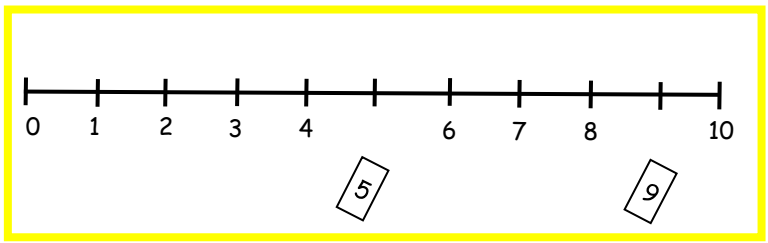
Chad Vale Primary School
Calculation Policy

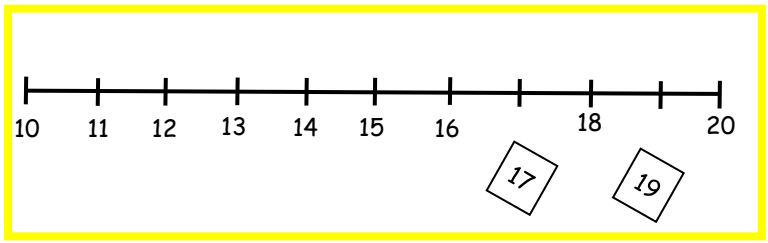
Place Value

The understanding of Place Value is fundamental if children are to expected to add, subtract, multiply or divide

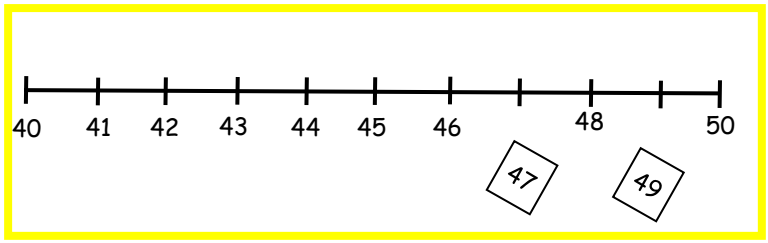
Ordering numbers to 10



Ordering numbers to 20



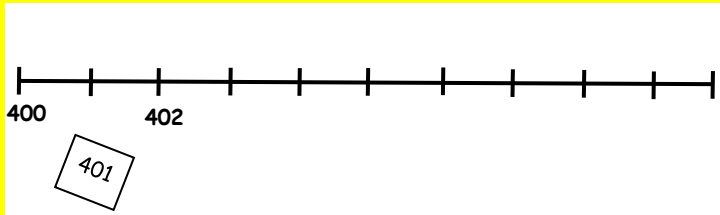
Ordering numbers to 50



Ordering numbers to 100

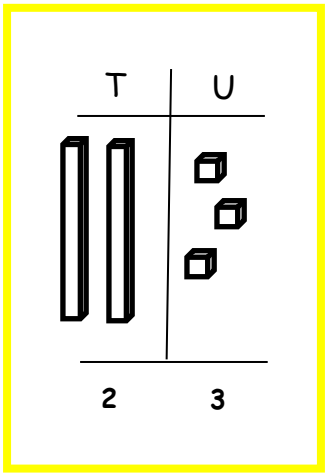
0		2	3	4	5	6	7	8	9
10	11	12		14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34		36	37	38	39
40	41	42		44	45	46	47	48	49
50	51	52	53	54	55	56	57		59
60	61	62	63	64	65	66	67	68	69
70	71	72	73		75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

Ordering numbers to 1000 and beyond

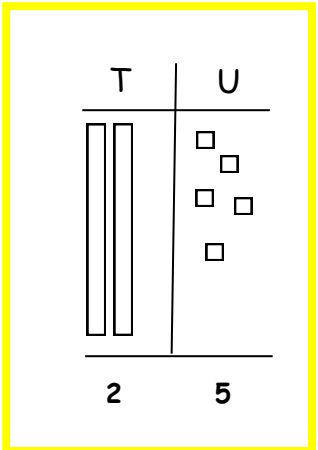


Once children can order two-digit numbers, they should be encouraged to partition

