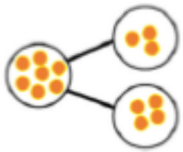
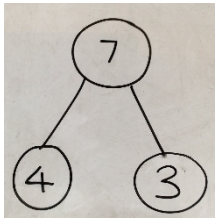
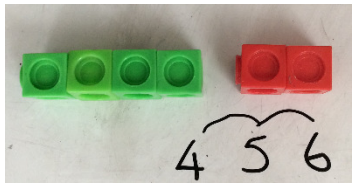
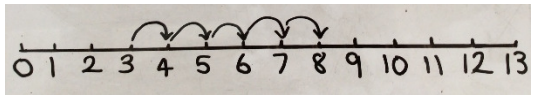
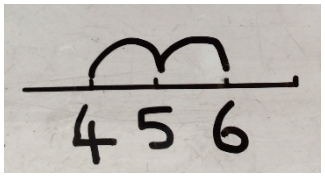
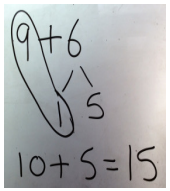
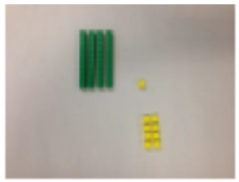
Hemingford Grey Calculation Policy

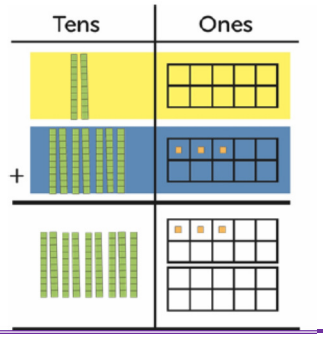
Concrete	Pictorial	Abstract
Addition		
Foundation Stage and Key Stage 1		
Combining two parts to make a whole **4+3=7** 	**A group of 3 combined with a group of 4 makes 7** 	**4+3=7 (four is a part, 3 is a part and the whole is 7)** **You can show this on the 'cherry model' or the model'.** 7 4 3  **'bar**
Counting on using cubes and number lines **4+2=6** 	**3+5=8** 	**The abstract number line.** **What is 2 more than four? What is the sum of 4 and 2? What is the total of 4 and 2?** 
 **Regrouping to make 'friendly' 10 by using 10s frames and counters 6+5=11 ("a 4 and a 1 live inside 5 and 6 add 4 will make a friendly 10" so 6+5 becomes 10+1)**	**Children to draw the 10s frames and counters** 	**9+6=15** **Inside 6 lives a 1 and a 5 so we can make a friendly 10 with the 9 and 1.** 

Hemingford Grey Calculation Policy

TO + O using dienes (T = tens and O = ones)
41+8



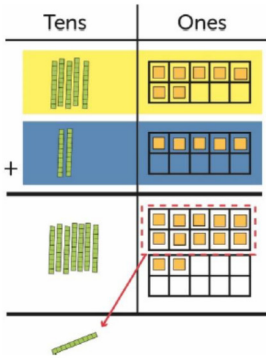
20+73



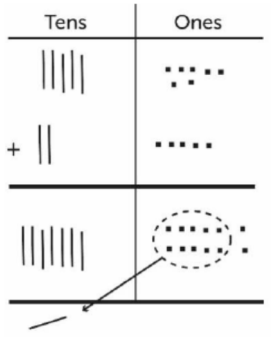
20+73

20	0
+ 70	3
90	3

TO + TO using dienes
57+25



57+25



57+25

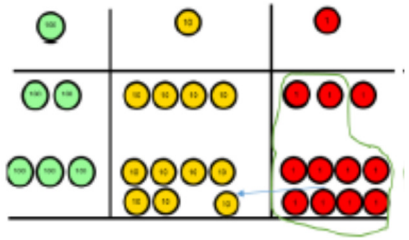
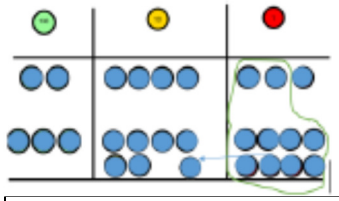
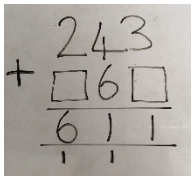
50	7
+ 20	5
80	~~12~~ 2
10	

7 + 5 = 12 but we need to put the 2 in the ones column and move the 10 to the tens column. 50+20=70 and then we must add the extra 10 to make 80.

