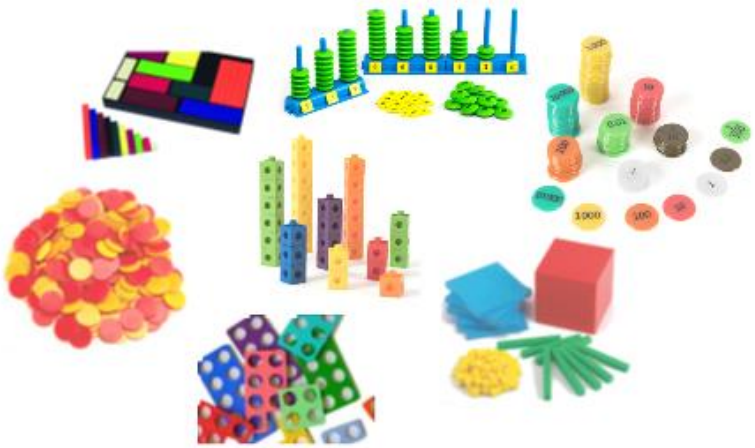
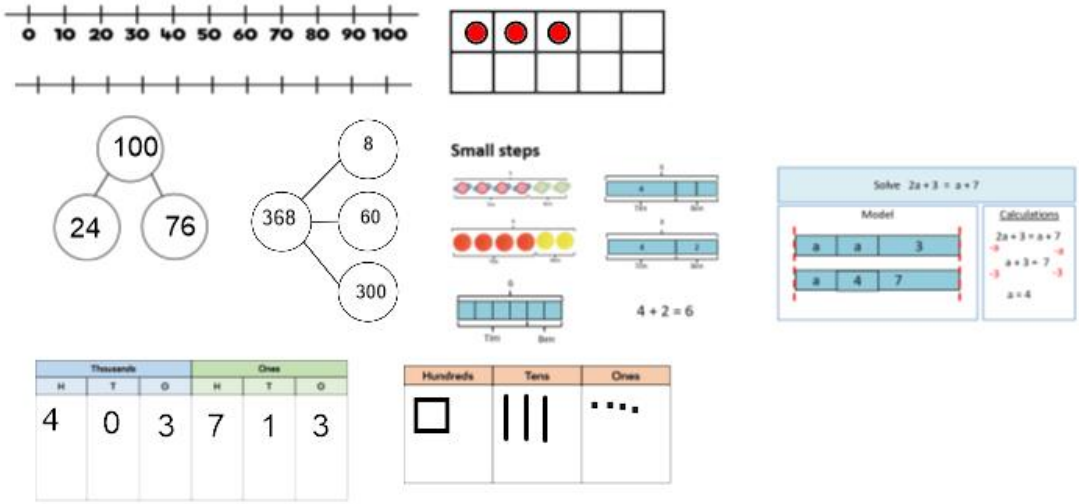
# Lanivet's Calculation Policy

At Lanivet School, we use a wide range of manipulatives to develop and support children's calculations. We also use a variety of pictorial models such as number lines, ten frames, part-whole models, bar models and place value charts. These concrete and pictorial resources are used throughout the school as they give the children a deeper understanding; enabling them to master their calculations for all four operations.



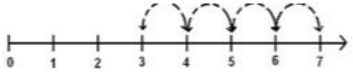


# Addition Key Stage 1

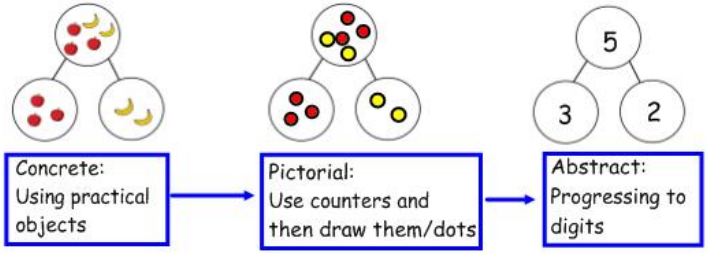
## Year 1

Adding numbers to 10 by joining two groups of cubes, counters or objects


Progress to counting on with a number line

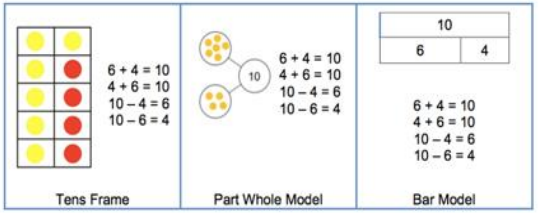


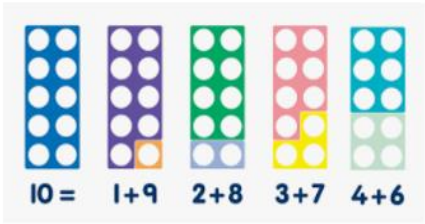

### Use Part-Whole models



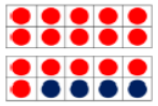

Concrete: Using practical objects → Pictorial: Use counters and then draw them/dots → Abstract: Progressing to digits

Learn their number bonds to 10 and recognise related addition and subtraction facts.



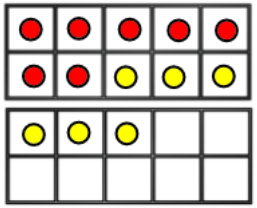

Use these models and children's understanding to progress with finding number bonds to 20.