Partitioning (splitting two-digit numbers)
Using concrete materials e.g. cubes

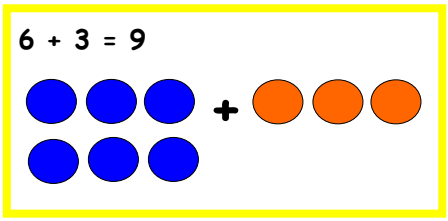


Partitioning (splitting two-digit numbers)
Using drawings in books

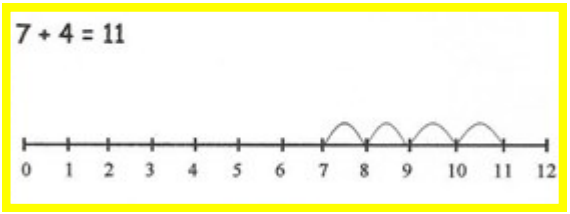


Addition

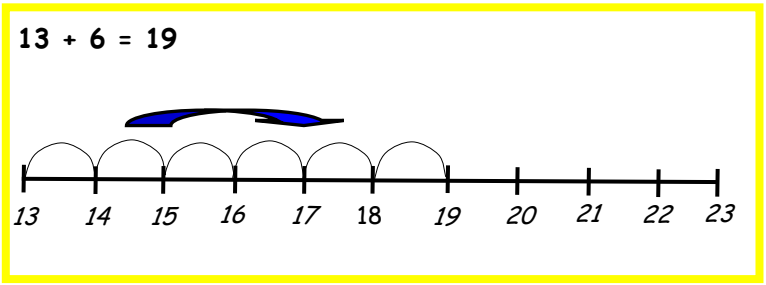
Addition (using objects)
Adding groups together



Addition (using a FIXED number line)
Counting *forwards* in ones



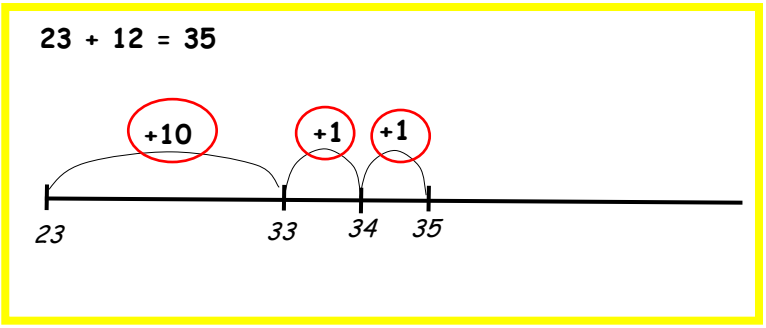
Addition (using an EMPTY number line)
Counting in ones (extend to jumping in larger groups)



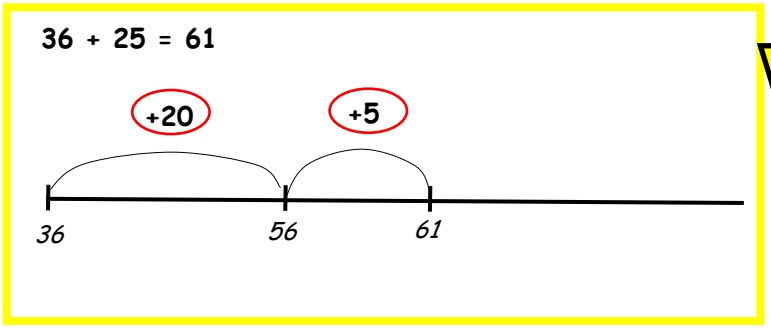
Mental Methods

Once children are confident at partitioning, particularly in KS2, they should be encouraged to develop mental methods. **Although this would be written at first, the number line should form part of a mental strategy**

Addition (using the number line)
Partitioning (splitting two-digit numbers)



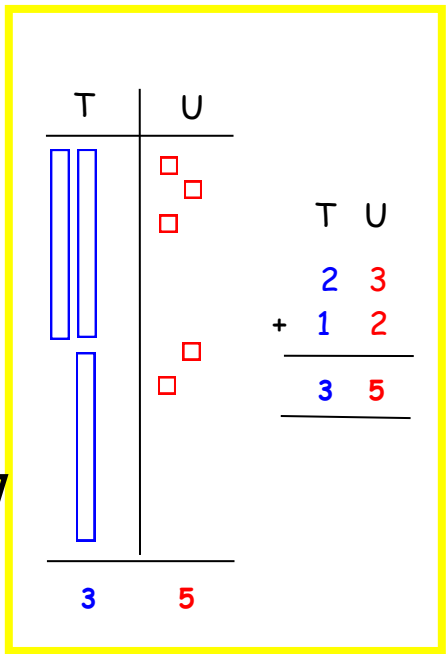
Addition (using the number line)
Partitioning (splitting two-digit numbers)



Written Methods

At first a visual representation should be used to support written addition. In order to do this, children should have a strong understanding of PLACE VALUE

Addition supported by visual maths
Using concrete or visual representations



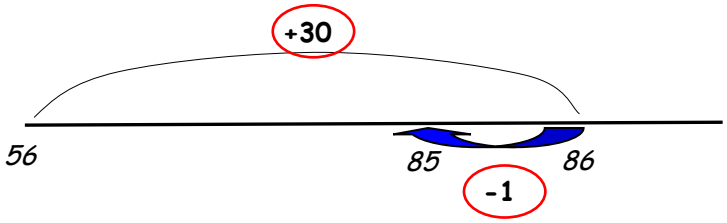
Addition

Mental Methods (continued)

Addition (Adjusting)

This works by *adjusting* **29** and **adding 30** instead.
We then **subtract 1**

