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.

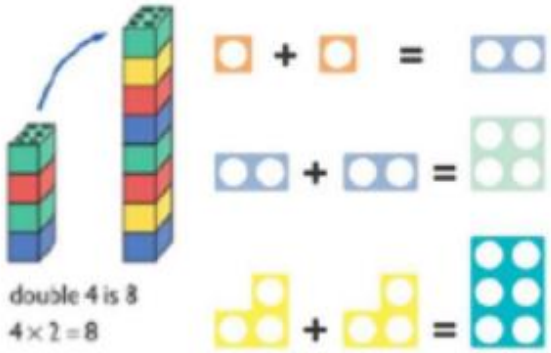
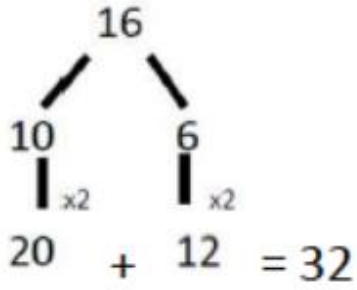
Adopted by Governors: ……..(signed on hard copy)

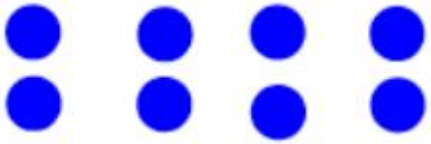
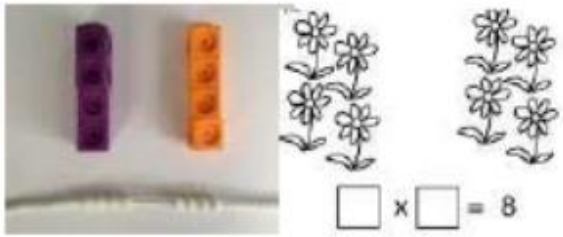
Date: …….

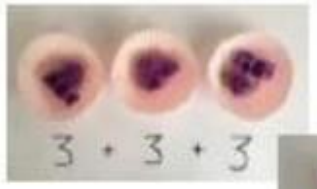
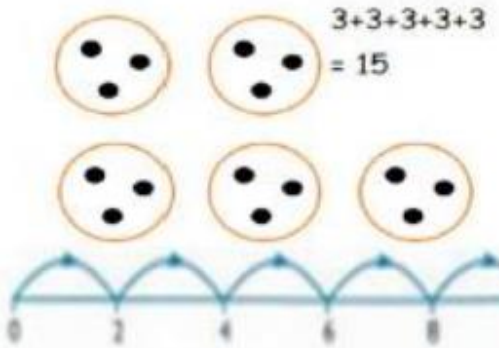
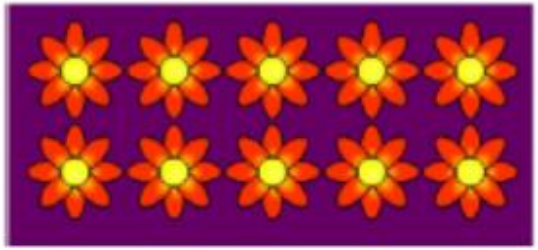
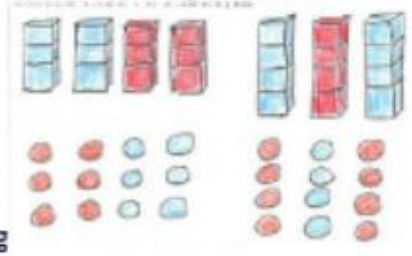
Review date:……

St Antony's RC Primary School
Calculation Policy

Multiplication Year 1

Year 1 Multiplication Programme of Study specifies the following objectives, however it does not require the explicit teaching of the mathematical symbol of multiplication			
Objective /Strategy	Concrete	Pictorial	Abstract
Doubling	Use practical activities using manipultives including cubes and Numicon to demonstrate doubling  	Draw pictures to show how to double numbers Double 4 is 8 	Partition a number and then double each part before recombining it back together. 