Hemingford Grey Calculation Policy

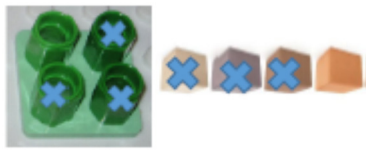
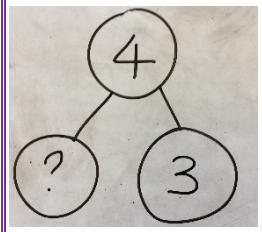
Key Stage 2

Addition

Concrete	Pictorial	Abstract
Use of place value counters to add HTO + HTU etc **243+368 (the 10 ones have been moved to make 1 ten. Then the 10 tens make another 100)**  **100s 10s 1s**	**Children to represent the counters:** **If they are problem solving, draw a bar model to represent the problem.**  **?** | **243** | **368** **?=243+368**	**This written method can be used for larger numbers. Taking out some of the digits can be used for further challenge.** 243 +368 611 1 1 

Subtraction

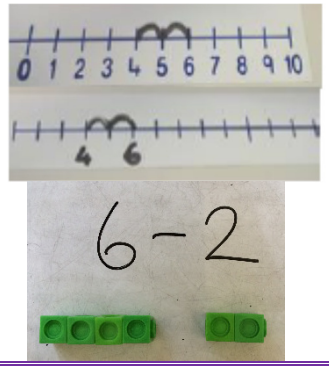
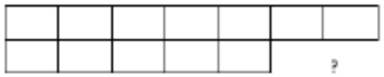
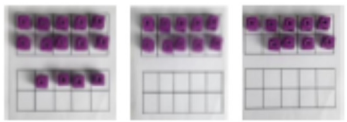
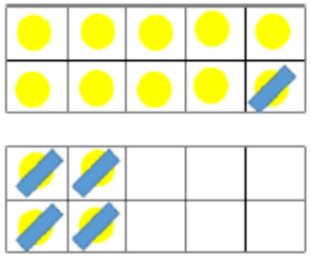
Foundation Stage and Key Stage 1

Physically taking away or removing objects from a whole. **4-3=1** 	**Children to draw the concrete resource and cross it out.**  Use of the bar model: 	**4-3** **?= 4-3** **4** / **3** | **?** 

Hemingford Grey SCHOOL

Hemingford Grey Calculation Policy

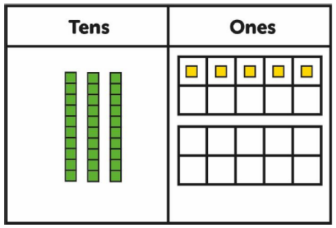
Hemingford Grey SCHOOL

Counting back (using a number line or track or cubes) 		
Find the difference (using cubes, Cuisenaire rods, or other objects) 	**Children to draw the concrete resources.** **Find the difference between 9 and 5** **XXXXXXXXX** **XXXXX** **Use the model:** 	**Find the difference between 8 and 6** **8-6, the difference is?**
Making "friendly 10" using ten frames. **14-5**  **14-5=** **14-4=10 (as inside 5 lives a 4 and a 1)** **10-1=9**	**Children to represent the calculation pictorially.** **14-5** **Cross out the 4 first to leave a 10 then cross out the 1 from the 10.** 	**14-5=9 can be represented in the bar model.** **14** **9** | **5** **Children to represent different ways they have solved the calcuation.**

Hemingford Grey Calculation Policy

Column Method (using dienes).
48-7
Children make the number using dienes and then
physically remove 7 cubes.

