St Cyprian's Greek Orthodox Primary Academy

ΠΑΝΤΑ ΙΣΧΥΩ ΕΝ ΤΩ ΕΝΔΥΝΑΜΟΥΝΤΙ ΜΕ ΧΡΙΣΤΩ ΙΝΑ ΑΡΙΣΤΕΥΩ

I AM STRONG THROUGH JESUS CHRIST

TO THE BEST THAT I CAN BE

Calculations Policy

Revised: July 2026

Reviewed and ratified by Full Academy Trust:

Date: 16/7/26

Signed: A. Christou.

Name: AREDI CHRISTOU

Position: Chair of Education Committee

Date of next review: July 2028

Mission Statement

The aim of St Cyprian's Greek Orthodox Primary Academy is to provide its children with primary education of the highest quality in a supportive learning environment through the national curriculum in the core subjects, enriched by the progressive teaching of the Greek language and Christian Orthodox religion.

The children will be equipped with the knowledge, skills and spirituality to enable them to achieve their full potential and prepare them for transition to secondary education and to contribute positively to the challenges of a diverse multicultural society.

The term 'parents' in this policy also refers to carers.

Calculations Policy

This policy contains the key pencil and paper procedures that are to be taught throughout the Academy. It has been written to ensure consistency and progression throughout the Academy.

Although the focus of the policy is on pencil and paper procedures it is important to recognise that the ability to calculate mentally lies at the heart of the Primary Framework for Mathematics. The mental methods in the Primary Framework for teaching mathematics will be taught systematically from Reception onwards and pupils will be given regular opportunities to develop the necessary skills. However mental calculation is not at the exclusion of written recording and should be seen as complementary to and not as separate from it. In every written method there is an element of mental processing. Sharing written methods with the teacher encourages children to think about the mental strategies that underpin them and to develop new ideas. Therefore written recording both helps children to clarify their thinking and supports and extends the development of more fluent and sophisticated mental strategies.

During their time at this Academy children will be encouraged to see mathematics as both a written and spoken language. Teachers will support and guide children through the following important stages:

- developing the use of pictures and a mixture of words and symbols to represent numerical activities;
- using standard symbols and conventions;
- use of jottings to aid a mental strategy;
- use of pencil and paper procedures;
- use of a calculator.

This policy concentrates on the introduction of standard symbols, the use of the empty number line as a jotting to aid mental calculation and on the introduction of pencil and paper procedures. It is important that children do not abandon jottings and mental methods once pencil and paper procedures are introduced. Therefore children will always be encouraged to look at a calculation/problem and then decide which is the best method to choose – pictures, mental calculation with or without jottings, structured recording or a calculator.

Aims

We aim to ensure that by the end of year 6, as many children as possible will understand, and use successfully, compact written methods to carry out and record calculations they cannot do in their head.

General Progression:

- Establish mental methods, based on a good understanding of place value
- Use of informal jottings to aid mental calculations
- Develop use of empty number line to help mental imagery and aid recording
- Use partitioning and recombining to aid informal methods
- Introduce expanded written methods
- Develop expanded methods into compact standard written form.

To enable children to move towards compact written methods **with full understanding** a step-by-step approach is taken. For each of the four operations children are first introduced to expanded methods that lead to the compact form of calculation. It is important that children feel secure and comfortable with each stage towards compact methods before they move on to the next. **Children will progress through the stages of expanded calculation at different rates.** It is far better that they can operate efficiently at any stage and with understanding than to move them on too quickly. **Not all children will reach a compact method by the end of Year 6.**

Before carrying out a calculation, children will be encouraged to consider:

- Can I do it in my head? (using rounding, adjustment)
- The size of an approximate answer (estimation)
- Could I use jottings to keep track of the calculation?
- Do I need to use an expanded or compact written method?

When are children ready for written calculations?
Addition and subtraction

- Do they know addition and subtraction facts to 20?
- Do they understand place value and can they partition numbers?
- Can they add three single digit numbers mentally?
- Can they add and subtract any pair of two digit numbers mentally?
- Can they explain their mental strategies orally and record them using informal jottings?
- Can they understand the commutative and associative laws of addition? (though not of these terms) * *see glossary*

Multiplication and division

- Do they know all their times tables?
- Do they know the result of multiplying by 0 and 1?
- Do they understand 0 as a place holder?
- Can they multiply two and three digit numbers by 10 and 100?
- Can they double and halve two digit numbers mentally?
- Can they use multiplication facts they know to derive mentally other multiplication facts that they do not know?
- Can they explain their mental strategies orally and record them using informal jottings?

- Can they fully understand commutative, distributive and associative laws of multiplication? (though not of these terms) * *see glossary*

The above lists are not exhaustive but are a guide for the teacher to judge when a child is ready to move from informal to formal methods of calculation.

