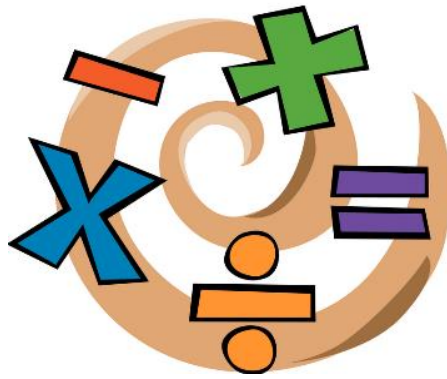


# Muschamp Primary School



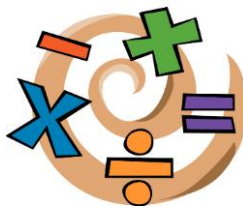
## Mathematics Calculations Policy



The following is intended to ensure effective progression in  
WRITTEN CALCULATIONS.

**Please note the following:**

- The method outlined for your year group is the 'expected standard' that should be modelled to all pupils.
- Teachers can use their professional judgement to differentiate methods according to ability but must refer to guidance in either year below or year above.
- Children should be encouraged to use mental calculations when appropriate.
- Note: New PoS expects teachers to use 'ones' rather than 'units'



The following is intended to ensure effective progression in  
WRITTEN CALCULATIONS.

**Please note the following:**

- The methods outlined for a particular year group is the 'expected standard' that should be modelled to all pupils.
- There will be occasions when a child would need to look at a previous step in order to master the step relevant to their year group. There are many factors which underpin such progression. These are mainly a confidence with number - being able to count in 1s, 10s and 100s from any number, spotting bonds (to 10 and 100), understanding the value of any digit in a number, recalling multiplication and division facts.
- Finally, these methods may not be exactly the same as the methods you use or were taught at school. They may be similar or exactly the same. What is really important though is that, whether they would be your preferred method or not, they are what we are teaching at school and consistency is the key to the children mastering the methods and avoiding confusion. If you or anyone else (including tutors) are helping your child with maths, please help us and your child by following the methods found within.
- If you would like to ask any questions about the Calculation Policy, then please feel free to ask either your child's class teacher or Mr Keefe (Mathematics Subject Leader). Thank you in advance for your support.

# Counting

Calculations are well supported by ensuring that children have plenty of practise and opportunities to be involved in counting. Counting should form a part of every maths lesson in some form.

The new curriculum outlines some statutory requirements related to this. These are as follows...

## Early Learning Goal

- children count reliably with numbers from 1 to 20, place them in order

## Year 1 - Number and place value

- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number.
- count, read and write numbers to 100 in numerals, count in different multiples, including ones, twos, fives and tens.

## Year 2 - Number and place value

- count in steps of 2, 3 and 5 from 0, and count in tens from any number, forwards or backwards.

## Year 3 - Number, place value and rounding

- count from 0 in multiples of 4, 8, 50, 100; finding 10 or 100 more or less than a given number.
- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.

## Year 4 - Number, place value and rounding

- count in multiples of 6, 7, 9, 25 and 1000.
- count backwards through zero to include negative numbers.
- count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten.

## Year 5 & 6 - Number, place value, approximation and estimation

- count forwards and backwards in steps of powers of 10 for any given number up to 1 000 000.

These elements of counting are particularly important in supporting the progression and development of calculations. There are other elements of counting, such as counting in fractions and contexts such as time and money.

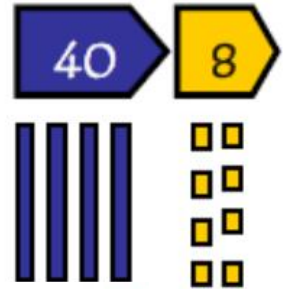
# Addition



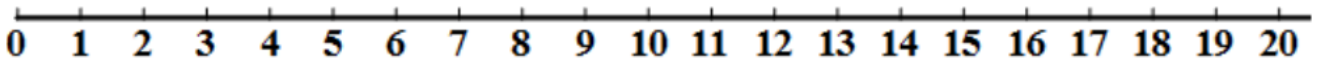
## Models and Images that will help support learning...

- 100 square
- Number lines
- Blank number lines
- Counting apparatus
- Counting stick
- Bead strings
- Place value apparatus
- Place value cards
- Place value counters

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	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	100



$$2 + 5 = 7$$



sum      addition      total

make

and      **+**      more

add      plus

altogether      increase






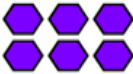

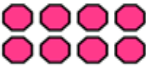

# Reception

Early learning goal statutory requirement:

- ✓ Say which number is one more or one less than a given number.
- ✓ Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.

0 1 2 3 4 5 6 7 8 9 10

Recognise numerals 0 to 10 and understand the meaning of each number by relating to a number of objects.

<b>1</b> <b>one</b> 	<b>2</b> <b>two</b> 	<b>3</b> <b>three</b> 
<b>4</b> <b>four</b> 	<b>5</b> <b>five</b> 	<b>6</b> <b>six</b> 
<b>7</b> <b>seven</b> 	<b>8</b> <b>eight</b> 	<b>9</b> <b>nine</b> 

Count reliably up to 10 everyday objects – 1-2-1 correspondence and know the final number is the total.

Find one more than a number



One more than three is four



1, 2, 3, 4, 5, 6 ... there are 6 teddies altogether



The number after three is four.

What is the number after.....?

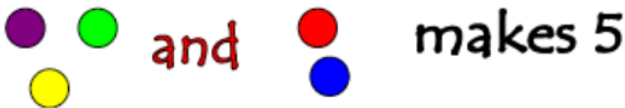
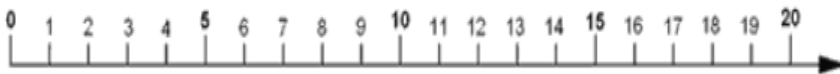


Recognise numbers up to 20 and understand the meaning of each number.