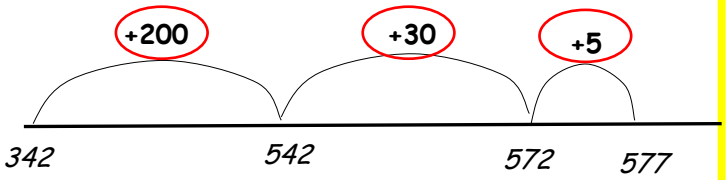
56 + 29 = 85



From here children should continue to develop their mental methods to add 3-digit numbers using partitioning and adjusting techniques

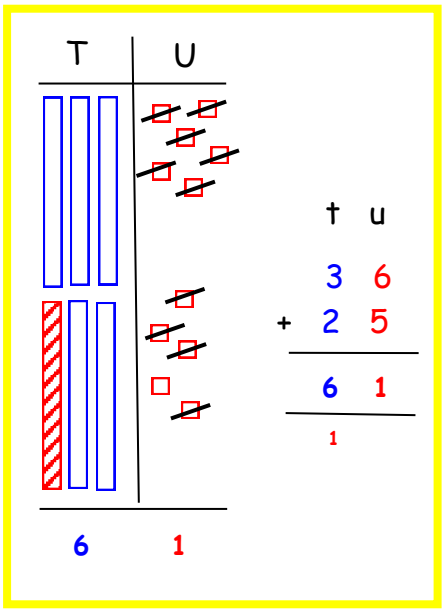
Addition (partitioning)

342 + 235 = 577



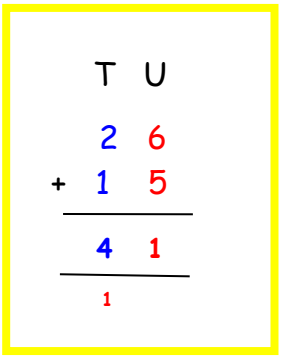
Written Methods (continued)

Addition (bridging the tens)

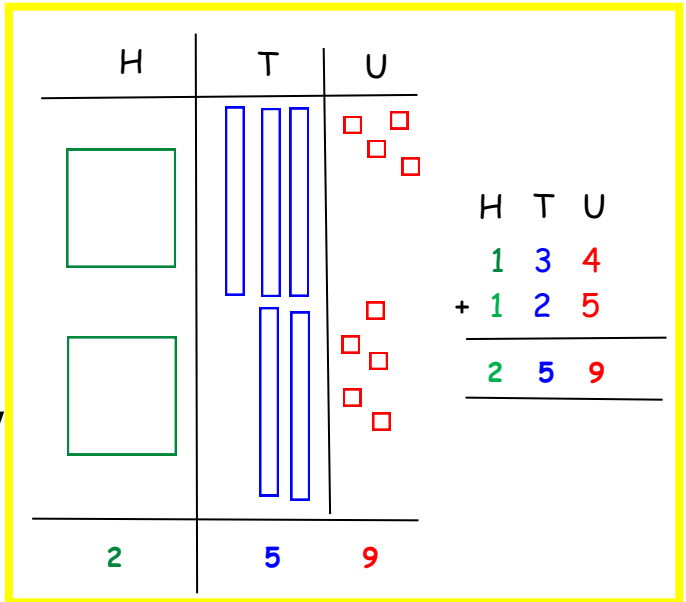


Addition (the column method)

Using visual maths if required



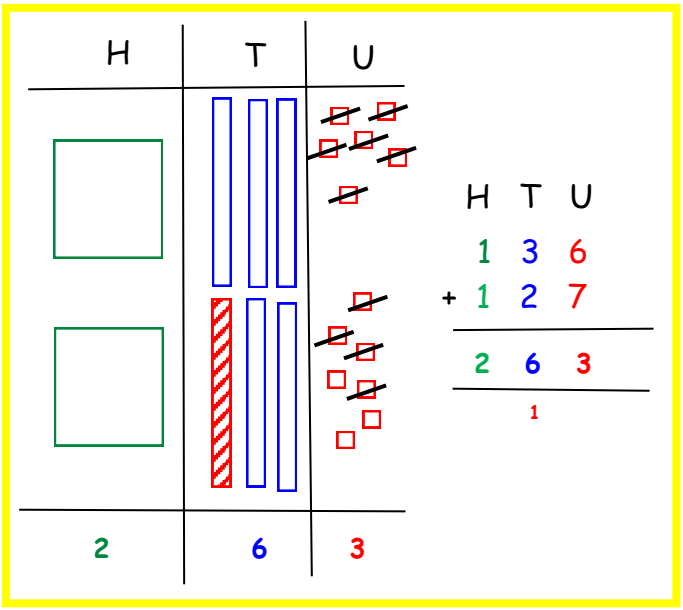
Addition (adding with hundreds)



Addition

Written Methods (continued)

Addition (bridging the tens)