Language

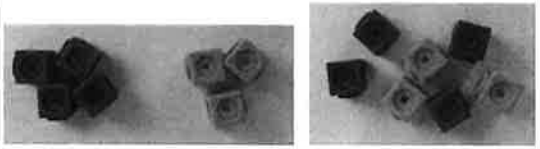
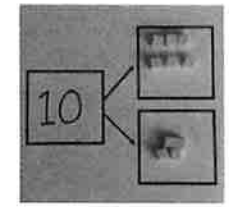
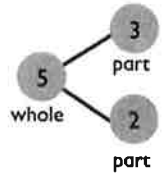
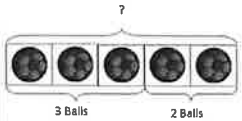
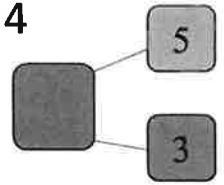
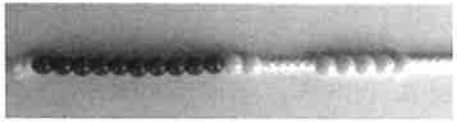
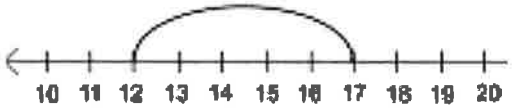
It is important that the language used when modelling calculations for children reflect the size of the numbers involved. In the following example where an addition calculation is completed using a compact written method you might say the following.

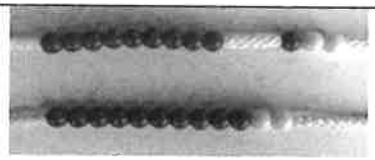
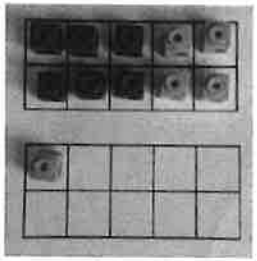
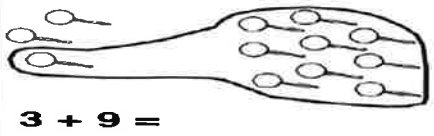
489	Nine plus eight equals seventeen. Put down seven ones and carry ONE TEN
+ 268	Eighty plus sixty equals one hundred and forty. Add the extra ten which equals one hundred and fifty.
_____	Put down fifty and carry ONE HUNDRED.
	Four hundred and two hundred equal six hundred. Add the extra
757	one hundred which equals seven hundred.
_____	Put down seven hundred. The answer is seven hundred and fifty
1 1	seven.

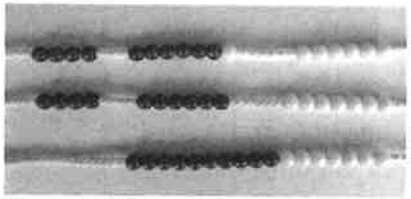
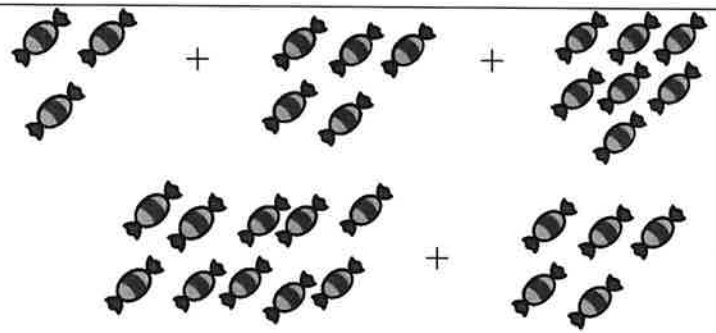
It is also important that children know the different vocabulary associated with each of the four operations. Listed below are the different ways children will see the four operations written down in word problems.