Count on in ones and say which number is one more than a given number using a number line or number track to 20.

Count in ones as they become more familiar with using numbers on a number line and 100 square.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	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	100



Begin to relate addition to combining two groups of objects using practical resources, role play, stories and songs.

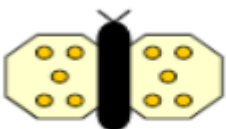
Begin to use the + and = signs to record mental calculations in a number sentence.



Know that counting on is a strategy for addition. Use numbered number lines to 20.

Begin to solve problems using doubling, halving, grouping and sharing.

$$5 + 5 = 10$$



Show mental recall of number bonds to 10 and use these for problem solving. Some children show mental recall of bonds to 20.

# Year 1

## Key Statutory Requirements :

- ✓ Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- ✓ Given a number, identify one more or one less
- ✓ Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.
- ✓ Represent and use number bonds and related subtraction facts within 20
- ✓ Add and subtract one-digit and two-digit numbers to 20, including zero.
- ✓ Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems

Exposure to number and counting in a variety of ways is a fundamental element of the year 1 curriculum. Children should experience doing this in different contexts.

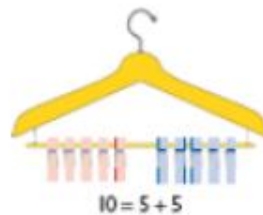
‘Playing’ with number is important in creating a confidence with the number system. Children do not benefit from a series of ‘worksheets’. There are other more engaging and effective activities, where photo evidence would be far more valuable.

Know by heart all pairs of numbers with a total of 10 and 20.

$$6 + \square = 10$$

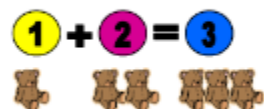
1	2	3	4	5	6	7	8	9	10

$$\square + 6 = 10$$



$$3 + 2 = 2 + 3$$

Know that addition can be done in any order.



Identify and represent numbers using objects and pictorial representations (multiple representations)



Know that counting on is a strategy for addition.

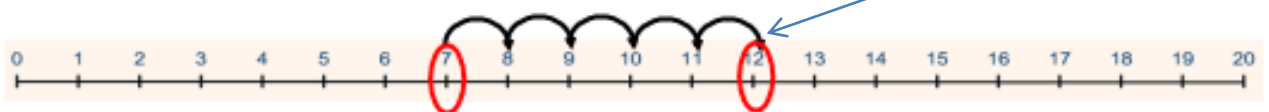


Know that mentally, this can be best achieved by counting on from the biggest number.

Children to use a number line to support the addition of numbers. Know and use strategy of finding the larger number, and counting on from this number – allow counting in ones, don't force use of bonds to 10.

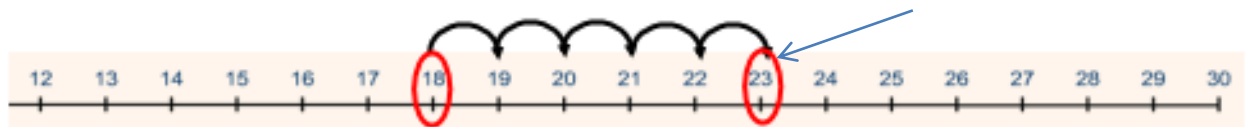
1 digit plus 1 digit

$$7 + 5 =$$



2 digit plus 1 digit

$$18 + 5 =$$



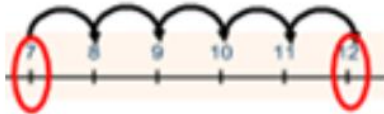
The above is a visual representation, which children should learn to use. However, it is still vital that children are given plenty of other opportunities (in practical contexts and using equipment) to practise their calculations.

# Year 2

## Key Statutory Requirements :

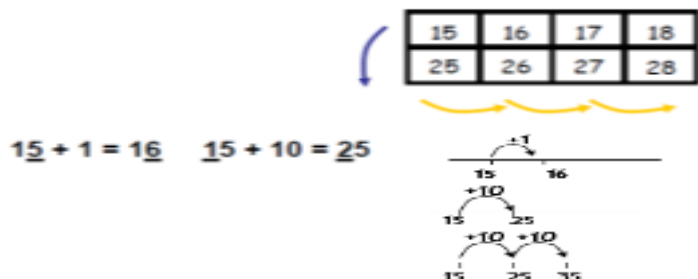
- ✓ recall and use addition and subtraction facts to 20 fluently, and derive and use related facts to 100.
- ✓ add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers.
- ✓ Solve problems with addition and subtraction, including those involving numbers, quantities and measures

1 digit plus 1 digit and 2 digit plus 1 digit – as year 1, the progression being that children learn to draw their own blank number line, starting with the larger number and counting on the amount of the smaller number being added to it.

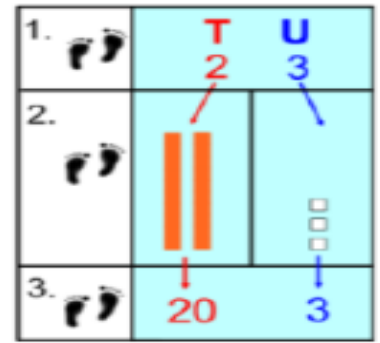


2 digit + 2 digit – Children will continue with the use of a number line, but must first be secure in their understanding of place value and be able to partition a number. They must also be able to add 10 and 1 to any 1 or 2 digit number (as well as count on in 10's and 1's).