# Addition Key stage 1

## Year 1

To add two digit to which bridge 20: Use counters and tens frames. When confident, children can draw counters onto tens frame images.



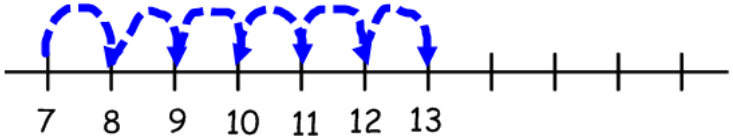
Example sentence stems:

There are ___ red counters.
There are ___ yellow counters.
Altogether there are ___ counters.

First there were___.
Then __ more were added.
Now there is_____.

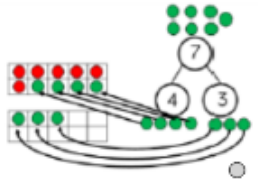
7 + 6 = 13

Use a numberline

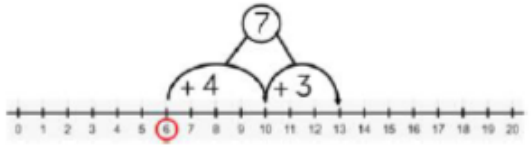



Start with the largest number (7) and count on 6 more

Progress to adding numbers within 20 by first making 10 using their understanding of number bonds using part-wholes and tens frames to support them. They can also show this paritioning using a number line. This will help them confidently move on to mental methods.




6 + 4 = 10
10 + 3 = 13



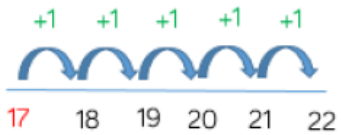
Addition Key Stage 1

## Year 2

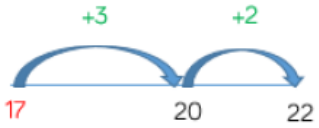
Continue to use concrete manipulatives and pictorial models from year 1 to support children with their mental strategies, learning their number bonds and to progress to learning their bonds to 100.

Use related facts such as 5 + 4 = 9, 50 + 40 = 90

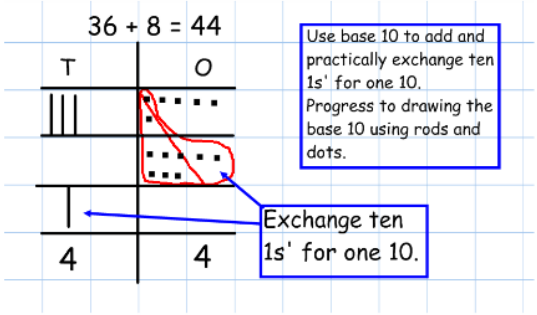
To add a one digit number to a two digit number up to 100.

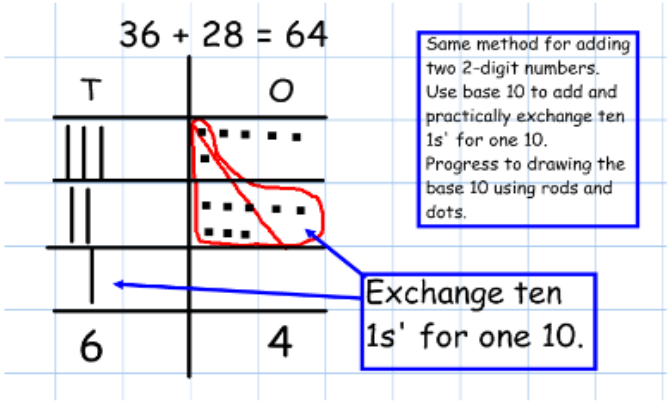



Start by counting up in ones on a blank number line




Progress to using their number bonds. Partition to add up to the next multiple of 10. Use manipulatives and part-whole models as in year 1 to support if needed with paritioning the number which is being added.




**Children can use the partitioning method:**

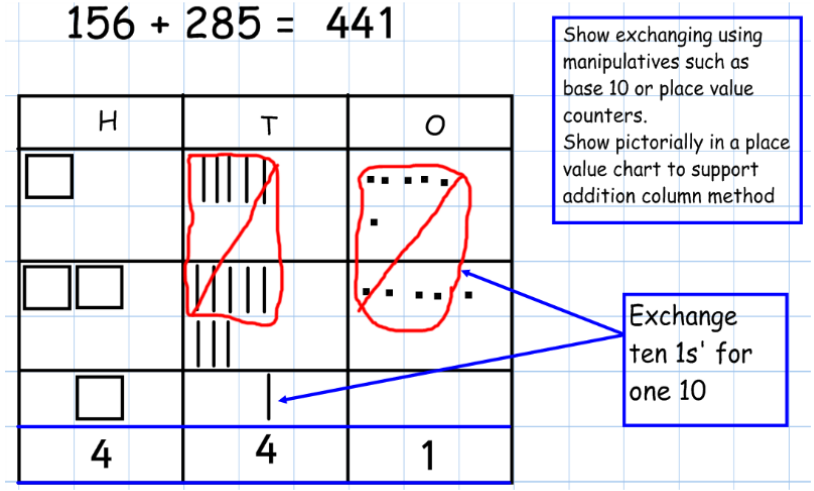
30 + 20 = 50

6 + 8 = 14

50 + 14 = 64

Addition Key stage 2

## Year 3




| | H | T | O |
|---|---|---|---|
| | 1 | 5 | 6 |
| + | 2 | 8 | 5 |
| | 4 | 4 | 1 |
| | ~~1~~ | ~~1~~ | |

Progress to formal column method for adding three digit numbers

## Year 4

2456 + 3728 =6184

| | Th | H | T | O |
|---|---|---|---|---|
| | 2 | 4 | 5 | 6 |
| + | 3 | 7 | 2 | 8 |
| | 6 | 1 | 8 | 4 |
| | ~~1~~ | | ~~1~~ | |