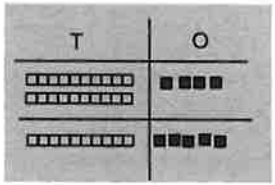
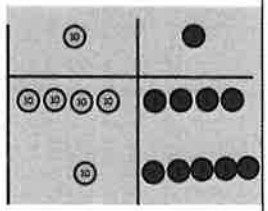
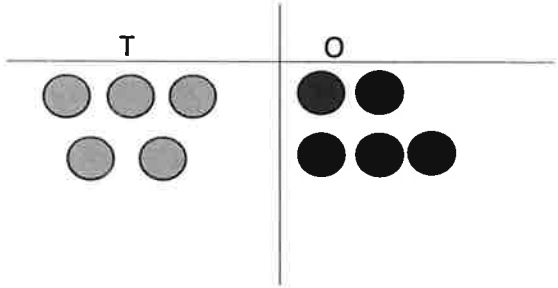
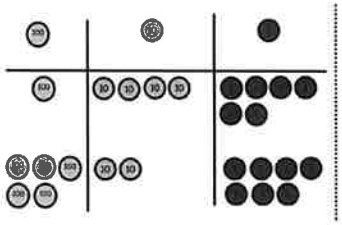
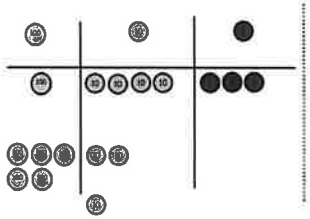
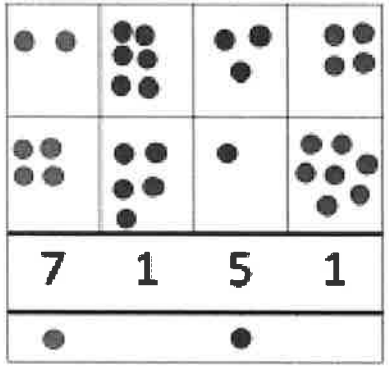
Addition	Subtraction	Multiplication	Division
altogether	take away	multiply	share
more than	minus	times	share equally
count on	count back	groups of	divide
plus	less than	lots of	divided by
add	subtract	repeated addition	groups
total	difference between	product	halve
and	decrease	array	half
	how many left		
	take from		

Addition

Objective and Strategies	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part-whole model	  Use cubes to add two numbers together as a group or in a bar.	  3 Balls 2 Balls Use pictures to add two numbers together as a group or in a bar.	4 + 3 = 7 10= 6 + 4  Use the part-part whole diagram as shown above to move into the abstract.
Starting at the bigger number and counting on	 Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	12 + 5 = 17  Start at the larger number on the number line and count on in ones or in one jump to find the answer.	5 + 12 = 17 Place the larger number in your head and count on the smaller number to find your answer.

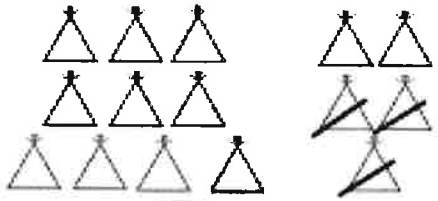
<table>
<tr>
<td>Regrouping to make 10.</td>
<td> 
6 + 5 = 11
 
Start with the bigger number and use the smaller number to make 10.</td>
<td> 
3 + 9 =
make 10.
Use pictures or a number line. Regroup or partition the smaller number to
9 + 5 = 14
1 4
+1 +4
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20</td>
<td>7 + 4= 11

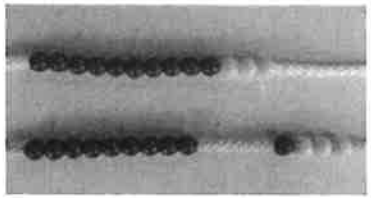
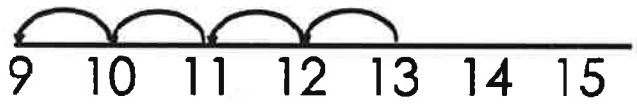
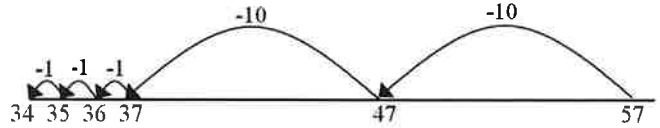
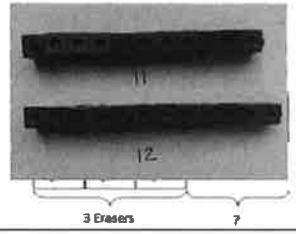
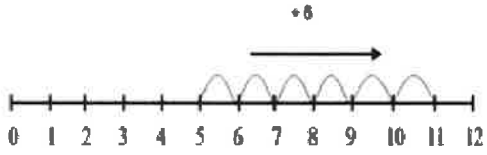
If I am at seven, how many more do I need to make 10. How many more do I add on now?</td>
</tr>
<tr>
<td>Adding three single digits</td>
<td>4 + 7 + 6= 17
Put 4 and 6 together to make 10. Add on 7.
 
Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.</td>
<td> 
Add together three groups of objects. Draw a picture to recombine the groups to make 10.</td>
<td>4 + 7 + 6 = 10 + 7
10
= 17
Combine the two numbers that make 10 and then add on the remainder.</td>
</tr>
</table>

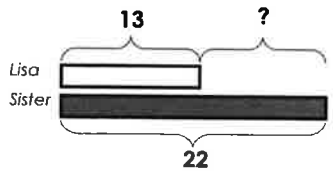
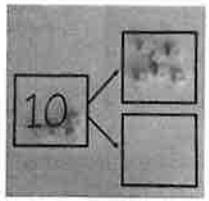
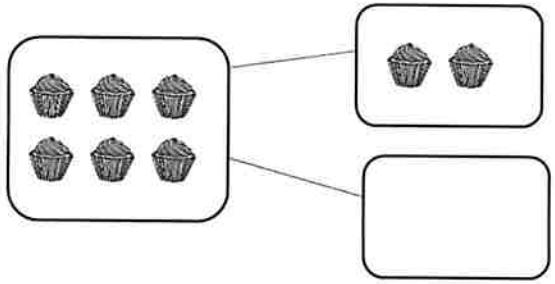
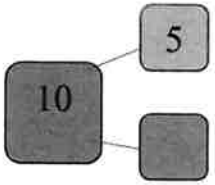
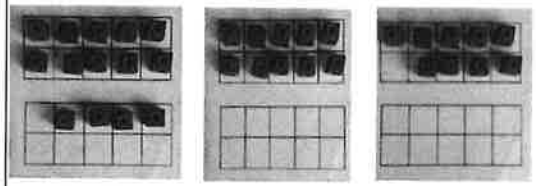
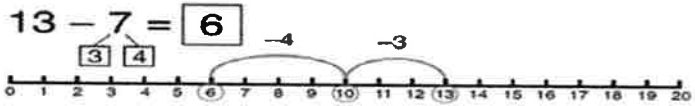
Column method- no regrouping	24 + 15= Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters.  	After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.  	<u>Calculations</u> 21 + 42 = 21 + <u>42</u>
Column method- regrouping	Make both numbers on a place value grid.  146 <u>+ 527</u> Add up the units and exchange 10 ones for one 10.  146 <u>+ 527</u> Add up the rest of the columns,	Children can draw a pictoral representation of the columns and place value counters to further support their learning and understanding.  	Start by partitioning the numbers before moving on to clearly show the exchange below the addition. 20 + 5 <u>40 + 8</u> 60 + 13 = 73 536 <u>+ 85</u> <u>621</u> 11 As the children move on, introduce 2 3 . 3 6 1 9 . 0 8 0 5 9 7 7 0 ± + 1 £ 2 3 . 5 9 + £ 7 . 5 5 9 3 £ 3 1 . 1 4 2 1 1 1 1

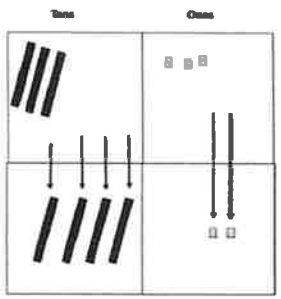
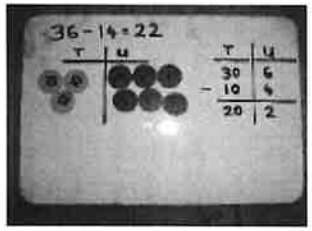
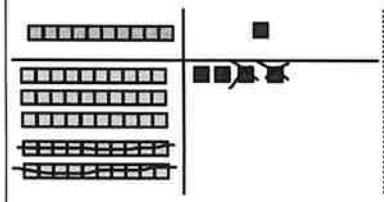
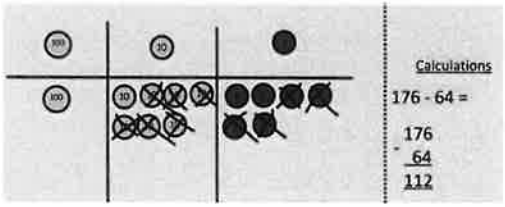
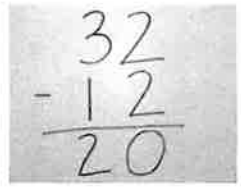
	exchanging the 10 counters from one column for the next place value column until every column has been added. This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100. As children move on to decimals, money and decimal place value counters can be used to support learning.		decimals with the same number of decimal places and different. Money can be used here.

Subtraction

Objective and Strategies	Concrete	Pictorial	Abstract
Taking away ones	Use physical objects, counters, cubes etc to show how objects can be taken away. 6 – 2 = 4 	Cross out drawn objects to show what has been taken away.  15 – 3 = 12	18 -3= 15 8 – 2 = 6

Counting back	Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.  13 – 4 Use counters and move them away from the group as you take them away counting backwards as you go. 	Count back on a number line or number track  Start at the bigger number and count back the smaller number showing the jumps on the number line.  This can progress all the way to counting back using two 2 digit numbers.	Put 13 in your head, count back 4. What number are you at? Use your fingers to help.
Find the difference	Compare amounts and objects to find the difference.  Use cubes to build towers or make bars to find the difference	 Count on to find the difference.	Hannah has 23 sandwiches, Helen has 15 sandwiches. Find the difference between the number of sandwiches.