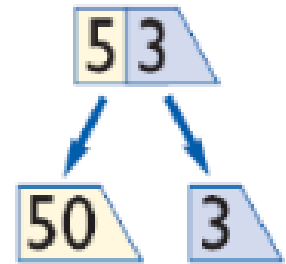
Know which digit changes when adding 1 or 10 to a number.



Be able to partition two 2-digit numbers using a variety of visual images and resources to support. It is important to refer to values as 'tens' and 'ones' (rather than units), however, most resources still label the column as 'units'. Therefore, it is worth using the vocabulary of both so they are still familiar with the term 'units'.



# 42



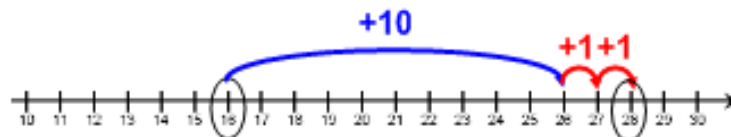
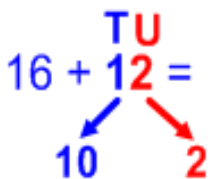
Use partitioning in order to add two 2-digit numbers.



$$16 + 12 = 28$$

Partition your second number

Add the **tens** first, then the **ones**, using knowledge of counting in tens and ones to support.

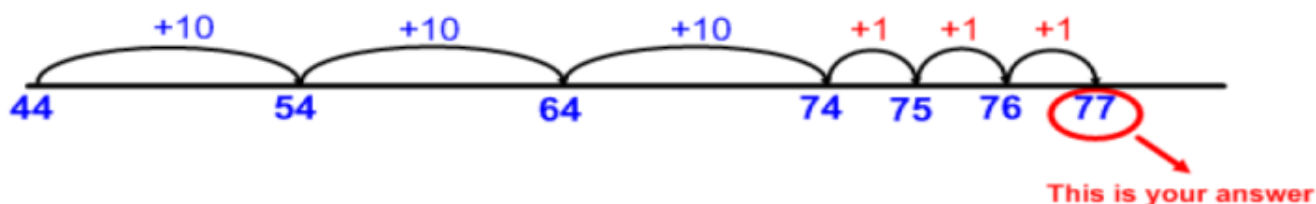


This is your answer

Partition your second number

$$44 + \begin{array}{c} \text{TU} \\ 33 \\ \swarrow \searrow \\ 30 \quad 3 \end{array} =$$

Add the **tens** first, then the **ones**, using knowledge of counting in tens and ones to support.



As children gain confidence with counting (adding on tens and ones), they should be taught to combine the jumps.



Children need to learn the bonds that make 10 and 20, however, they also need to develop familiarity with bonds of numbers to 20, and know that these can be represented in different ways in number sentences.

$$9 + 7 = 16$$

$$16 - 7 = 9$$

$$7 = 16 - 9$$

# Year 3

Key statutory requirements :

- Find 10 or 100 more or less than a given number.
- Recognise the place value of each digit in a three-digit number (hundreds, tens, ones).
- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.
- Add and subtract numbers mentally, including:
  - A three-digit number and ones
  - A three-digit number and tens
  - A three-digit number and hundreds.

Pre-step for column addition, to help develop conceptual understanding of what column addition actually is.

This is based on previously developed knowledge of place value and partitioning of numbers. This can be introduced, in year 2, with children working at or towards level 3.

$$42 + 31$$

$$\begin{array}{r} 40 \text{ \& } 2 \\ + 30 \text{ \& } 1 \\ \hline 70 \text{ \& } 3 = 73 \end{array}$$

$$42 + 31$$



Place value counters should be used to support

73

Below is an outline of the progression, to be introduced from the beginning of year 3 (year 2 for those working at level 3) related to addition with 'carrying'. It is absolutely vital that at this stage in their development, that everyone refers to 'carrying ten' and not 'carrying one'. This will also be the case when children carry 'one hundred', not 'one'.

The number carried is just as important as any other number, therefore, it should be written as clear and as large as any other number, and placed at the top of the column in which it is to be added. Children will be confused if not everyone follows this and also if people place the 'carried' value below the line. We will not refer to numbers as being 'placed on the doorstep'!

$$47 + 36$$

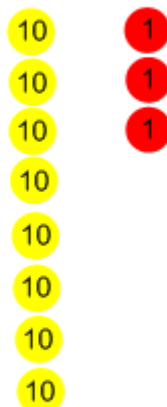
$$\begin{array}{r} 40 \text{ \& } 7 \\ + 30 \text{ \& } 6 \\ \hline 70 \text{ \& } 13 = 83 \end{array}$$

$$47 + 36$$

$$\begin{array}{r} 10 \\ 40 \text{ \& } 7 \\ + 30 \text{ \& } 6 \\ \hline 80 \text{ \& } 3 = 83 \end{array}$$

$$47 + 36$$

$$\begin{array}{r} 1 \\ 47 \\ + 36 \\ \hline 83 \end{array}$$



Place value counters should be used to support – they are a very visual way to show how ten counters (ones) are the same as having one 10.