35-4
Children cross out the ones



30 + 1 =31

48-7

40 8
- 7

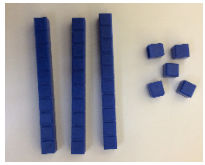
Moving onto(in Key Stage 2):

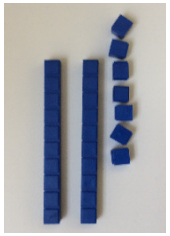
874 – 523 becomes

8	7	4
– 5	2	3
3	5	1

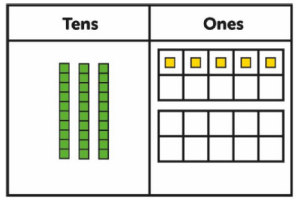
Answer: 351

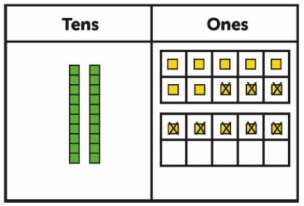
Exchanging using dienes or counters. 35-8
Children make the number out of dienes and then exchange 1 ten for 10 ones.
Make the number Exchange Take away the 8





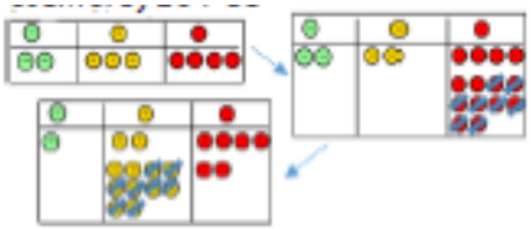
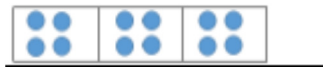
35-8





See below

Hemingford Grey Calculation Policy

Key Stage 2		
Column Method using counters. **234-88**  **(the red counters represent ones, the yellow are tens and the green are hundreds. One of the tens is exchanged for 10 ones)**	**Children's own drawing of counters in a place value chart.**	**With exchanging:** 932 – 457 becomes 8 12 1 9 ~~3~~ ~~2~~ – 4 5 7 4 7 5 Answer: 475
Concrete	**Pictorial**	**Abstract**
Multiplication		
Foundation Stage and Key Stage One		
Repeated grouping or repeated addition. **3 times 4, 3 lots of 4 or 3 groups of 4** 	**Children to represent the practical resources as a picture.** **XX XX XX** **XX XX XX** **Use the bar model:** 	**4x3** **4+4+4**

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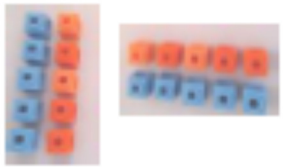
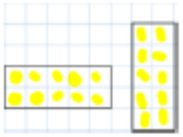
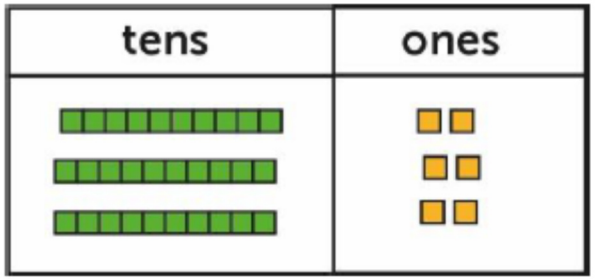
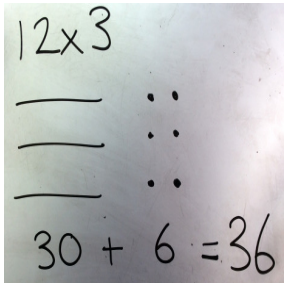
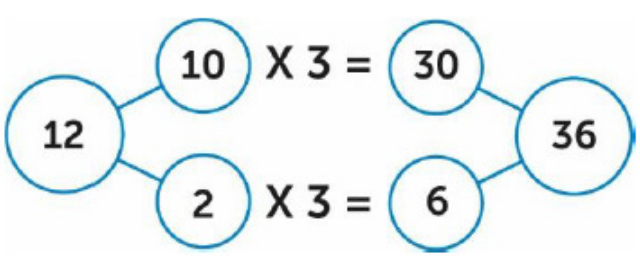
Hemingford Grey Calculation Policy