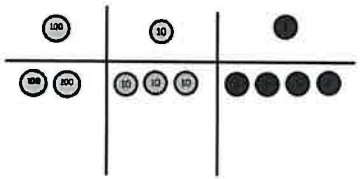
	Use basic bar models with items to find the difference	Draw bars to find the difference between 2 numbers. **Comparison Bar Models** *Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them.*  	
Part Part Whole Model	 Link to addition- use the part whole model to help explain the inverse between addition and subtraction. If 10 is the whole and 6 is one of the parts. What is the other part? 10 - 6 =	Use a pictorial representation of objects to show the part part whole model. 	 Move to using numbers within the part whole model.
Make 10	14 – 9 =  Make 14 on the ten frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.	 Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer.	16 – 8= How many do we take off to reach the next 10? How many do we have left to take off?

Column method without regrouping	 Use Base 10 to make the bigger number then take the smaller number away. Show how you partition numbers to subtract. Again make the larger number first. 	  Draw the Base 10 or place value counters alongside the written calculation to help to show working.	47 - 24 = 23 40 + 7 - 20 + 4 20 + 3 This will lead to a clear  written column subtraction.

Column method with regrouping

Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges.

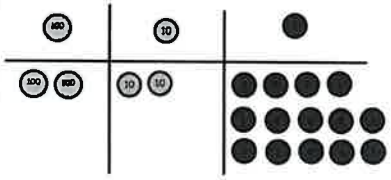
Make the larger number with the place value counters



Calculations

234
- 88

Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.

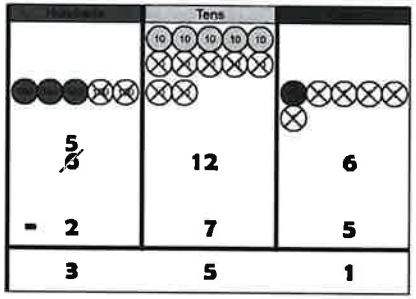


Calculations

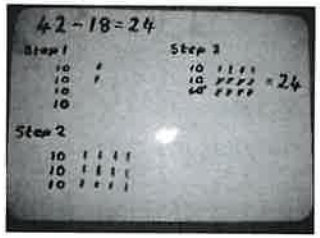
234
- 88

Now I can subtract my ones.

Now look at the tens, can I take away 8 tens easily? I need to exchange one hundred for ten tens.

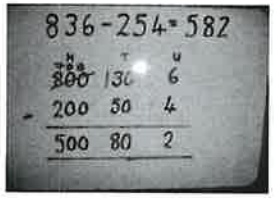


Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.

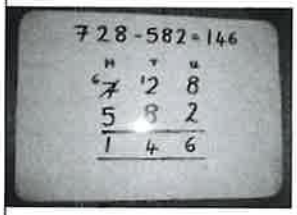


When confident, children can find their own way to record the exchange/regrouping.

Just writing the numbers as shown here shows that the child understands the method and knows when to exchange/regroup.

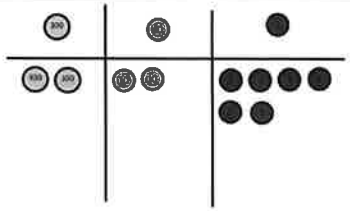


Children can start their formal written method by partitioning the number into clear place value colu mns.



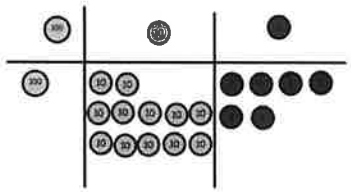
Moving forward the children use a more compact method.

This will lead to an understanding of subtracting any number including decimals.



Calculations

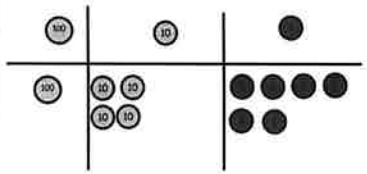
234
- 88



Calculations

234
- 88

Now I can take away eight tens and complete my subtraction



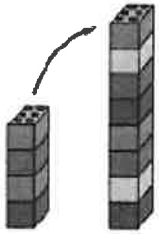
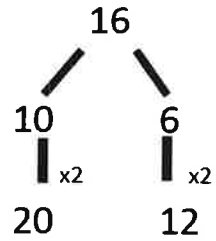
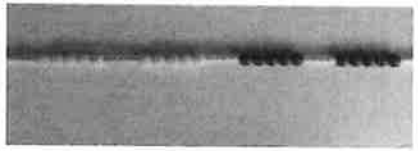
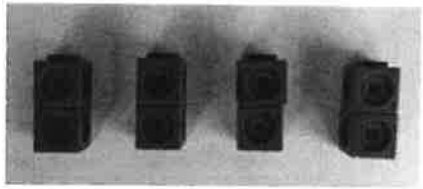
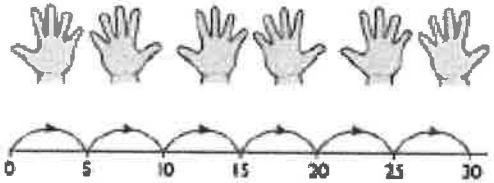
Calculations