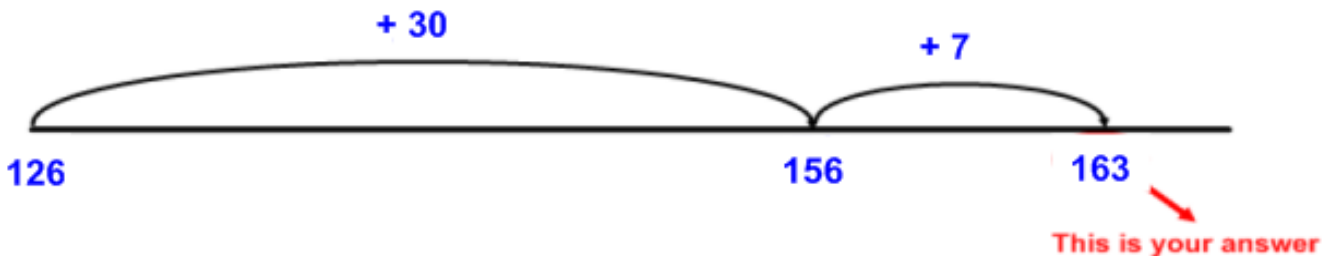
# Year 4

Key statutory requirements –

- find 1000 more or less than a given number.
- recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, ones).
- add and subtract numbers with up to four digits, using formal written methods of columnar addition and subtraction where appropriate.
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

Children should still be developing their mental strategies for addition. This would now include, mentally visualising a number line on which to add 2 numbers, by partitioning the smaller and counting on in 100s, 10s and 1s.

$$126 + 37$$



Bonds to 10 (and to 100) should be used and encouraged.

Continue with representation of column addition as outlined for year 3. When introducing addition of three-digit numbers, show the link to the expanded version and use of counters to ensure an understanding of the place value involved. Then focus on the compact method as a quick and efficient way. It is important to still follow the same format for setting out and referring to the value of carried digits – carry one thousand, not carry 1.

$$345 + 283$$

$$\begin{array}{r}
 100 \\
 300 \ \& \ 40 \ \& \ 5 \\
 + 200 \ \& \ 80 \ \& \ 3 \\
 \hline
 600 \ \& \ 20 \ \& \ 8 = 628
 \end{array}$$

$$\begin{array}{r}
 1 \\
 345 \\
 + 283 \\
 \hline
 628
 \end{array}$$

$$768 + 473$$

$$\begin{array}{r}
 100 \quad 10 \\
 700 \ \& \ 60 \ \& \ 8 \\
 + 400 \ \& \ 70 \ \& \ 3 \\
 \hline
 1200 \ \& \ 40 \ \& \ 1 = 1241
 \end{array}$$

$$\begin{array}{r}
 11 \\
 768 \\
 + 473 \\
 \hline
 1241
 \end{array}$$

The number carried is just as important as any other number, therefore, it should be written as clear and as large as any other number, and placed at the top of the column in which it is to be added.

By the summer term of year 4, pupils should be adding numbers up to 4 digits using compact column addition method.

# Year 5 and 6

By the end of Year 5 Pos Requirements :

- add and subtract whole numbers with more than 4 digits using formal written methods of columnar addition.
- add and subtract numbers mentally, with increasingly large numbers.
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
- Solve problems involving numbers up to three decimal places
- In year 6 pupils are expected to solve more complex addition and subtraction problems

$$4837 + 2549$$

$$\begin{array}{r} 1 \quad 1 \\ 4837 \\ + 2549 \\ \hline 7386 \end{array}$$

In year 5 and 6 pupils should be adding numbers using compact column addition method. **Note:** The carried ten, hundred, thousand is just as important as any other number, therefore, it should be written as clear and as large as any other number, and placed at the **top** of the column in which it is to be added.

$$12.5 + 23.7$$

$$\begin{array}{r} 1 \\ 12.5 \\ + 23.7 \\ \hline 36.2 \end{array}$$

$$34.5 + 27.43$$

$$\begin{array}{r} 1 \\ 34.50 \\ + 27.43 \\ \hline 61.93 \end{array}$$

When adding decimals, it is essential that the decimal point is kept in line within the question and the answer.

Where necessary, a zero should be added as a place holder.

# Subtraction

Being the inverse of addition, many of the supporting images, apparatus, understanding of number and place value are the same.

## Models and Images that will help support learning...

100 square

Number lines

Blank number lines

Counting apparatus

Counting stick

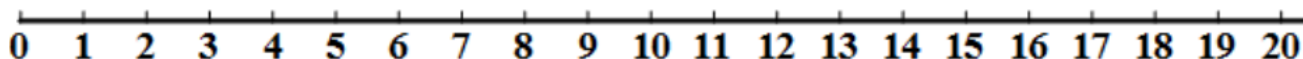
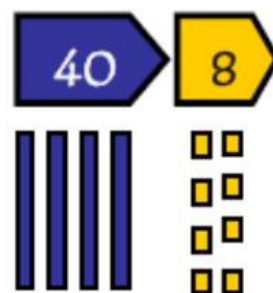
Bead strings

Place value apparatus

Place value cards

Place value counters

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	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	100



subtract  
count on      count back  
fewer      —      less  
take away      minus  
                         difference

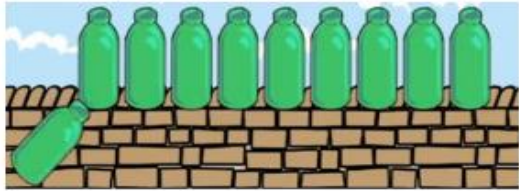
# Reception

Early learning goal statutory requirement:

- ✓ Say which number is one more or one less than a given number.
- ✓ Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.



Say which number is one less than a given number using a number line or number track to 20.



10 green bottles sitting on the wall ...

Begin to count backwards in familiar contexts such as number rhymes or stories.



5 little ducks  
went swimming  
one day...



10 little men in their flying saucer...

10, 9, 8, 7, ...

Continue the count  
back in ones from any  
given number

Begin to relate subtraction to 'taking away'



Three teddies **take away** two teddies leaves one teddy

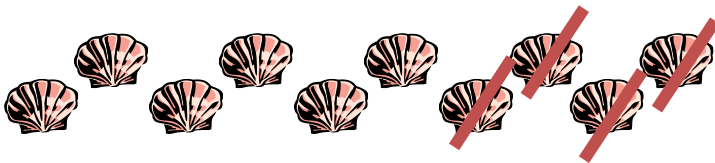
Find one less than any number.