Counting in multiples (2s, 5s, 10s)	Count the groups as children are skip counting, children may use their fingers as they are skip counting. 	 Children make representations to show counting in multiples. 	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30
Making equal groups and counting the total	 ☐ x ☐ = 8 Use manipulatives to create equal groups.	Draw  to show 2 x 3 = 6 Draw and make representations	2 x 4 = 8

Repeated addition	   Use different objects to add equal groups	Use pictorial including number lines to solve prob There are 3 sweets in one bag. How many sweets are in 5 bags altogether? 	Write addition sentences to describe objects and pictures. 
Understanding arrays	Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2 etc. 	Draw representations of arrays to show understanding 	3 x 2 = 6 2 x 5 = 10

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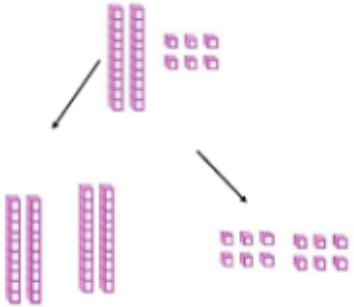
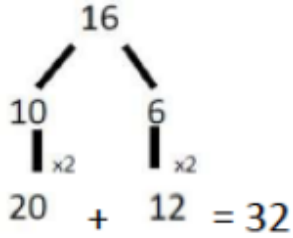
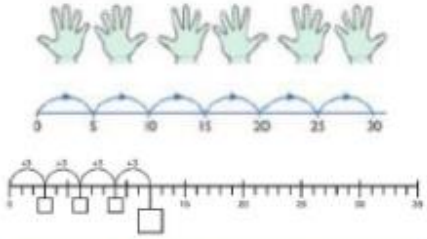
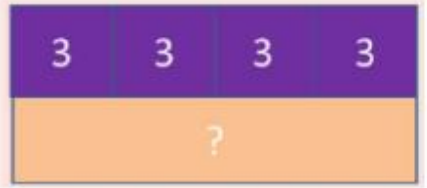
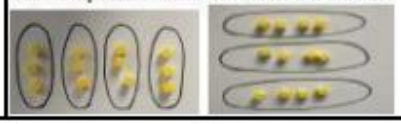
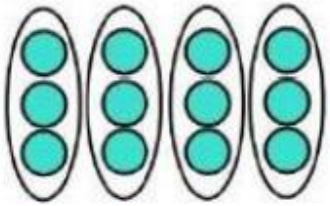
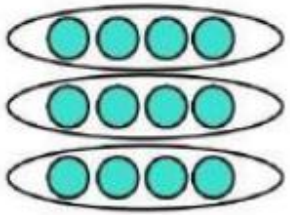
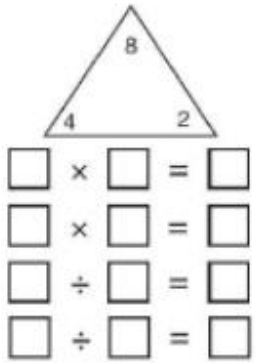
Multiplication Year 2

Year 2 Multiplication Children should be able to recall and use multiplication and division facts for the 2, 5 and 10 times tables.			
Objective /Strategy	Concrete	Pictorial	Abstract
Doubling	Model doubling using dienes and PV counters.  40 + 12 = 52	Draw pictures and representations to show how to double numbers	Partition a number and then double each part before recombining it back together. 

Counting in multiples of 2, 3, 4, 5, 10 from 0 (repeated addition)	Count the groups as children are skip counting, children may use their fingers as they are skip counting. Use bar models.  5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40 	Number lines, counting sticks and bar models should be used to show representation of counting in multiples.  	Count in multiples of a number aloud. Write sequences with multiples of numbers. 0, 2, 4, 6, 8, 10 0, 3, 6, 9, 12, 15 0, 5, 10, 15, 20, 25 , 30 $4 \times 3 = \square$
Multiplication is commutative	Create arrays using counters and cubes and Numicon.    Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer. 	Use representations of arrays to show different calculations and explore commutativity.  	12 = 3 × 4 12 = 4 × 3 Use an array to write multiplication sentences and reinforce repeated addition.  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15

Using the inverse This should be taught alongside division, so pupils learn how they work alongside each other.			2 x 4 = 8 4 x 2 = 8 8 ÷ 2 = 4 8 ÷ 4 = 2 8 = 2 x 4 8 = 4 x 2 2 = 8 ÷ 4 4 = 8÷ 2 Show all 8 related fact family sentences.