Following on from year 3 methods to adding 4 digit numbers with exchanging.

Addition Keys stage 2

## Year 5 and 6

Formal column method to add more than 4 digits.

29456 + 34728 = 64184

| | Tth | Th | H | T | O |
|---|---|---|---|---|---|
| | 2 | 9 | 4 | 5 | 6 |
| + | 3 | 4 | 7 | 2 | 8 |
| | 6 | 4 | 1 | 8 | 4 |
| | ~~1~~ | ~~1~~ | | ~~1~~ | |

## Year 5 and 6 (adding decimals)

Add decimals upto 3 decimal places varying in decimal places

42.956 + 13.785 = 56.741

| | T | O | • | $\frac{1}{10}$ | $\frac{1}{100}$ | $\frac{1}{1000}$ |
|---|---|---|---|---|---|---|
| | 4 | 2 | • | 9 | 5 | 6 |
| + | 1 | 3 | • | 7 | 8 | 5 |
| | 5 | 6 | • | 7 | 4 | 1 |
| | | ~~1~~ | | ~~1~~ | ~~1~~ | |

42.95 + 3.785 = 46.735

Ensure they place the digits in the correct place value columns

| | T | O | • | $\frac{1}{10}$ | $\frac{1}{100}$ | $\frac{1}{1000}$ |
|---|---|---|---|---|---|---|
| | 4 | 2 | • | 9 | 5 | 0 |
| + | | 3 | • | 7 | 8 | 5 |
| | 4 | 6 | • | 7 | 3 | 5 |
| | | ~~1~~ | | ~~1~~ | | |

Place 0 in decimal columns so they understand it has a value of 0 not nothing.

# Subtraction Key Stage 1

## Year 1

Children need to know their number bond facts for addition and subtraction to 10 and to 20. Refer to the addition calculations for year 1 for number bond activities and related facts.

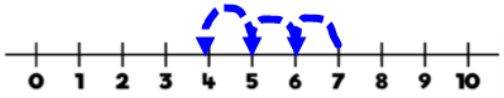
**Subtract single digit numbers**

7-3=

Physically take away cubes, counters or objects to find how many are left.

7-3= 4

Cross out the amount on images and count how many are left.

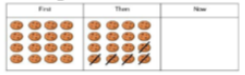



Count back on a number line

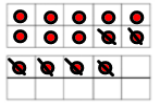
To subtract a single digit up to 20

Use first, then and now grids

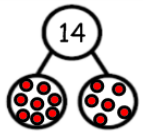
First there were ___ biscuits.
Then ___ were eaten.
Now there are ___ biscuits.
16 – 5 = ___



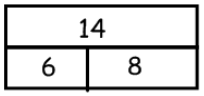
14 - 6 =



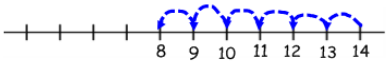
Cross out counters on a tens frame




Move counters from the whole to the part to support understanding

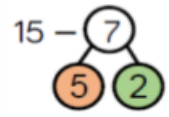


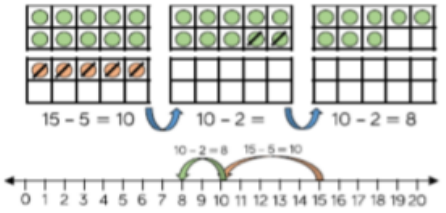

Abstract bar model




Use a number line to count back in ones

Partition using knowledge of number bonds to 10 to count back to the nearest ten and then subtract what is left. Use tens frames or number lines as a pictorial model for support.



# Subtraction Key Stage 1

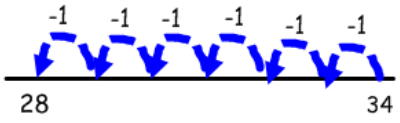
## Year 2

Continue to use concrete manipulatives and pictorial models from year 1 to support children with their mental strategies, learning their number bonds and to progress to learning their related facts with bonds to 100.