Hemingford Grey SCHOOL

Use arrays to illustrate commutativity. **2x5=5x2** 	**Children to draw the arrays and turn them round so they can see they represent the same total. 2x5 5x2** 	**Children to be able to use an array to write a range of calculations.** **2x5=10** **5x2=10** **2+2+2+2+2=10** **5+5=10**
Partition to multiply. (using dienes or place value counters) **12 x 3 (12 "3 times" or 3 groups of 12)**  **30 6**	**Children represent this pictorially** 	**12 x 3=36** 

Hemingford Grey SCHOOL

Hemingford Grey Calculation Policy

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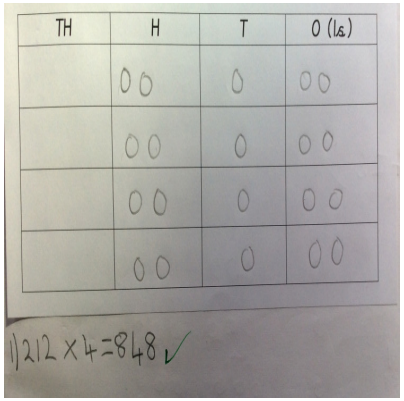
Key Stage 2

Formal column method. (using place value counters)

Make 23, 3 times

60 + 9 = 69

Children represent this pictorially



Short multiplication
Multiply 3x3 first,
Then 3x20

$$\begin{array}{r} 23 \\ \times\ 3 \\ \hline 69 \\ \hline \end{array}$$

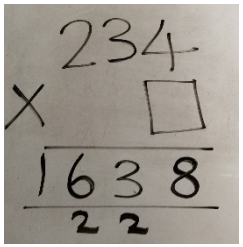
342 × 7 becomes

$$\begin{array}{rrrr} & 3 & 4 & 2 \\ \times & & & 7 \\ \hline 2 & 3 & 9 & 4 \\ \hline & 2 & 1 & \end{array}$$

Answer: 2394

6 x 23 =

$$\begin{array}{r} 23 \\ \times\ 6 \\ \hline 138 \\ \hline 1\ 1 \end{array}$$



A challenge could be removing a digit as above.

Hemingford Grey Calculation Policy

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Long multiplication
6 x 124, then
20 x 124

```
   1 2 4
 ×   2 6
 -------
   7 4 4
 2 4 8 0
 -------
 3 2 2 4
 -------
 1 1
```

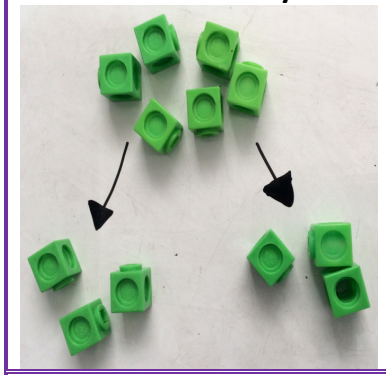
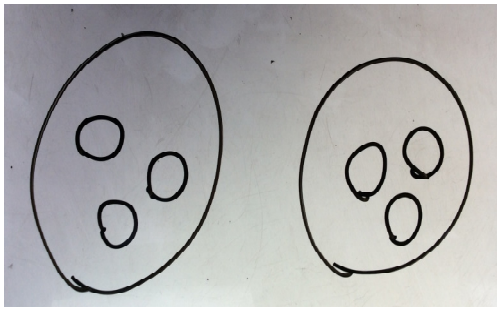
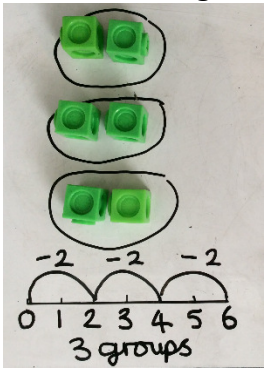
Answer: 3224