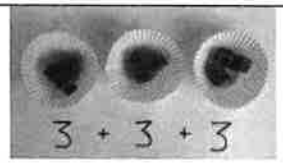
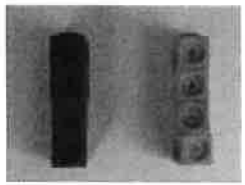
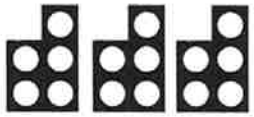
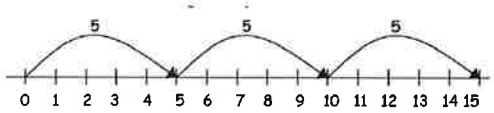
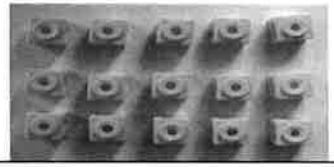
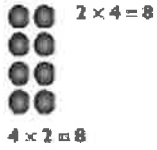
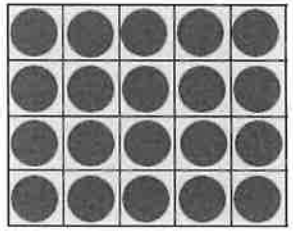
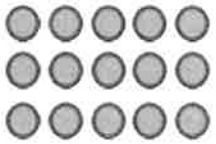
~~234~~
- 88
146

Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.

		5	12		1
	2	~~6~~	~~3~~	.	**0**
-		2	6	.	5
	2	3	6	.	5

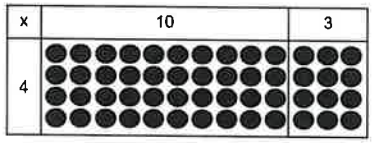
Multiplication

Objective and Strategies	Concrete	Pictorial	Abstract
Doubling	Use practical activities to show how to double a number.  double 4 is 8 4 × 2 = 8	Draw pictures to show how to double a number. Double 4 is 8 	 Partition a number and then double each part before recombining it back together.
Counting in multiples	  Count in multiples supported by concrete objects in equal groups.	 Use a number line or pictures to continue support in 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

Repeated addition	   Use different objects to add equal groups.	There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there? 2 add 2 add 2 equals 6  5 + 5 + 5 = 15	Write addition sentences to describe objects and pictures. 2 + 2 + 2 + 2 + 2 = 10
Arrays- showing commutative multiplication	Create arrays using counters/ cubes to show multiplication sentences. 	Draw arrays in different rotations to find **commutative** multiplication sentences.   Link arrays to area of rectangles.	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

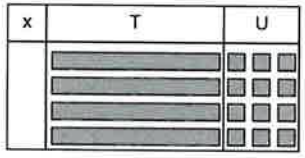
Grid Method

Show the link with arrays to first introduce the grid method.



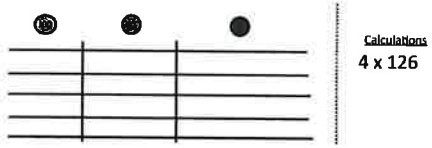
4 rows of 10
4 rows of 3

Move on to using Base 10 to move towards a more compact method.

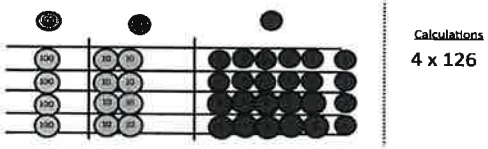


4 rows of 13

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.



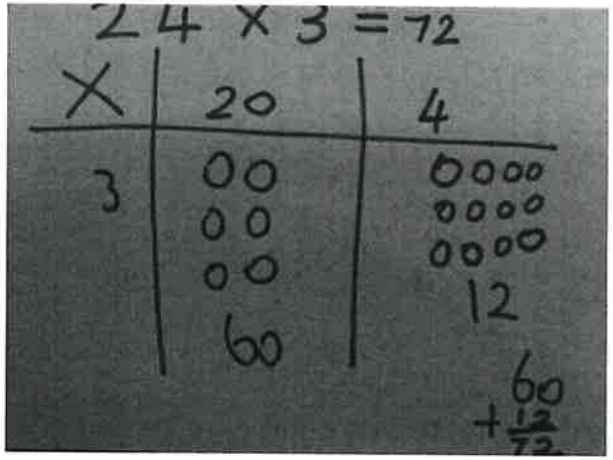
Fill each row with 126.