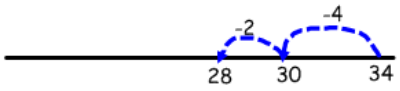
Use related facts such as 9 - 4 = 5, 90 + 40 = 50

**Subtracting a single digit from a two digit number**

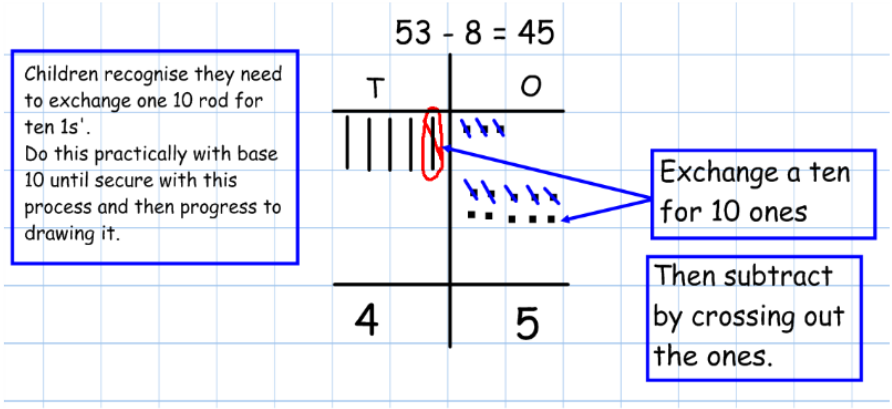
34 - 6 = 28



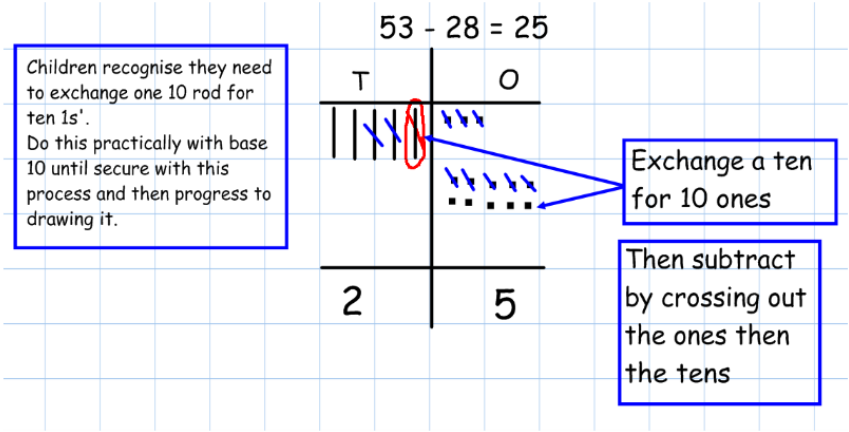

Use a blank number line to count back in ones




Progress to using their number bonds. Partition to subtract to the previous multiple of 10. Use manipulatives and part-whole models as in year 1 to support if needed with paritioning the number which is being subtracted.



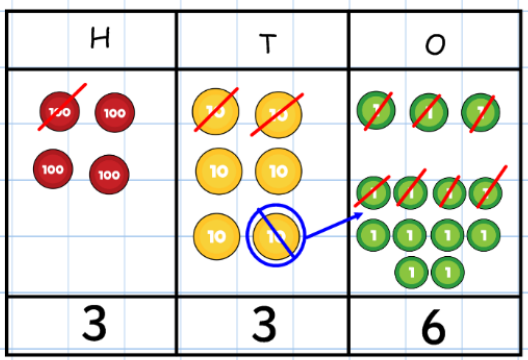

**Subtracting two 2-digit numbers**



# Subtraction Key Stage 2

## Year 3

463 - 127 = 336




Use manipulatives such as place value counters and base 10. Show pictorially using a place value chart to support understanding of exchanging in the formal column method.

Exchange one 10 for ten 1s'.

463 - 127 = 336

| | H | T | O |
|---|---|---|---|
| | 4 | 5 6 | 1 3 |
| - | 1 | 2 | 7 |
| | 3 | 3 | 6 |

Formal column method to subtract three digit numbers with exchanging.

## Year 4

7483 - 2736 =4747

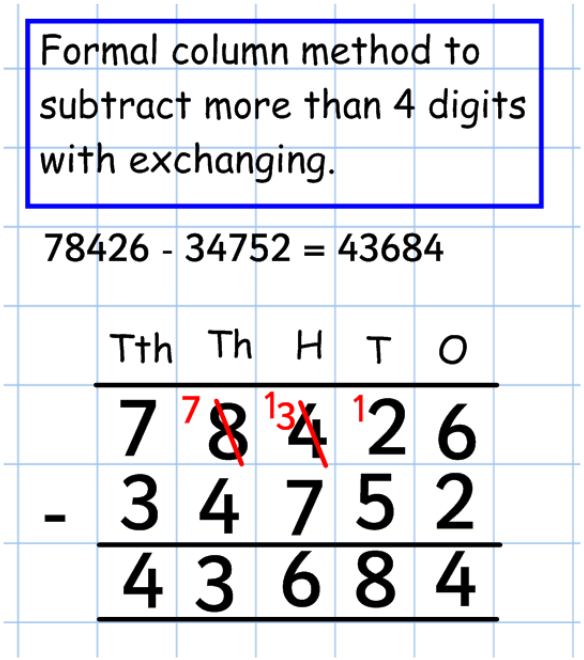
| | Th | H | T | O |
|---|---|---|---|---|
| | 6 | 7 1 | 4 7 | 8 1 3 |
| + | 2 | 7 | 3 | 6 |
| | 4 | 7 | 4 | 7 |

Following on from year 3 methods to subtract 4 digit numbers with exchanging.

