	Abstract
Subtract numbers mentally, including: three-digit number + ones three-digit number + tens three-digit number + hundreds			Vary the position of the answer and question. Expose children to missing number questions and vary the missing part of the calculation. $678 = ? - 1$ $688 - 10 = ?$ $678 = ? - 100$
Column subtraction without regrouping (friendly numbers)	 <p>47 - 32</p> <p>Use base 10 or Numicon to model</p>	 <p>Calculations</p> $\begin{array}{r} 54 \\ - 22 \\ \hline 32 \end{array}$ <p>Draw representations to support understanding</p>	$47 - 24 = 23$ $\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$ <p>Intermediate step may be needed to lead to clear subtraction understanding.</p> 

Column subtraction
with regrouping



Begin with base 10 or Numicon. Move to pv
counters, modelling the exchange of a ten into ten
ones. Use the phrase 'take and make' for exchange.

$$\begin{array}{r} 45 \\ -29 \\ \hline 16 \end{array}$$

Tens | Ones

$$10 + 6 = 16$$

Children may draw base ten or PV counters and cross off.

$$836 - 254 = 582$$

	H	T	U
	800	30	6
-	200	50	4
	500	80	2

Begin by partitioning into pv columns

Then move to formal method.

$$728 - 582 = 146$$

	H	T	U
	7	2	8
-	5	8	2
	1	4	6



St Antony's RC Primary School Calculation Policy



Subtraction Year 4-6

Years 4-6 Subtraction			
Objective /Strategy	Concrete	Pictorial	Abstract
Subtracting tens and ones Year 4 subtract with up to 4 digits. Introduce decimal subtraction through context of money	$234 - 179$ 	Children to draw pv counters and show their exchange—see Y3	
	Model process of exchange using Numicon, base ten and then move to PV counters.		Use the phrase 'take and make' for exchange
Year 5- Subtract with at least 4 digits, including money and measures. Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal Up to 3 decimal places	As Year 4	Children to draw pv counters and show their exchange—see Y3	<p>Use zeros for placeholder</p> <p>Use zeros for placeholder s.</p>

<p>Year 6—Subtract with increasingly large and more complex numbers and decimal values (up to 3 decimal place).</p>	<p>As Year 4</p>	<p>Children to draw pv counters and show their exchange—see Y3</p>	$\begin{array}{r} \cancel{7}^{\circ} \cancel{8}^{\circ} \cancel{0}^{\circ}, 699 \\ - \quad 89,949 \\ \hline 60,750 \end{array}$ $\begin{array}{r} \cancel{7}^{\circ} \cancel{0}^{\circ} 5 \cdot \cancel{4}^{\circ} 19 \text{ kg} \\ - \quad 36 \cdot 08 \text{ kg} \\ \hline 69 \cdot 339 \text{ kg} \end{array}$
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