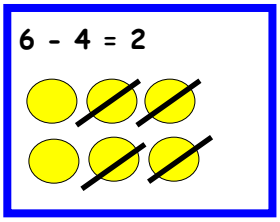


Addition (The Column Method)

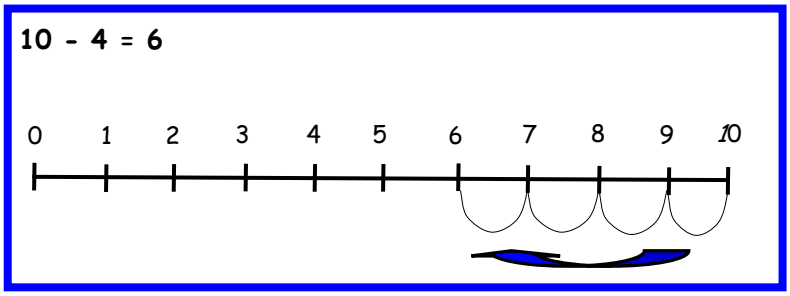
H T U
1 3 6
+ 1 2 7
2 6 3
1

Subtraction

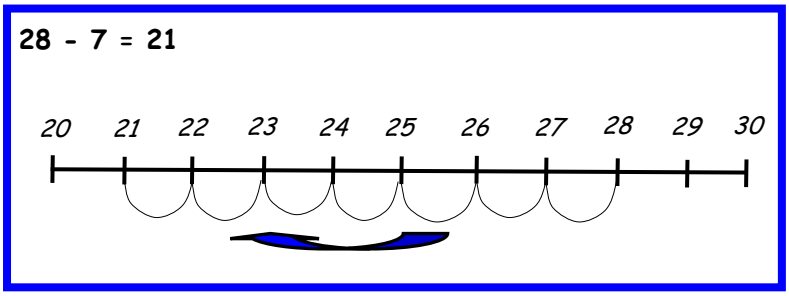
Subtraction (using objects)
Taking away from a group



Subtraction (using a FIXED number line)
Counting *back* in ones



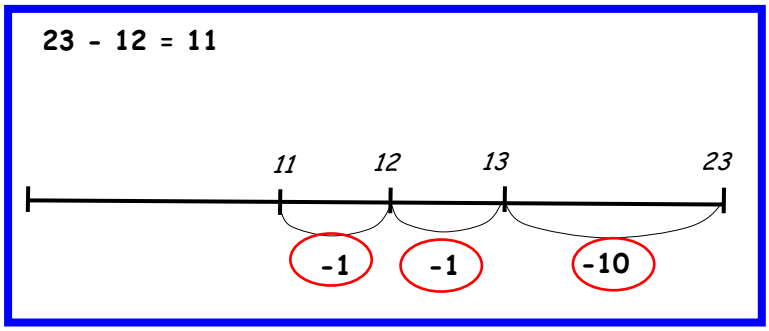
Subtraction (using an EMPTY number line)
Counting back in ones (extend to jumping in larger groups)



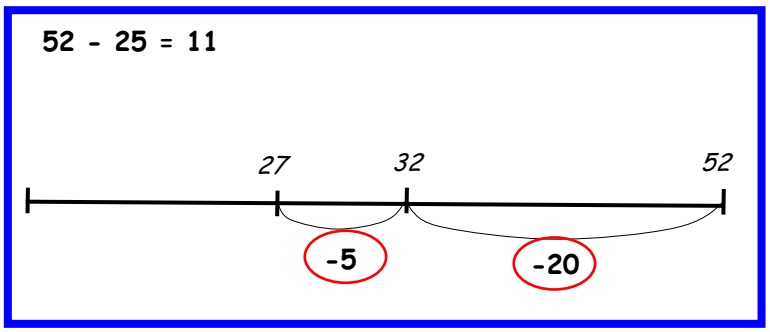
Mental Methods
Once children are confident at partitioning, particularly in KS2, they should be encouraged to develop mental methods. **Although this would be written at first, the number line should form part of a mental strategy**

Written Methods
At first a visual representation should be use to support written subtraction. In order to do this, children should have a strong understanding of PLACE VALUE

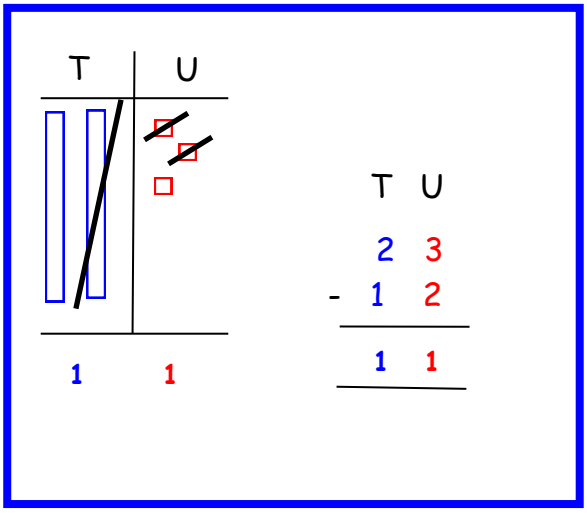
Subtraction using the number line
Partitioning (splitting two-digit numbers)