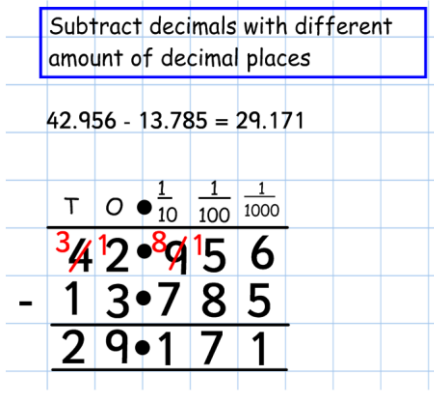
# Subtraction Key Stage 2

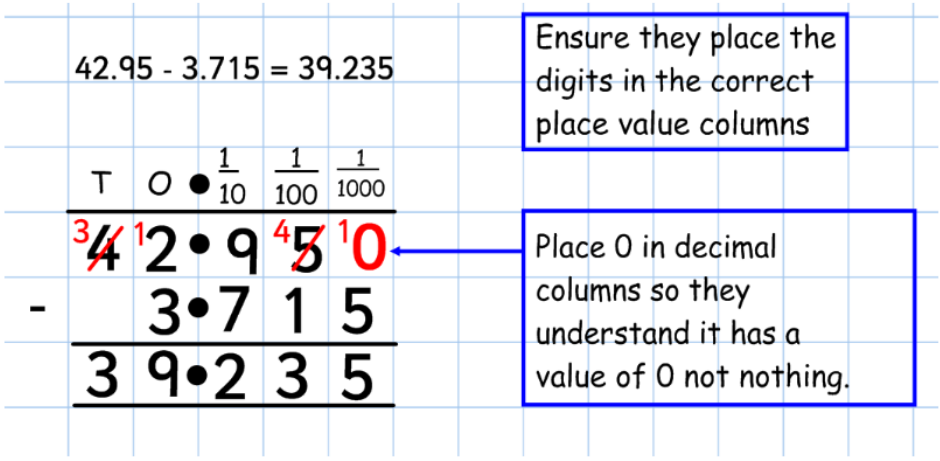
## Year 5 and 6

Use manipulatives and model using place value charts with base 10 and place value counters to support where needed.




## Year 5 and 6 (Subtracting decimals)

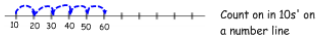


# Multiplication Key Stage 1

## Year 1

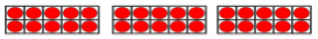
Use 100 squares, number lines, tens frames, base 10, place value counters and objects to support children with counting in tens



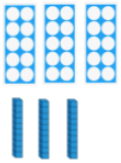

Count on in 10s' on a number line

There are 10 flowers in each bunch
There are 5 bunches.
There are 50 flowers altogether.

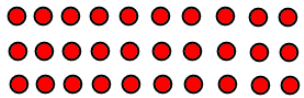
Children will count in 2s', 5s' and 10s'. They will recognise equal groups, repeated addition and finally progressing to the multiplication symbol when secure.



10 + 10 + 10 = 30
3 lots of 10 = 30
3 equal groups of 10 = 30
*Progress to 3 x 10 when secure*




Use numicon, tens frames, place value counters, base 10 and objects to support and have variation with counting in 10s.

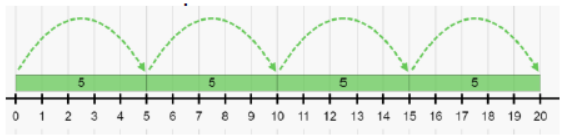


Use arrays:
3 rows with 10 counters in each row
10 columns with 3 counters in each column
30 counters altogether


Use hands to support counting in 5s. Use other familiar objects such as wheels on bikes for counting in 2s'.

How many wheels altogether?


5 + 5 + 5 + 5 = ____




4 bags
5 apples in each bag
There are 20 apples altogether.

4 x 5 = 20



Use numicon, counters, base 10 and objects

4 rows of 5 = 20

6 columns of 2 = 12

Recognise and use arrays

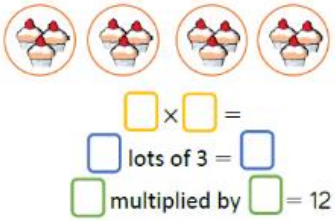
Use the term 'doubling' when counting and multiplying by 2.

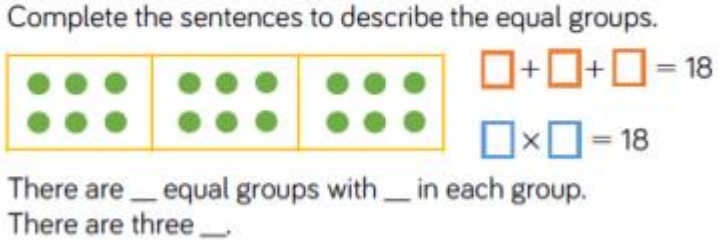
# Multiplication Key Stage 1

## Year 2

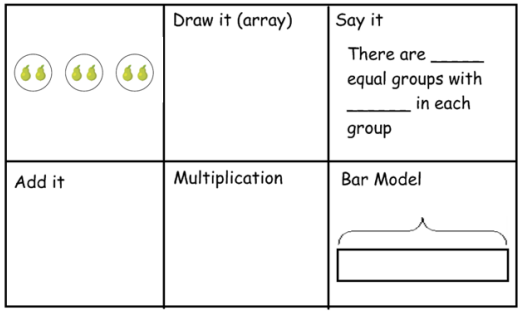
The pupils are to learn the multiplication facts for the 2, 5 and 10 times tables.