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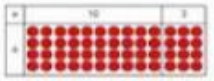
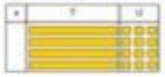
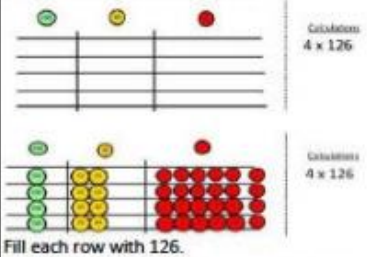
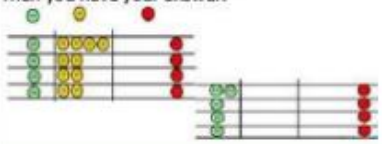
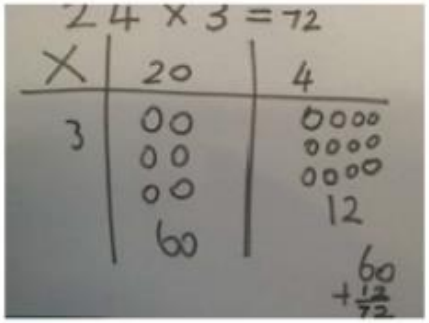
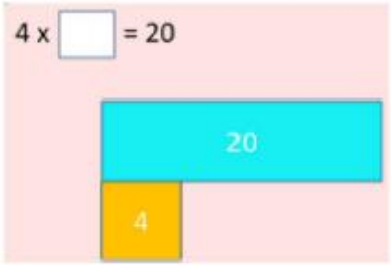
Multiplication Year 3

Year 3 Multiplication

Children should be able to recall and use multiplication facts for the 3,4, and 8 times tables

Objective /Strategy	Concrete	Pictorial	Abstract
Grid method, progressing to the formal method. Multiply 2-digit numbers by 1-digit numbers.	Show the links with arrays to first introduce the grid method.  4 rows of 10 4 rows of 3 Move onto base ten to move towards a more compact method.  4 rows of 13 Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows  Fill each row with 126. Add up each column, starting with the ones making any exchanges needed Then you have your answer. 	Children can represent their work with place value counters in a way that they understand. They can draw the counters using colours to show different amounts or just use the circles in the different columns to show their thinking as shown below.  Bar model are used to explore missing numbers  	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. | × | 30 | 5 | | 7 | 210 | 35 | 210 + 35 = 245 Move forward to the formal written method: 35 X 7 245 3

Solve problems, including missing number problems, integer scaling problems.			Three times as high, eight times as long ? x 5 = 20 20 ÷ ? = 5 3 hats and 4 coats, how many different outfits?

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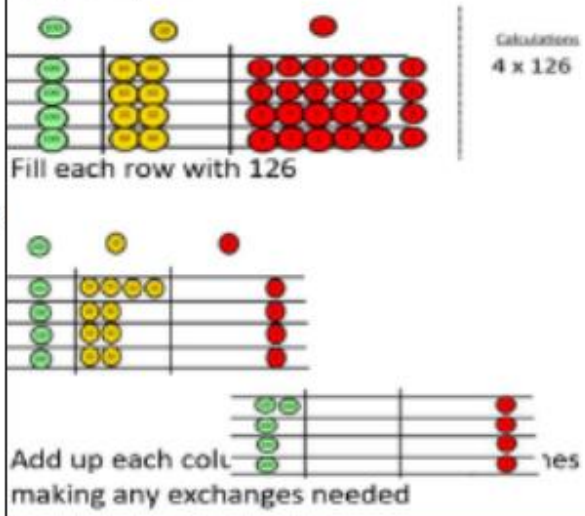
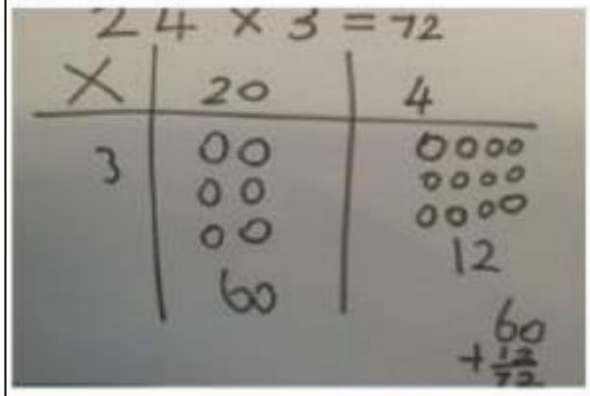
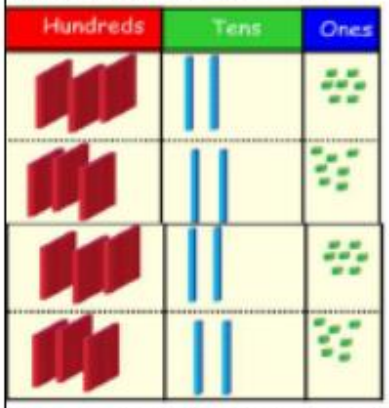
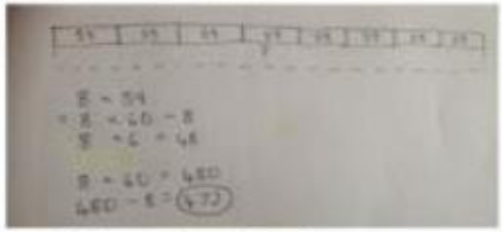
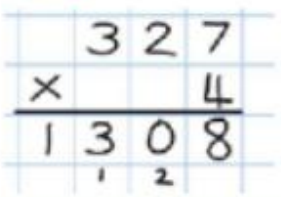
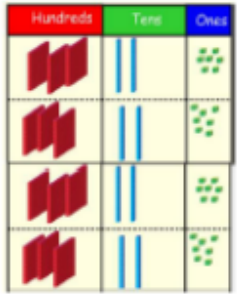
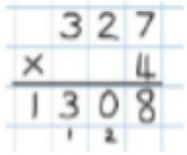
Multiplication Year 4-6