Subtraction using the number line
Partitioning (splitting two-digit numbers)



Subtraction supported by visual maths

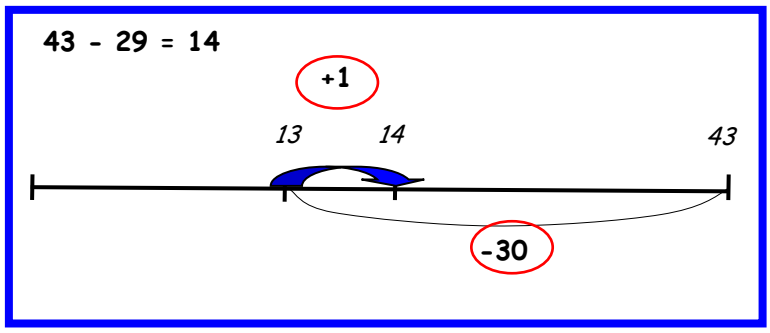


Subtraction

Mental Methods (continued)

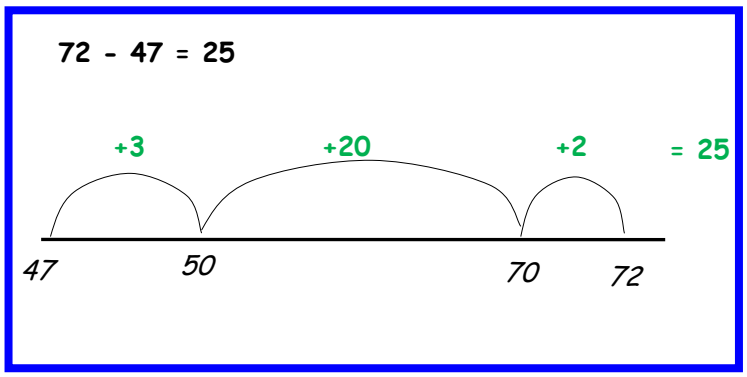
Subtraction (by adjusting)

This works by *adjusting* **29** and **subtracting 30** instead. We then **add 1**



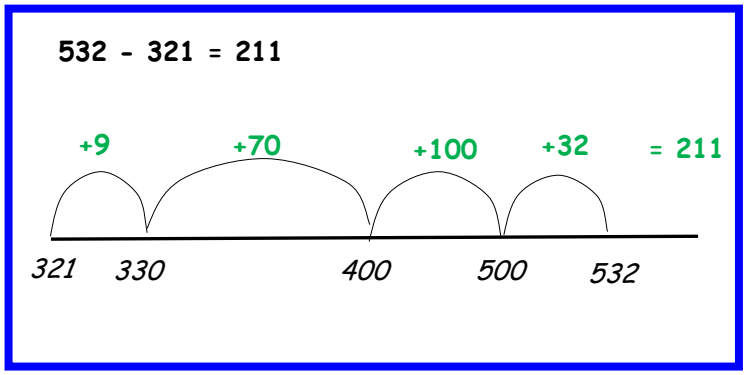
Subtraction (by addition)

This method works by partitioning. **Count-**on in **steps** from the **smallest number** to the **largest**



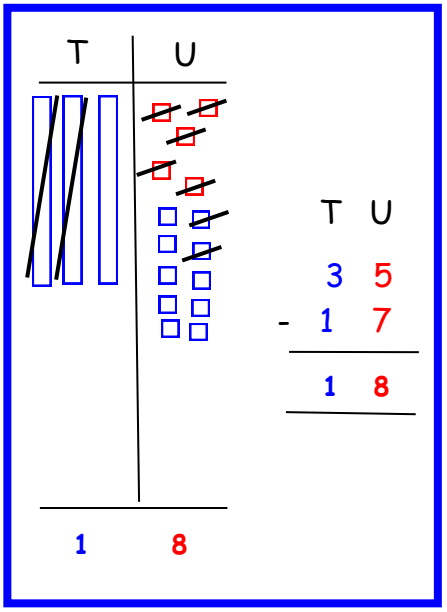
Subtraction (by addition)

This method works by partitioning. **Count-**on in **steps** from the **smallest number** to the **largest**