Pupils are to continue to use the pictorial models and language used in year 1 to reinforce and secure their understanding: equal groups of objects, numicon, tens frames, cubes, base 10, number lines and arrays.




Show their understanding by representing the calculations in different ways:

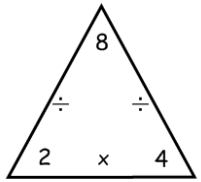



*Recognise related facts with division*

Use fact family triangles.

Have missing numbers in the calculations

2 x 4 = 8
4 x 2 = 8
8 ÷ 4 = 2
8 ÷ 2 = 4

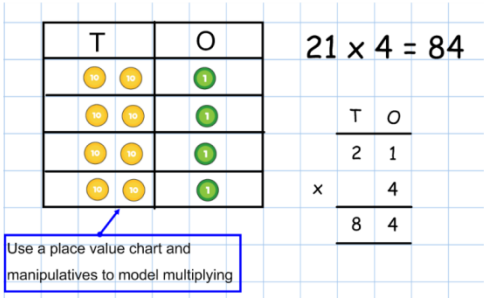


# Multiplication Key stage 2

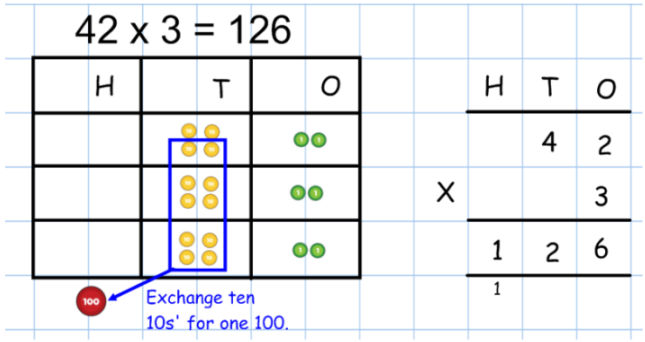
## Year 3

Pupils to learn their multiplication and division facts for 2, 5, 10, 3, 4 and 8 times table facts.

In year 3, children multiply two digit numbers by a single digit, using a place value chart and place value counters or base 10. They progress to a pictorial model to finally using a formal multiplication method without exchanging. Children in year 3 to multiply by 2, 3, 4, 5 and 8.



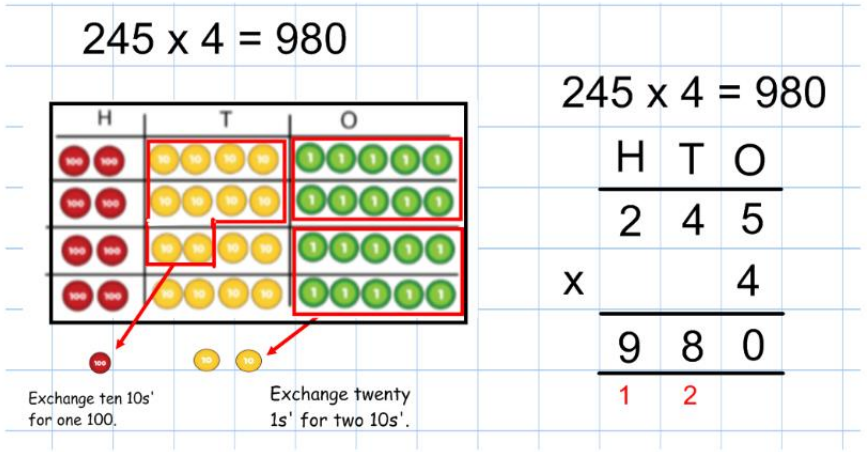

Children progress to multiplying with exchanging by using counters or base 10, then a pictorial model; finally use the formal multiplication method.




## Year 4

Pupils to learn their multiplication and division facts up to 12 x 12

Children to multiply three digit numbers by a single digit using the formal multiplication method. Support understanding, if needed, using manipulatives and pictorial model in a place value chart.

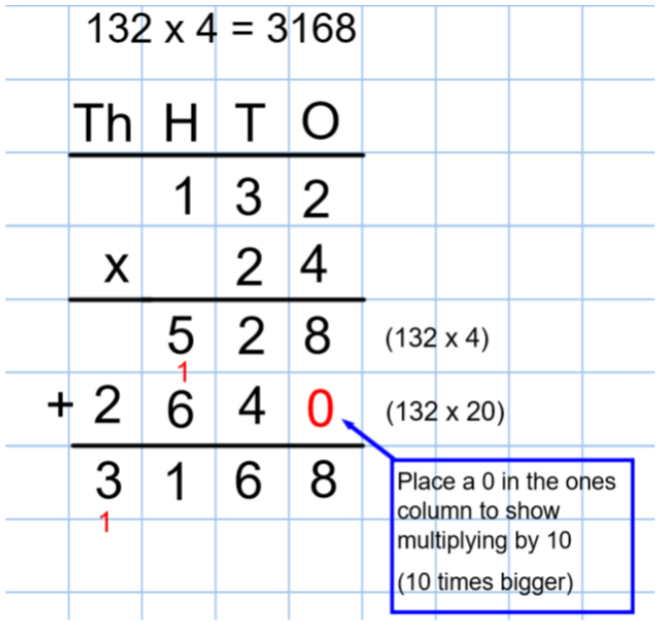


# Multiplication Key Stage 2

## Year 5 and Year 6

Short multiplication using the same grid and formal method as year 4 using four digits multiplied by one digit.