124 × 26 becomes

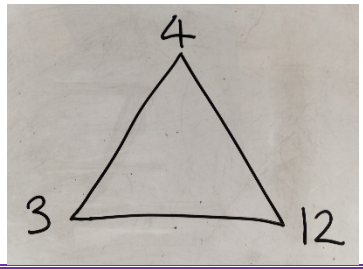
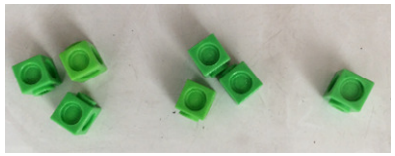
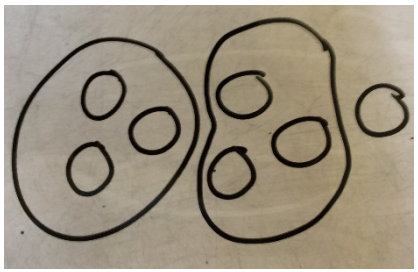
```
     1 2
   1 2 4
 ×   2 6
 -------
   7 4 4
 2 4 8 0
 -------
 3 2 2 4
 -------
 1 1
```

Answer: 3224

Hemingford Grey Calculation Policy

Concrete	Pictorial	Abstract
Division		
Foundation Stage and Key Stage 1		
6 shared between 2. Sarah has 6 cubes and she shares them equally between herself and her friend Jo. How many do they have each? 	**6 shared into 2 groups.** **XXX** | **XXX** 	**6÷2=3** **The bar model could be presented and the question asked: What's the calculation?** **6** **3** | **3**
Understanding division as repeated grouping and subtracting. 6÷2  **Using a beadstring: Present children with a meaningful context**	**There are 6 apples altogether but only 2 apples fit in each bag. How many bags do I need for all the apples?** **6 divided into groups of 3 with 2 in each group.** **XX** **XX** **XX**	**6÷2** **3 groups of 2** **6** **2** | **2** | **2**

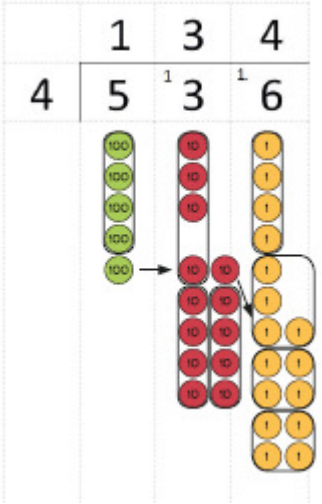
Hemingford Grey Calculation Policy

Each table in the picnic area could seat 5 children. Fifteen children were going to the picnic. How many tables would they need? **15÷5=3** 		**Please note the links between ÷ and x should be constantly reinforced. This can be done through the triangle model:** **The core fact is 3x4=12 but we can derive a division fact from this.**  **12÷4=3 (the inverse) and** **12÷3=4**
Division with remainders **7÷2** 		**7÷2=3r1**

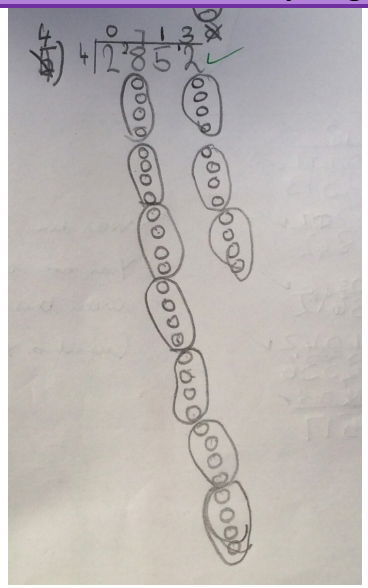
Hemingford Grey Calculation Policy

Key Stage 2

Grouping using place value counters



When I put 536 into groups of 4, I can see that there is 1 group of hundreds, 3 groups of tens and 4 groups of ones in 536.
There are 100 + 30 + 4 groups of 4 in 536.
Each group will get 1 hundred (100), 3 tens (30) and 4 ones (4).
134 x 4 = 536
536 ÷ 4 = 134