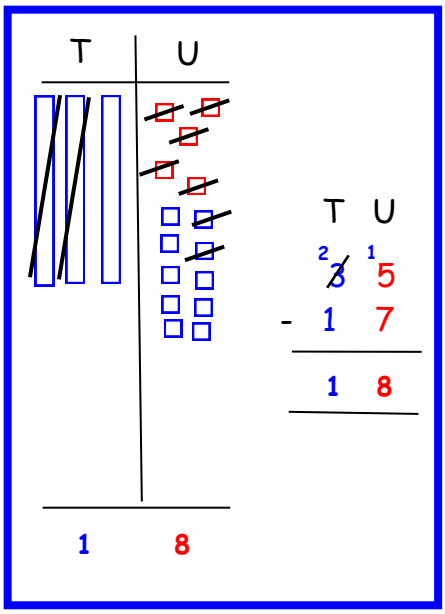
Written Methods (continued)

Subtraction (crossing the tens)

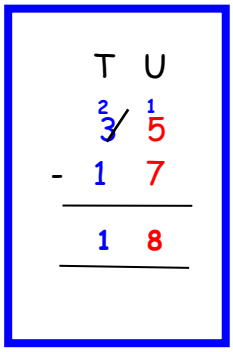


Subtraction (decomposition)

Supported by visual maths



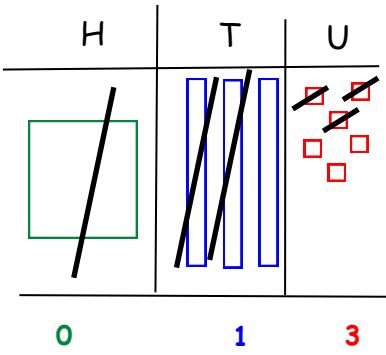
Subtraction (decomposition)



Subtraction

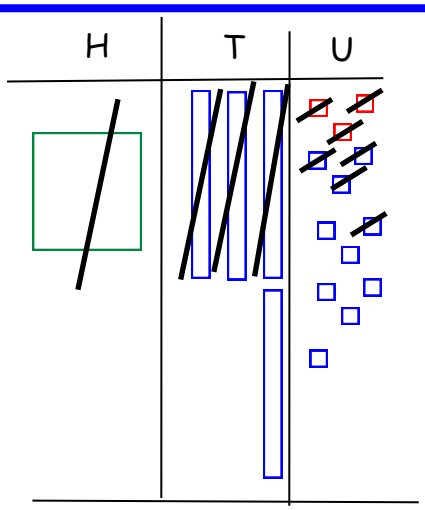
Written Methods (continued)

Subtraction (crossing the tens)



H	T	U
1	3	6
- 1	2	3
0	1	3

Subtraction (decomposition)



H	T	U
1	$^{3}\not{4}^{1}$	3
- 1	2	7
0	1	6

Subtraction (decomposition)

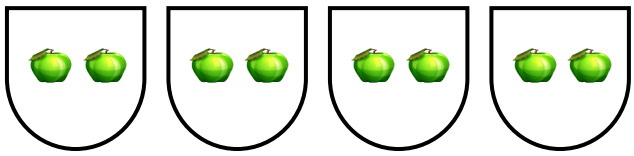
H	T	U
1	$^{3}\not{4}^{1}$	3
- 1	2	7
0	1	6

Multiplication

Repeated Addition (using objects)

Adding groups together

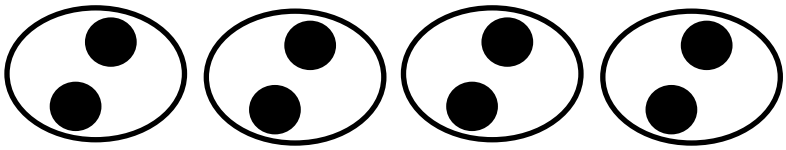
4 x 2 = 8



Repeated Addition (using symbols)

Adding groups together

4 x 2 = 8



4 x 2 = 8

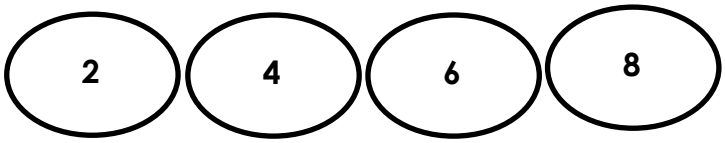
X X X X

X X X X

Repeated Addition (using symbols)

Adding groups together

4 x 2 = 8



Splitting

At this point children should be learning their times-tables and taught **Splitting**. This will support their understanding of the **Grid Method.**