Add up each column, starting with the ones making any exchanges needed.

Children can represent the work they have done with place value counters in a way that they understand.

They can draw the counters, using colours to show different amounts or just use 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.

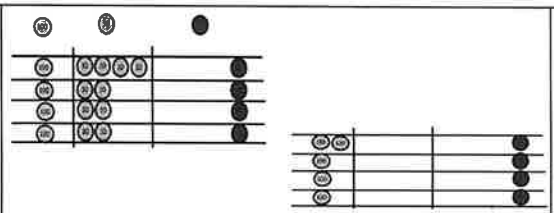
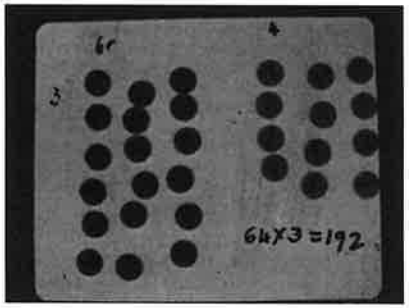
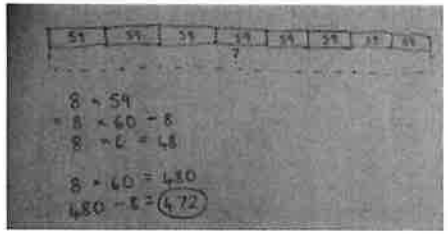
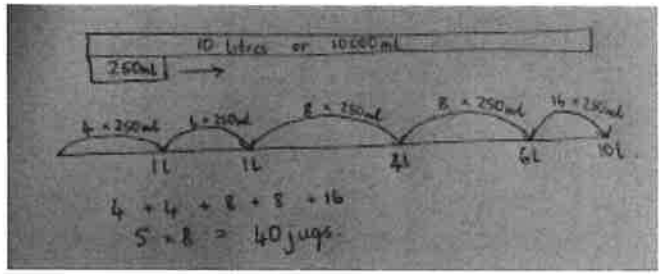
×	30	5
7	210	35

210 + 35 = 245

Moving forward, multiply by a 2 digit number showing the different rows within the grid method.

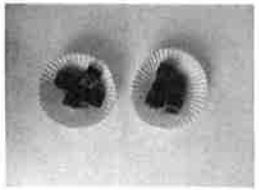
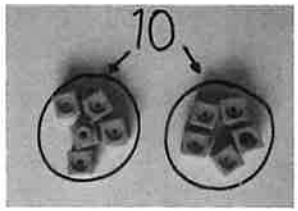
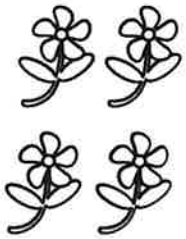
	10	8
10	100	80
3	30	24

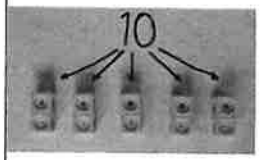
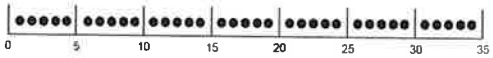
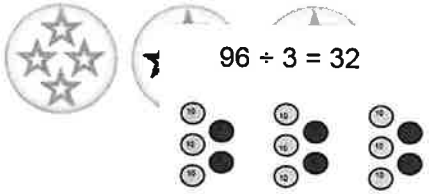
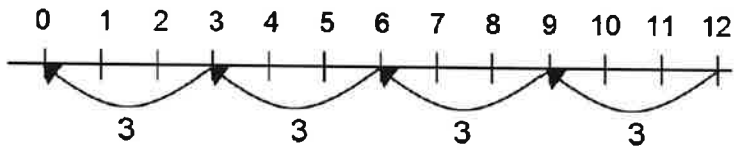
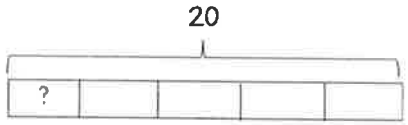
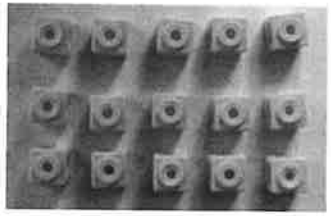
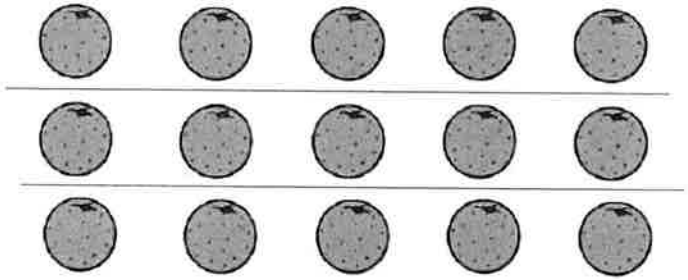
X	1000	300	40	2
10	10000	3000	400	20
8	8000	2400	320	16