What is the number before 4?



Begin to relate subtraction to 'taking away' using concrete objects and role play.

If I **take away** four shells there are six left



Count backwards along a number line to 'take away'



# Year 1

Key statutory requirement:

- say which number is one more or one less than a given number.
- represent and use number bonds and related subtraction facts within 20
- read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.
- add and subtract one-digit and two-digit numbers to 20, including zero.

Exposure to number and counting in a variety of ways is a fundamental element of the year 1 curriculum. Children should experience doing this in different contexts.

'Playing' with number is important in creating a confidence with the number system. Children do not benefit from a series of 'worksheets'. There are other more engaging and effective activities, where photo evidence would be far more valuable.

Know by heart subtraction facts for numbers up to 10 and 20.



$6 + ? = 10 \quad ? + 6 = 10$

$10 - 6 = ? \quad 10 - ? = 6$



$12 + 8 = 20 \quad 8 + 12 = 20$

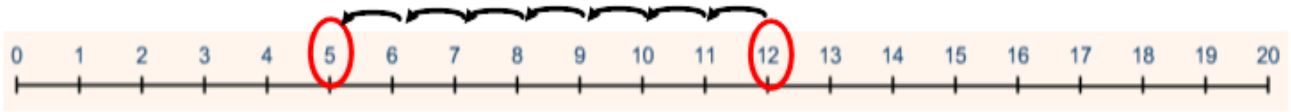
$20 - 8 = 12 \quad 20 - 12 = 8$

Begin to use the – and = signs to record mental calculations in a number sentence.

$7 - 3 = 4$

Frankie had 7 apples. He ate 3. How many did he have left?

Subtract single digits by counting back on a number line in ones – this helps establish the concept of what you start with and the fact you are taking away.



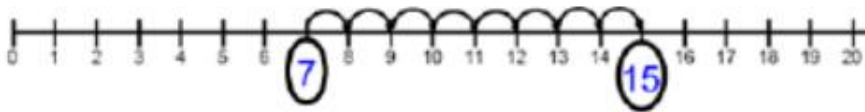
Circle the larger number then count back from the bigger to the smaller...the answer is the number you finish at.

$$12 - 7 = 5$$



The difference is!

Begin to find the difference by counting on from the smallest number. **This is to be taught in the summer term.**



Circle both numbers then count on from the smaller to the larger number above the number

Extend by counting on in 10s, then ones.

The answer is the number of steps made  
 $15 - 7 = 8$

Counting on should be used when the language used is 'find the difference', 'difference between' and 'distance between'.

The above is a visual representation, which children should learn to use. However, it is still vital that children are given plenty of other opportunities (in practical contexts and using equipment) to practise their calculations.

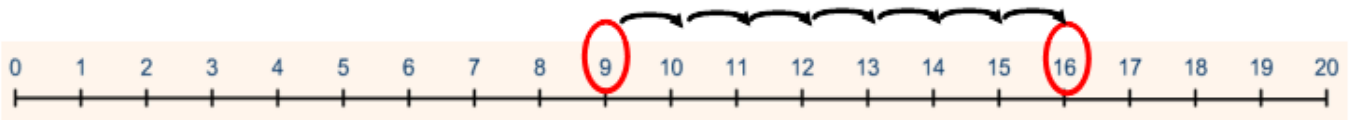
# Year 2

Key statutory requirement:

- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts to 100.
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers.

Subtraction – continue to subtract by counting back on a number line. When the amount to be subtracted is a 2 digit number, they can use jumps of 10 and 1.

Subtraction – using a number line to find the difference.



$$16 - 9 = 7$$

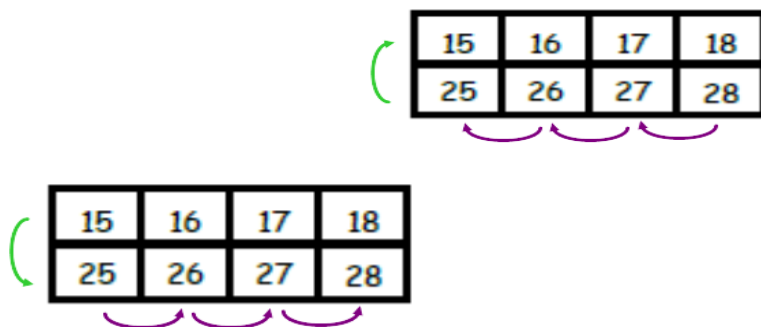
$$9 + 7 = 16$$

The vocabulary to be used is 'finding the difference', but keeping the link to the written number sentence, showing that it is a take away calculation. 'Finding the difference' is finding how many numbers there are between the two chosen numbers.

Starting with the smallest number, children count on. They count the number of jumps.

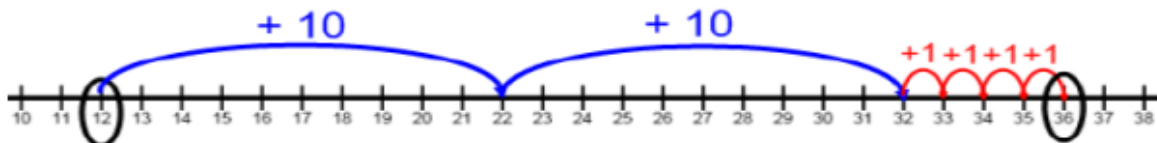
Links can also be made to the inverse to reinforce the concept.

Know which digit changes when counting on (forwards) in 10's and 1's and when counting back in 10's and 1's.