Example: 8 x 5 =

5 x 5 = 25

3 x 5 = + 15

40

Grid Method

May be used to develop understanding of formal methods of written multiplication

12 x 8 = 96

X	10	2	
8	80	16	(80 + 16) = 96

35 x 24 = 840

X	30	5	
20	600	100	(600 + 100) = 700
4	120	20	(120 + 20) = 140

700 + 140 = 840

Formal Methods of Multiplication

Taught by the end of Year 4

```
  T  U
  1  2
X    8
-------
  9  6
  1
```

Taught by the end of Year 4

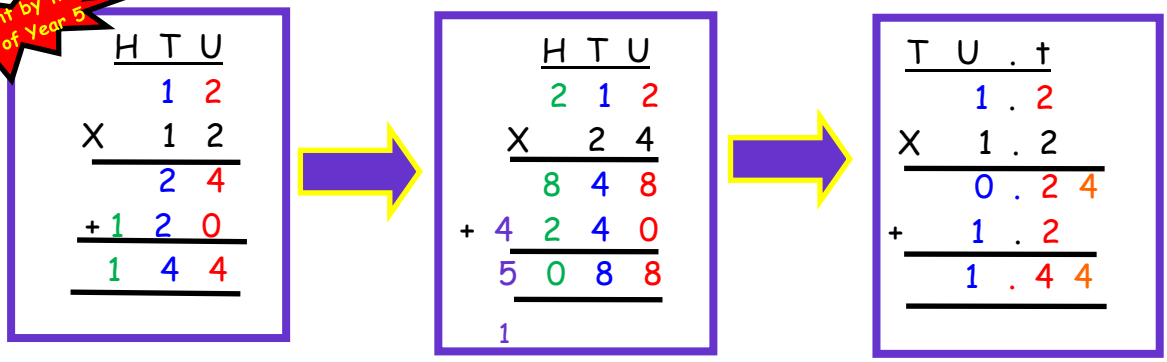
```
  H  T  U
  2  3  1
X        3
----------
  6  9  3
```

```
  H  T  U
  2  3  6
X        4
----------
  9  4  4
  1  2
```

```
  T  U . t
     3 . 1
X    3
-------
     9 . 3
```

Extended Column Multiplication

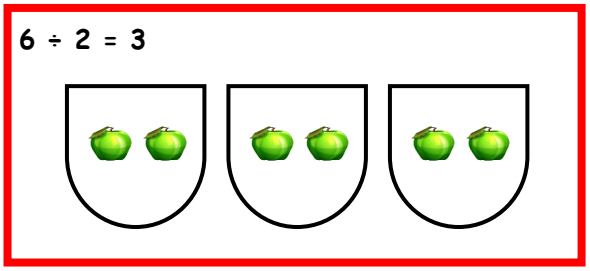
Taught by the end of Year 5



Division

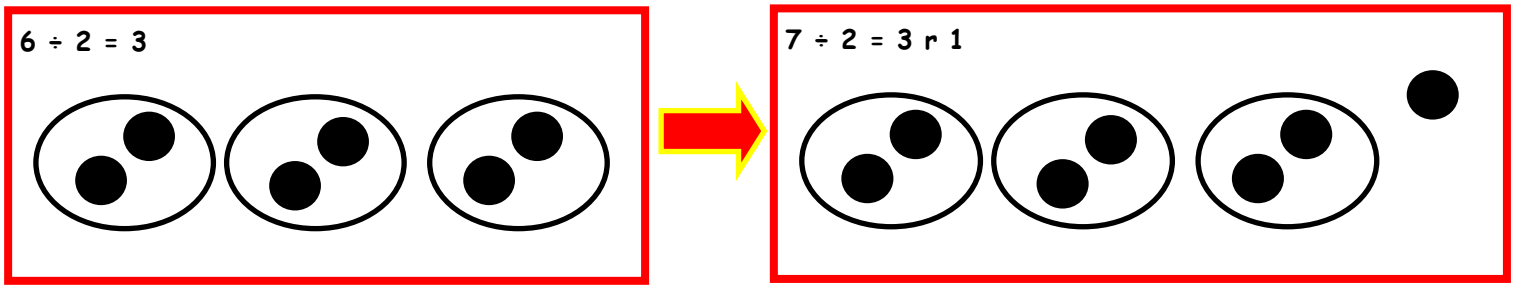
Splitting (using objects)

How many groups are there?



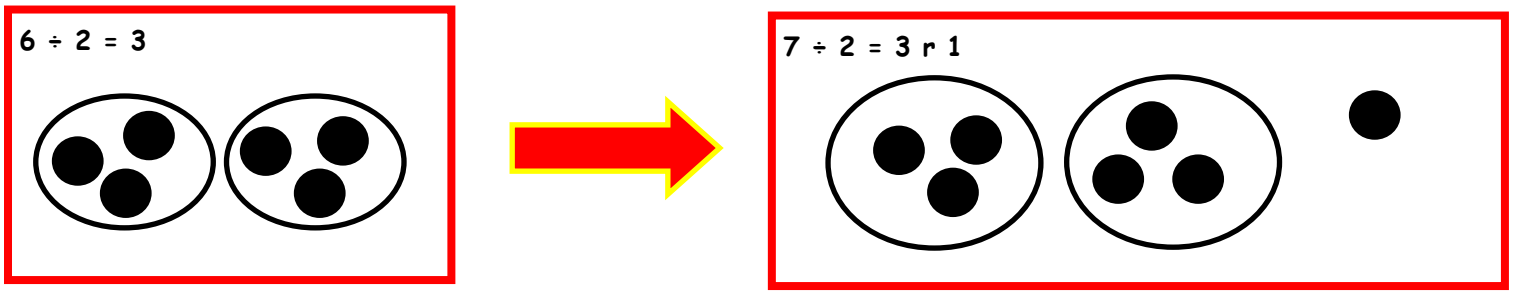
Division as 'Grouping' (using symbols)

How many groups are there?