Long multiplication

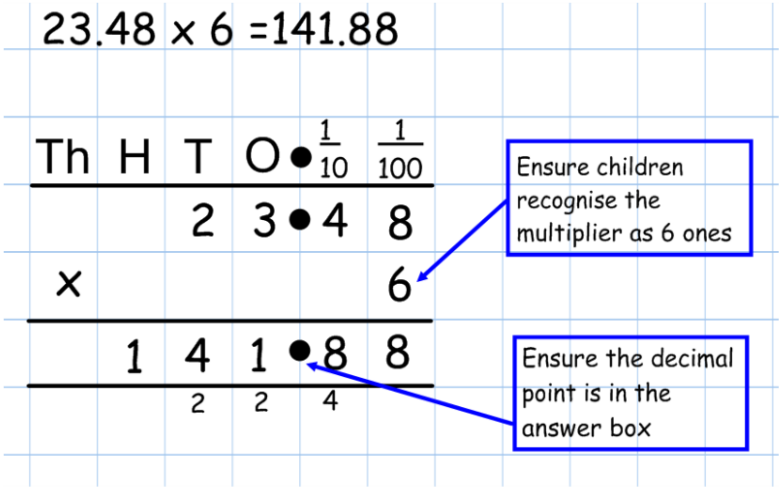



Progress to removing brackets from the expanded method.

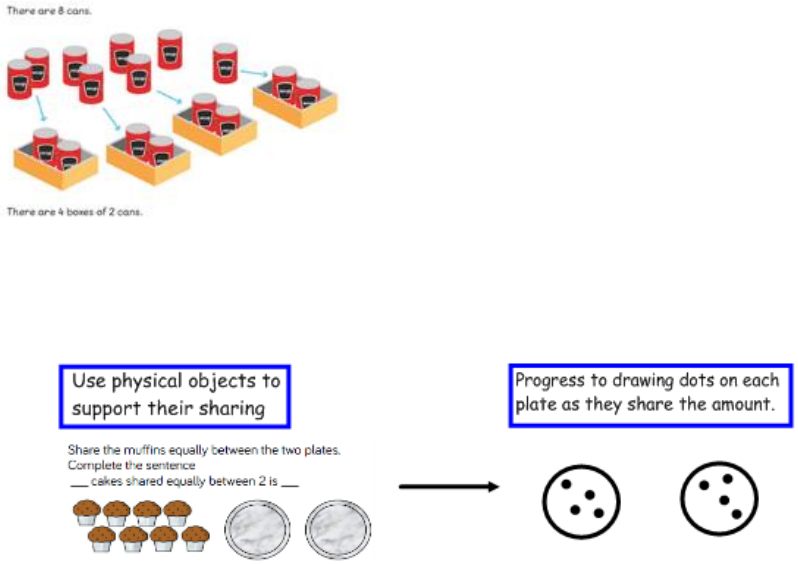
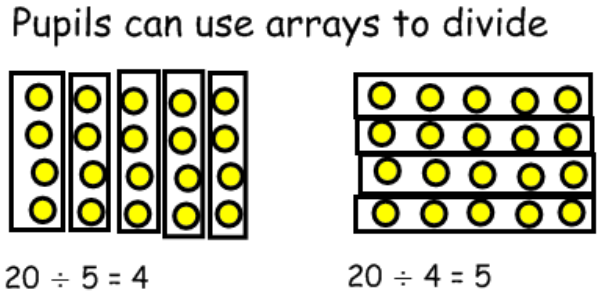
## Year 5 and Year 6

For year 6 carry out the same short and long multiplication method as year 5 (Progress to removing brackets from expanded method)

Multiplying one digit numbers by decimals up to two decimal places.



Division Key Stage 1

| Year 1 | Year 2 |
| --- | --- |
| Pupils are to be given lots of practical activities to physically share objects, cubes, place value counters etc.<br><br>  <br> | *See related multiplication and division facts on multiplication section.*<br><br>Pupils are given practical activities to practise sharing and grouping.<br><br>  <br> |

# Division Key stage 1

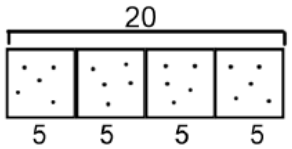
## Year 2

Solve by sharing into three groups.
How many in each group?

Share the 15 cakes between three children.
How many cakes do they each get?

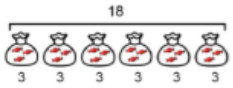
Pupils can share by counting out 20 dots as they share into a bar model

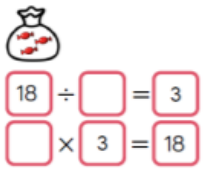
Billy draws this bar model to divide 20 between 4 equal groups.
He writes $20 \div 4 = 5$

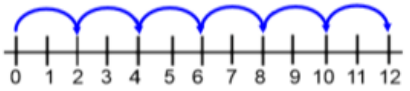



Solve by grouping into 3s'.
How many groups?