Find the difference between two 2-digit numbers by counting on, in tens first and then in ones, on a marked number line. Circle both the numbers on the line, then count on from the smallest to the largest. Add together the 10's and 1's to find the difference.

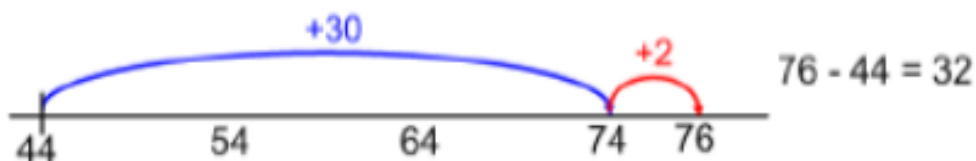
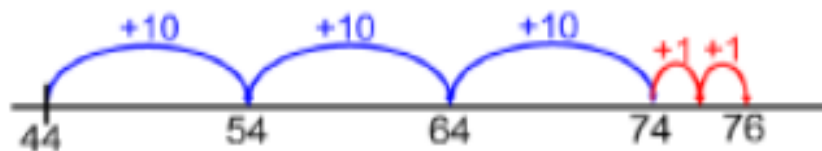
$$36 - 12 = 24$$



As the children progress to larger 2-digit numbers, or 2-digit numbers with a larger difference between them, they should be introduced to using a blank number line.

Finally, using their knowledge of number, they should be encouraged to combine jumps.

$$76 - 44 = 32$$



# Year 3

Key statutory requirement:

- Find 10 or 100 more or less than a given number.
- Recognise the place value of each digit in a three-digit number (hundreds, tens, ones).
- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.
- Add and subtract numbers mentally, including:
  - A three-digit number and ones
  - A three-digit number and tens
  - A three-digit number and hundreds.

Pre-step for column subtraction, to help develop conceptual understanding of what column subtraction actually is.

This is based on previously developed knowledge of place value and partitioning of numbers. This can be introduced, in year 2, with children working at or towards level 3.

$$37 - 15$$

$$\begin{array}{r} 30 \text{ \& } 7 \\ - 10 \text{ \& } 5 \\ \hline 20 \text{ \& } 2 = 22 \end{array}$$

$$74 - 27$$

$$\begin{array}{r} 60 \\ \cancel{70} \text{ \& } ^1 4 \\ - 20 \text{ \& } 7 \\ \hline 40 \text{ \& } 7 = 47 \end{array}$$

$$37 - 15$$

$$\begin{array}{r} 30 \text{ \& } 7 \\ - 10 \text{ \& } 5 \\ \hline 20 \text{ \& } 2 = 22 \end{array}$$

$$74 - 27$$

$$\begin{array}{r} 60 \\ \cancel{70} \text{ \& } 14 \\ - 20 \text{ \& } 7 \\ \hline 40 \text{ \& } 7 = 47 \end{array}$$

It is very important from this early stage that everyone is accurate and consistent with their use of language.

For example, by partitioning the numbers, we must refer to them as their value, so in the first example above, it is 30 take away 10.

In the second example, we would say that you can't have 4 and take away 7 (without getting into negative numbers), therefore, we can take (or use) 10 from the 70 and put it with the 4. This leaves us with 60 (not 6 at this stage). This gives us 14 - 7. However, we are not 'borrowing' as it is often referred to.

This then leads to the formal compact version which for the core ability should be the method they are using by the end of year 3. For those working at a higher level, 3-digit subtract a 2/3-digit should be introduced – see year 4 guidance.

$$37 - 15$$

$$\begin{array}{r} 37 \\ - 15 \\ \hline 22 \end{array}$$

$$74 - 27$$

$$\begin{array}{r} 6 \\ \cancel{7} 14 \\ - 27 \\ \hline 47 \end{array}$$

# Year 4

Key statutory requirement:

- find 1000 more or less than a given number.
- recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, ones).
- add and subtract numbers with **up to four digits**, using formal written methods of columnar addition and subtraction where appropriate.
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

$$367 - 125$$

$$\begin{array}{r} 367 \\ - 125 \\ \hline 242 \end{array}$$

$$537 - 254$$

$$\begin{array}{r} 4 \\ \cancel{5}^1 37 \\ - 254 \\ \hline 283 \end{array}$$

$$741 - 367$$

$$\begin{array}{r} 6 \quad 13 \\ \cancel{7}^1 \cancel{4}^{11} \\ - 367 \\ \hline 374 \end{array}$$

It is very important that everyone continues to be accurate and consistent with their use of language.

Children can still be shown the expanded version as in year 3 to help with their understanding of what we are actually doing.

$$537 - 254 = 243$$

$$\begin{array}{r} 400 \quad 130 \\ \cancel{500} \ \& \ \cancel{30} \ \& \ 7 \\ - 200 \ \& \ 50 \ \& \ 4 \\ \hline 200 \quad 80 \quad 3 \end{array}$$



$$\begin{array}{r} 4 \\ \cancel{5}^1 \cancel{3}^7 \\ - 254 \\ \hline 283 \end{array}$$

For those working at a higher level, 4-digit subtract a 3/4-digit should be introduced.

A couple of points...

- Children should be shown and encouraged to use the inverse operation as a way of checking (it also provides opportunity to practise both the methods of addition and subtraction).
- The use of column addition is purely a means of calculating efficiently on paper. Children should still be taught and encouraged to use the mental method of 'finding the difference' on a blank number line.
- It is also useful to use the number line for calculating the difference in the context of money (purely as a life skill).
- It is **essential** that a number line (written or mental) is used when working with time and finding the difference between two times.