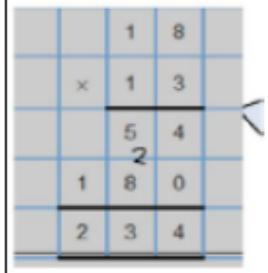
Years 4-6 Multiplication			
Objective /Strategy	Concrete	Pictorial	Abstract
Grid method recap from Year 3 for 2-digit by 1-digit. Move to multiplying 3-digit numbers by 1-digit. (Year 4 expectation)	Use place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows  	Children can represent their work with place value counters in a way that they understand. They can draw the counters using colours to show different amounts or just use the circles in the different columns to show their thinking as shown below.  	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. | × | 30 | 5 | | --- | --- | --- | | 7 | 210 | 35 | 210 + 35 = 245

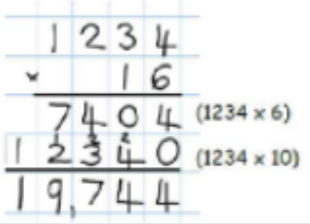
Column multiplication	Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. 321 x 2 = 642  It is important at this stage that they always multiply the ones first. The corresponding long multiplication is modelled alongside	<table><tr><td>x</td><td>300</td><td>20</td><td>7</td></tr><tr><td>4</td><td>1200</td><td>80</td><td>28</td></tr></table> The grid method my be used to show how this relates to a formal written method.  Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.	327 x 4 28 80 1200 1308  This may lead to a compact method.

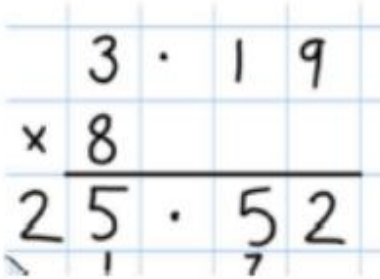
<table>
<tr>
<td>Column multiplication for 3 and 4-digit x 1 digit.</td>
<td> 

It is important at this stage that they always Multiply the ones first.
Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. 321 x 2 = 642</td>
<td><table>
<tr><td>x</td><td>300</td><td>20</td><td>7</td></tr>
<tr><td>4</td><td>1200</td><td>80</td><td>28</td></tr>
</table>

28
80
1200
1308</td>
<td>327
x 4
———
28
80
1200
1308
 
</td>
</tr>
<tr>
<td>Column multiplication</td>
<td>Manipulatives may still be used with the corresponding long multiplication modelled alongside.</td>
<td> 

Continue to use bar modelling to support problem solving</td>
<td> 

18 x 3 on the first row
(8 x 3 =24, carrying the 2 for 20, then 1 x 3)
18 x 10 on the 2nd row. Show multiplying by 10 by putting zero in units first
 
</td>
</tr>
</table>

Multiplying decimals up to 2 decimal places by a single digit.			Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer. 