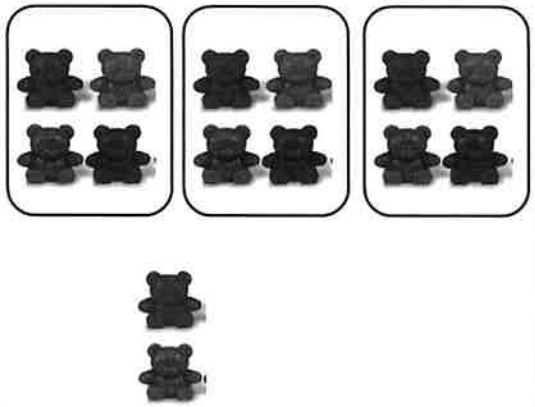
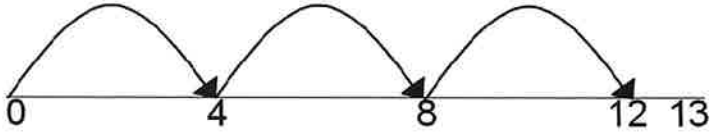
	 Then you have your answer.		
Column multiplication	Children can continue to be supported by place value counters at the stage of multiplication.  It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.	Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.  	Start with long multiplication, reminding the children about lining up their numbers clearly in columns. If it helps, children can write out what they are solving next to their answer. 32 x 24 8 (4 x 2) 120 (4 x 30) 40 (20 x 2) 600 (20 x 30) 768

			This moves to the more compact method.

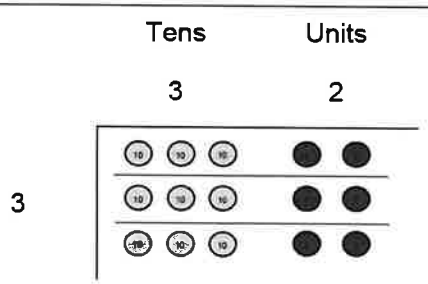
Division

Objective and Strategies	Concrete	Pictorial	Abstract
Sharing objects into groups	  I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities.  $8 \div 2 = 4$	Share 9 buns between three people. $9 \div 3 = 3$

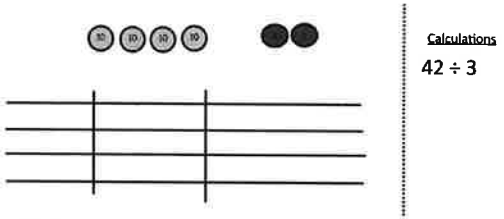
Division as grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.    	Use a number line to show jumps in groups. The number of jumps equals the number of groups.  Think of the bar as a whole. Split it into the number of groups you are 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?
Division within 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	 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 four linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7

	15 ÷ 5 = 3 3 x 5 = 15		
Division with a remainder	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. 	Complete written divisions and show the remainder using r.

Short division

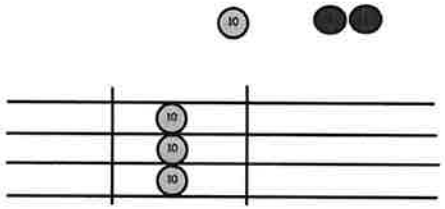


Use place value counters to divide using the bus stop method alongside

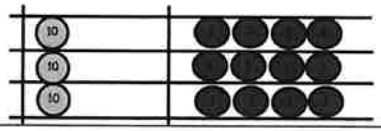


42 ÷ 3=

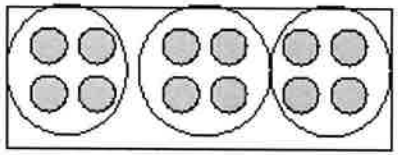
Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.



We exchange this ten for ten ones and then share the ones



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.

$$\begin{array}{r} 2\,1\,8 \\ 4\overline{)\,8\,7\,2} \\ \quad\;\; 3 \end{array}$$

Move onto divisions with a remainder.

$$\begin{array}{r} 8\,6\ \text{r}\ 2 \\ 5\overline{)\,4\,3\,2} \\ \quad\;\; 3 \end{array}$$

Finally move into decimal places to divide the total accurately.

$$\begin{array}{r} 1\,4\,.\,6 \\ 3\,5\overline{)\,5\,1\,1\,.\,0} \\ \quad\;\; 16\quad 21 \end{array}$$

	equally among the groups. We look how much in 1 group so the answer is 14.		