# Year 5/6

By the end of Year 5 Pos Requirements :

- add and subtract whole numbers with more than 4 digits using formal written methods of columnar addition.
  - add and subtract numbers mentally, with increasingly large numbers.
  - solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
  - Solve problems involving numbers up to three decimal places
- In year 6 pupils are expected to solve more complex addition and subtraction problems

In year 5 and 6 pupils should be subtracting numbers using compact column subtraction method.

The column method of subtraction can be used with decimals when the children are ready to progress.

$$\begin{array}{r} \phantom{0}3 \\ 784^12 \\ - 1829 \\ \hline 6013 \end{array}$$

$$\begin{array}{r} 5.37 - 2.54 \\ \phantom{0}4 \\ 5.^137 \\ - 2.54 \\ \hline 2.83 \end{array}$$

With mental strategies, this should include numbers with quite large values, but where the smaller number is a multiple of 10, 100 or 1000.

$$12\,462 - 2300 = 10\,162$$

# Multiplication

## Mental skills to embed...

Counting on in different steps

Quickly recall doubles of numbers

Understand that multiplication is repeated addition

Develop and rehearse quick recall of multiplication facts

Derive unknown facts using strategies (including known facts)

Multiplying numbers (inc. decimals) by 10, 100 and 1000, and understand and explain the effects.

Multiplying by multiples of 10

## Models and Images that will help support learning...

Arrays

Multiplication squares

100 square

Number lines

Blank number lines

Counting apparatus

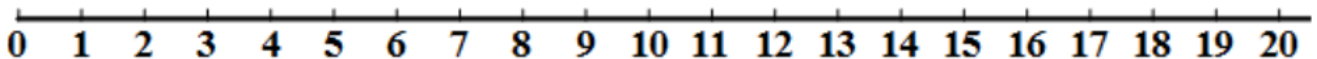
Counting stick

Bead strings

Place value apparatus



1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80



multiplication

product

once, twice, three times

double groups of

repeated addition lots of

array, row, column multiply

times

multiple

# Reception

Early learning goal statutory requirement:

✓ They solve problems, including doubling, halving and sharing.

Begin to double numbers to 10.



$$1 + 1 = 2$$



$$2 + 2 = 4$$

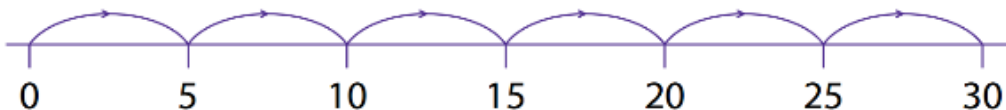
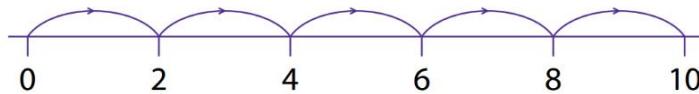


$$3 + 3 = 6$$



$$4 + 4 = 8$$

Begin to count in twos, fives and tens using practical resources, role play, stories and songs.



# Year 1

Key statutory requirements –

- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.
- They make connections between arrays, number patterns and counting in twos, fives and tens.

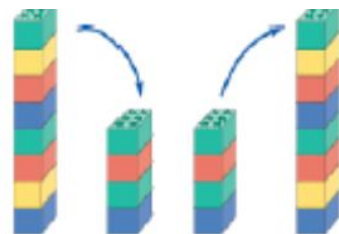
Children to have regular opportunities to count in 2s, 5s and 10s (forwards and backwards). This can start at 0 or any of its multiples. A 100 square can be used to help and provides the opportunity to discuss any patterns that are recognised.

Begin to recall doubles and recognise the patterns.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	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	100



Use fingers to work out doubles up to double 5.



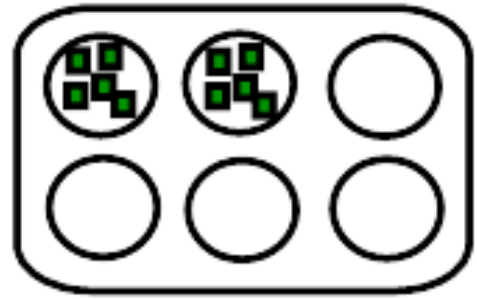
half of 8 is 4  
 $8 \div 2 = 4$

double 4 is 8  
 $4 \times 2 = 8$



Use laminated sheets with circles on is a simple resource to help reinforce the concept of 'groups of' and the use of the correct vocabulary. Obviously there is scope for using a variety of other resources (pots, hoops, boxes etc.), but the mats are just very visual.

$2 \times 5$   
2 groups of 5



$3 \times 5$   
3 groups of 5

This naturally progresses to children using their own 'jottings' to represent multiplication as 'groups of'.

Children should be shown that there are different ways in which multiplication can be expressed and given plenty of opportunities to use concrete materials and work in real life contexts.



Express as repeated addition.

Express as arrays.

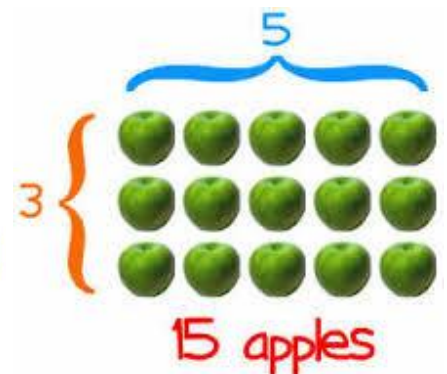


$5 + 5 + 5$   
or  
 $3 \times 5$

Use pictorial representations



$3 \times 5$   
3 groups of 5



Children begin to commit multiples of 2, 5, 10 to memory and use these facts to solve problems.



There are 10 spiders... how many legs do they have altogether?  
 $8 \times 10 = 80$

When Peter behaves well in school he gets 2 sweets at the end of the day. If he behaves well for 5 days, how many sweets will he get altogether?