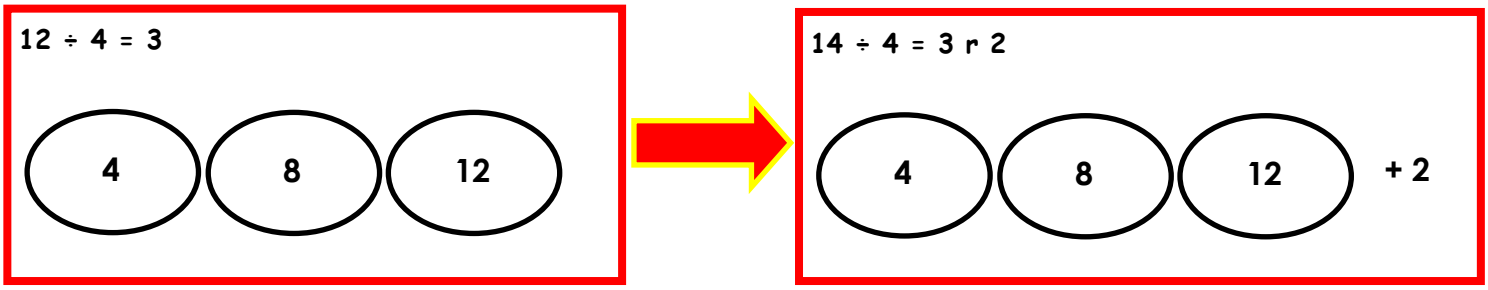
Division as 'Sharing' (using symbols)

How many are in each?



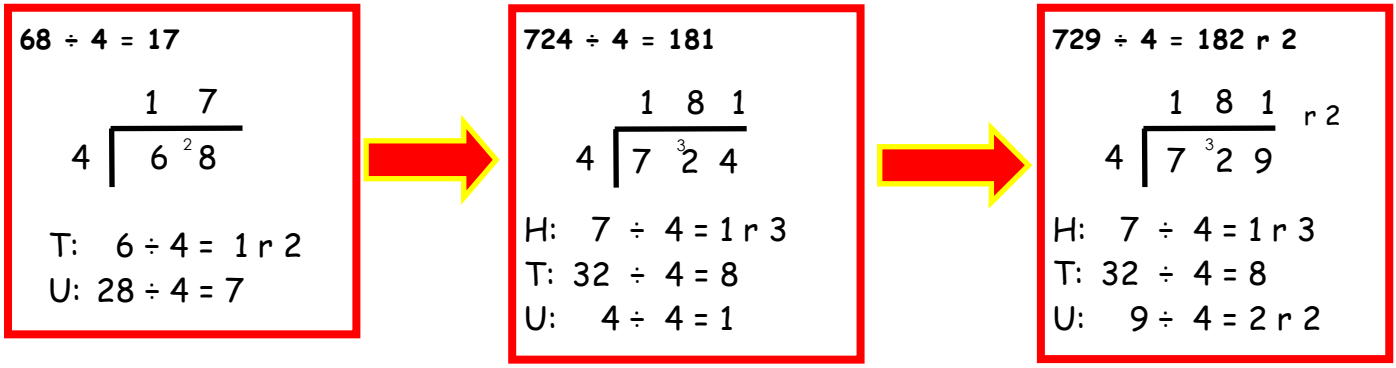
Times-table Patterns

How many groups are there?



Bus Shelter

Children should have a strong understanding of Place Value



N.B. Methods to be used when teaching **decimal** and **fractional** remainders.

Chunking - used to develop place value

Children should have a strong understanding about the affect of multiplying any number by 10, 100 and 1000.

288 ÷ 12 = 24

```
        2 4
   ┌──────
12 │ 2 8 8
   - 2 4 0    (20 x 12)
   ─────────
     0 4 8
   - 0 4 8    (4 x 12)
   ─────────
     0 0 0
```

345 ÷ 13 = 26 r 7

```
        2 6
   ┌──────
13 │ 3 4 5
   - 2 6 0    (20 x 13)
   ─────────
     0 8 5
   - 0 7 8    (6 x 13)
   ─────────
     0 0 7
```

Long Division

322 ÷ 14 = 23

```
        2 3
   ┌──────
14 │ 3 2 2
   - 2 8
   ─────────
       4 2
   -   4 2
   ─────────
       0 0
```

432 ÷ 15 = 28 r 12

```
        2 8
   ┌──────
15 │ 4 3 2
   - 3 0
   ─────────
     1 3 2
   - 1 2 0
   ─────────
     0 1 2
```