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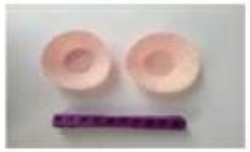
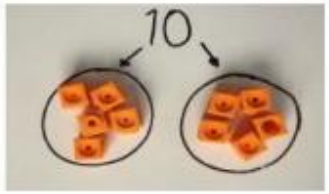
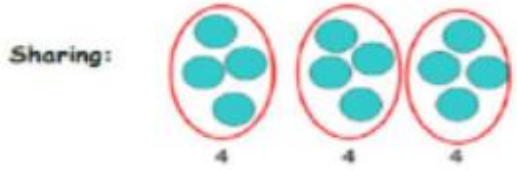
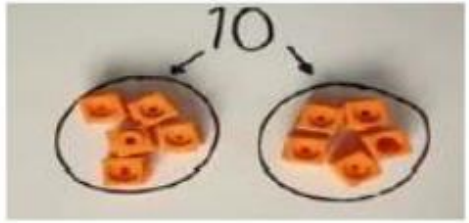
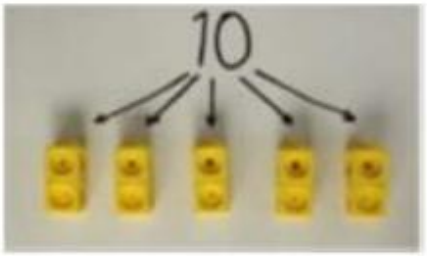
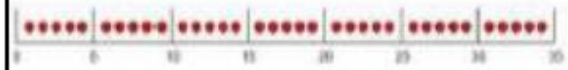
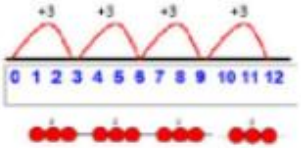
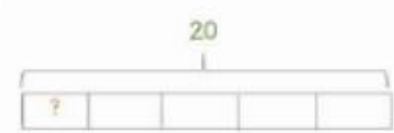
Division Year 1

Year 1 Division			
Objective /Strategy	Concrete	Pictorial	Abstract
Division as sharing	   I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities.  8 shared between 2 is 4  12 shared between 3 is 4	12 shared between 3 is 4

Division as sharing	 I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities.  Children use bar modelling to show and support understanding.  12 ÷ 4 = 3	12 ÷ 3 = 4
Division as grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.  	Use number lines for grouping  12 ÷ 3 = 4 Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.  20 ÷ 5 = ? 5 x ? = 20	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?

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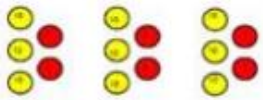
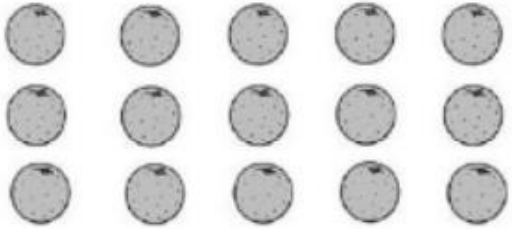
Division Year 2

Year 2 Division			
Objective /Strategy	Concrete	Pictorial	Abstract
Division as grouping	Use cubes, counters, objects or place value counters to aid understanding.  24 divided into groups of 6 = 4 96 ÷ 3 = 32 	Continue to use bar modelling to aid solving division problems.  20 ÷ 5 = ? 5 x ? = 20	How many groups of 6 in 24? 24 ÷ 6 = 4
Division with arrays	 Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	Draw an array and use lines to split the array into groups to make multiplication and division sentences 	Find the inverse of multiplication and division sentences by creating eight linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7 28 = 7 x 4 28 = 4 x 7 4 = 28 ÷ 7 7 = 28 ÷ 4