Short Division

98 ÷ 7 becomes

1 4
7 | 9 8

Answer: 14

432 ÷ 5 becomes

8 6 r 2
5 | 4 3 2

Answer: 86 remainder 2

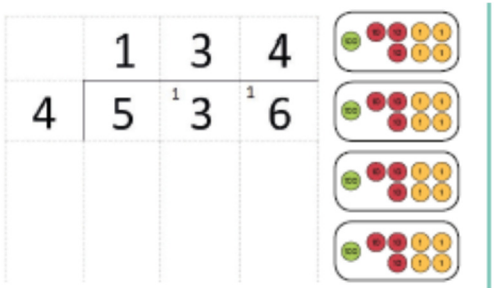
Hemingford Grey SCHOOL

Hemingford Grey Calculation Policy

Hemingford Grey SCHOOL

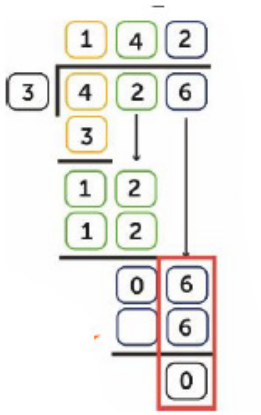
Division as sharing using place value counters

This is a division calculation. It is 536 shared equally by 4.
The counters represent 536 and they have been shared equally into the 4 boxes which were empty at the beginning. I want to know how many in each group.

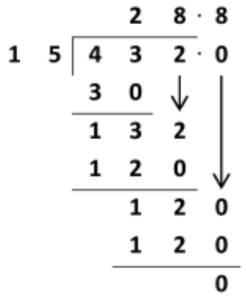


Children represent the counters pictorially

Long Division



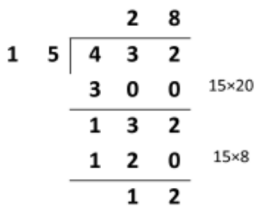
432 ÷ 15 becomes



Answer: 28·8

Step 1: List the multiples of 3: 3,6,9,12,15,18,21,24
Step 2: " 3's into 4 goes 1 group because 1x3=3. Put the 1 at the top the 3 underneath and the remainder 1 under the 3 . Bring down the next digit to form the 12. Repeat."

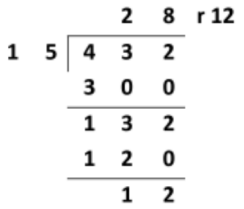
432 ÷ 15 becomes



$\frac{12}{15} = \frac{4}{5}$

Answer: $28\frac{4}{5}$

432 ÷ 15 becomes



Answer: 28 remainder 12

Questions you can ask your child at home:

- What do you think about...
- Why do you think that?
- How do you know this?
- Tell me more...
- What questions do you still have?
- Prove that…
- Explain your thinking.
- Explain the method you used.
- How could you improve your learning?
- Now try this…
- X of these are incorrect/correct. Which ones and why?
- Can you tell a maths story to go with your calculation?
- Can you find any related facts?
- Invent another method or show how to solve it a different way.
- Can you explain what a common mistake might be and why?
- Are you sure? ...
- How do you know? ...
- What do you notice? ...
- What's the same and what's different? ...
- Can you convince me? ...
- Is there another way? ...
- Is it always, sometimes, or never true? ...
- I think I understand what you mean. Are you saying…