Mrs Green has 18 sweets.
She puts 3 sweets in each bag.
How many bags can she fill?




Group using number lines by counting in 2s'

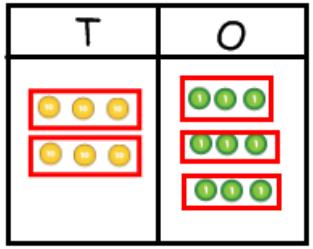
Division Key Stage 2

## Year 3
## To divide two digits by a single digit number

In year 3, children divide two digit numbers by a single digit. Group by the divisor using counters, then pictorial to finally using formal division method without exchanging. Children in year 3 to divide by 2, 3, 4, 5 and 8.

Group the counters by the divisor.
How many groups?

69 ÷ 3 = 23

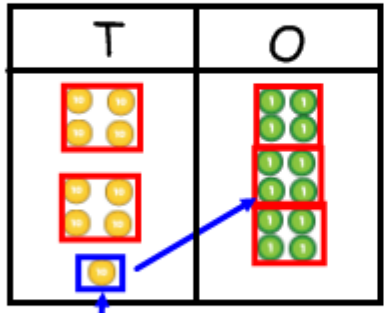



$$3\overline{)69} = 23$$

## Year 3

Children in year 3 progress to dividing with exchanging by using counters or base 10 to pictorial modelling of exchanging to formal short division method.

92 ÷ 4 = 23




Exchange one 10 for ten 1s'

$$4\overline{)92} = 23$$

Shows the ten remainder - exchanged for ten 1s'.

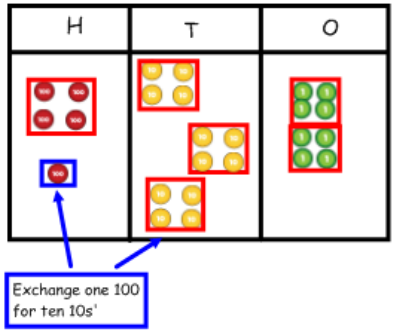
# Division Key Stage 2

## Year 4

Continue with formal method for division. In year 4 they are to divide by 2, 3, 4, 5, 6, 7, 8, and 9. They are to divide three digit numbers by a single digit.
Use the place value counters and a place value chart as a reminder and to support children where needed to help visualise exchanging.

Group by the divisor
How many groups?

528 ÷ 4 = 132




$$4\overline{)528}\quad 132$$

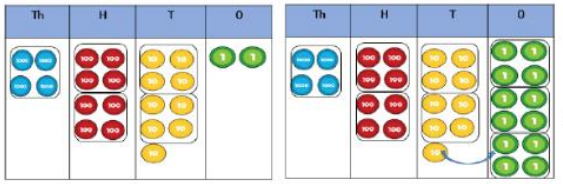
Shows the 100 remainder - exchanged for ten 1s'.

## Year 5

Use the short division method to divide 4 digit numbers by a single digit.

Use place value counters and a place value chart to support understanding of the short division method where needed.

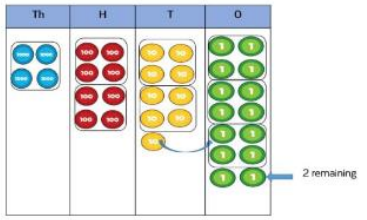
4892 ÷ 4 = 1223




$$4\overline{)4892}\quad 1223$$

4894 ÷ 4 = 1223

Dividing with remainders



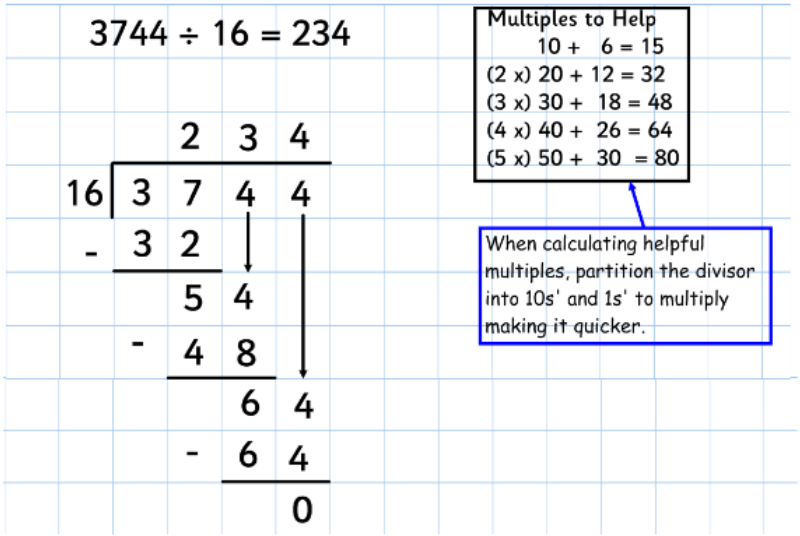

$$4\overline{)4894}\ \text{r}2\quad 1223$$

Division Key stage 2

## Year 6

Use the same short method for division as in year 5. Also use the short division method if dividing by 11 and 12.

Long division method




## Year 5 and 6 (dividing with remainders and decimals)