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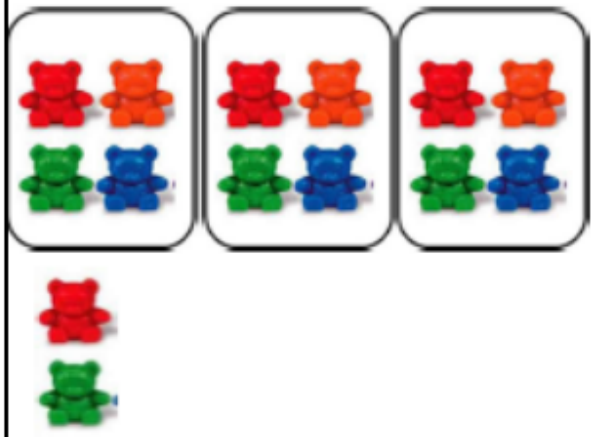
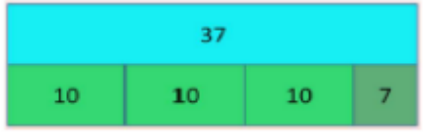
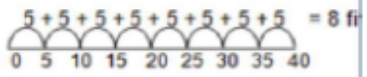
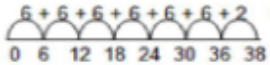
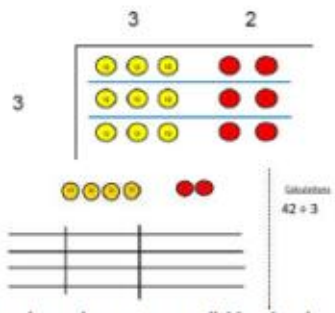
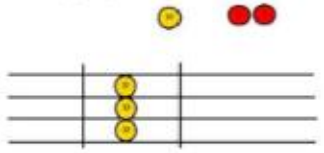
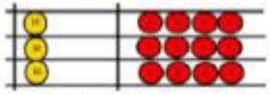
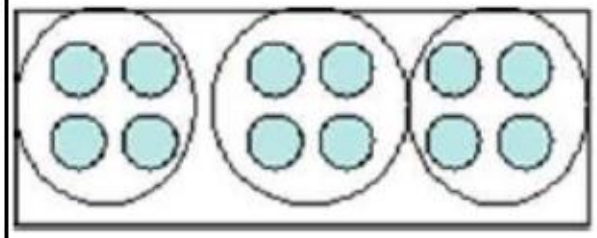
Division Year 3

Year 3 Division			
Objective /Strategy	Concrete	Pictorial	Abstract
Division with remainders.	14 ÷ 3 = Divide objects between groups and see how much is left over 	Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.  Draw dots and group them to divide an amount and clearly show a remainder.  Use bar models to show division with remainders.  remainder:  5s in 40?" mainder:  s, when it becomes inefficient to count in single mu orded using known facts.	Complete written divisions and show the remainder using r. 29 ÷ 8 = 3 REMAINDER 5 ↑ ↑ ↑ ↑ dividend divisor quotient remainder

St Antony's RC Primary School
Calculation Policy

Division Year 4-6

Years 4-6 Division

Objective /Strategy	Concrete	Pictorial	Abstract
Divide at least 3 - digit numbers by 1 digit. Short Division	96 ÷ 3 Tens Units 3 2  Use place value counters to divide using the bus stop method alongside 42 ÷ 3= Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.  We exchange this ten for ten ones and then share the ones equally among the groups.  We look how much in 1 group so the answer is 14.	Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.  Encourage them to move towards counting in multiples to divide more efficiently.	Begin with divisions that divide equally with no remainder. 2 1 8 3 4 | 8 7 2 Move onto divisions with a remainder. 8 6 r 2 3 5 | 4 3 2 Finally move into decimal places to divide the total accurately. 1 4 . 6 16 21 3 5 | 5 1 1 . 0 0 6 6 3 r 5 8 | 5 5 3 5 0 2 9

Long Division

		0	3	6	
1	2	4	3	2	(×30)
	−	3	6	0	
			7	2	(×6)
	−		7	2	
				0	

$12 \times 1 = 12$
$12 \times 2 = 24$
$12 \times 3 = 36$
$12 \times 4 = 48$
$12 \times 5 = 60$
$12 \times 6 = 72$
$12 \times 7 = 84$
$12 \times 8 = 96$
$12 \times 7 = 108$
$12 \times 10 = 120$

$$432 \div 12 = 36$$

$$7{,}335 \div 15 = 489$$

	0	4	8	9	
15	7	3	3	5	
−	6	0	0	0	(×400
	1	3	3	5	
−	1	2	0	0	(×80)
		1	3	5	
−		1	3	5	(×9)
				0	

$1 \times 15 = 15$
$2 \times 15 = 30$
$3 \times 15 = 45$
$4 \times 15 = 60$
$5 \times 15 = 75$
$10 \times 15 = 150$

Long Division

$372 \div 15 = 24\ r12$

			2	4	r	1	2
1	5	3	7	2			
	–	3	0	0			
			7	2			
	–		6	0			
			1	2			

$1 \times 15 = 15$
$2 \times 15 = 30$
$3 \times 15 = 45$
$4 \times 15 = 60$
$5 \times 15 = 75$
$10 \times 15 = 150$

			2	4	$\frac{4}{5}$
1	5	3	7	2	
	–	3	0	0	
			7	2	
	–		6	0	
			1	2	

$372 \div 15 = 24\frac{4}{5}$