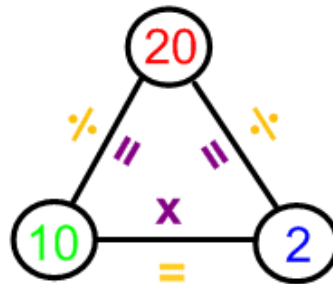
There are 4 flower beds in a garden. Each flower bed has 3 flowers. How many flowers are in the garden altogether?

# Year 2

Key statutory requirement:

- ✓ recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- ✓ calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals ( $=$ ) signs
- ✓ show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- ✓ solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

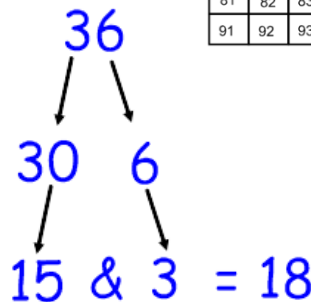
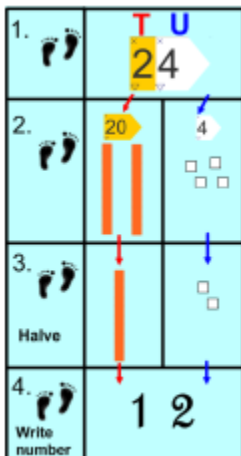
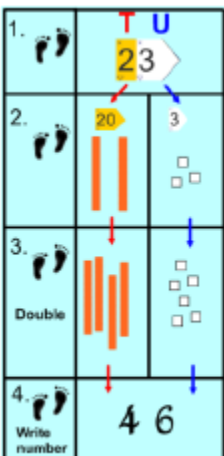
Counting – count in steps of 2, 3, 5, 10 and 20, forward and backwards, from 0 and any of its multiples, using the 100/200 square.



Recall multiplication and division facts for 2, 5, 10

Know doubles and corresponding halves and use to double and halve 2-digit numbers by partitioning.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	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	100



101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

Continue using jottings of simple multiplication, using the associated vocabulary. The laminated sheets shown in year 1 would still be a useful resource.

The same concept can be used to teach children how to multiply multiples of 10. At no point will we say 'just add a zero'.



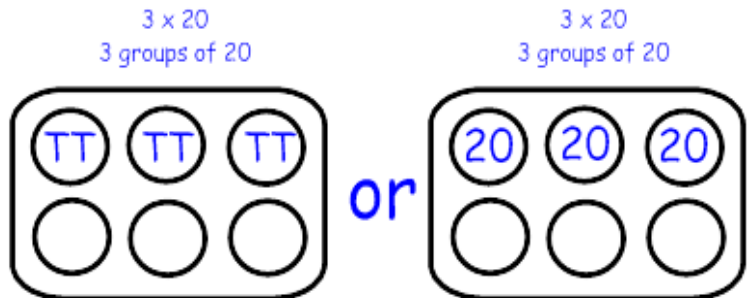
$$3 \times 20$$

3 groups of 20



$$3 \times 30$$

3 groups of 30

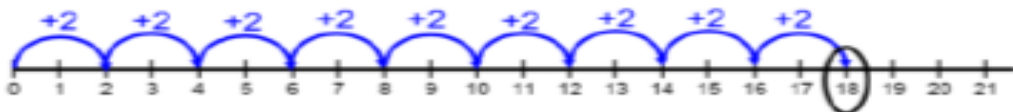


Linking with the concept of counting in multiples, a number line can be used to support their development, help in recognising multiples and seeing that multiplication is the same as repeated addition. It is important that the vocabulary of 'groups of/lots of' is used.

$$9 \text{ groups of } 2 = 18$$

$$9 \text{ jumps of } 2 = 18$$

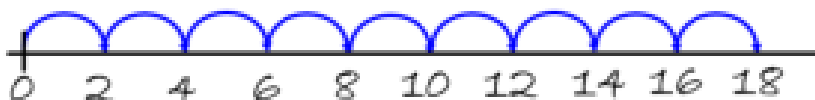
$$9 \times 2 = 18$$



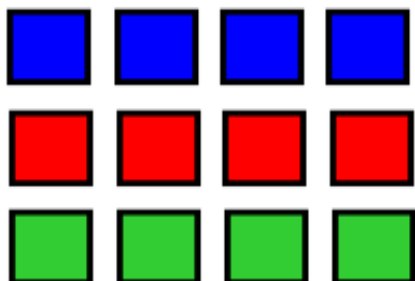
$$9 \text{ groups of } 2 = 18$$

$$9 \text{ jumps of } 2 = 18$$

$$9 \times 2 = 18$$



Use of arrays are also a powerful way for children to see patterns and relationships. They can also be used to provide opportunity to develop the skills of problem solving using multiplication.



$$3 \times 4 = 12$$

$$3 \text{ groups of } 4 = 12$$

Children can investigate the number of multilink cubes need to create a block with a given length and width – an early introduction into finding the area of a rectangle.



$$3 \times 6 = 18$$

$$3 \text{ groups of } 6 = 18$$

$$3 \text{ rows of } 6 = 18$$

# Year 3

Key statutory requirement:

- ✓ recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- ✓ write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- ✓ solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

Develop recall of multiplication facts (this should always be done alongside the inverse of the corresponding division facts).

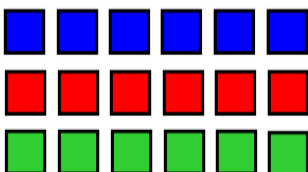
x	3	4	8
5			
6			
4			

x	4	?	?
?	8	6	10
6	24	18	30
?	32	24	40

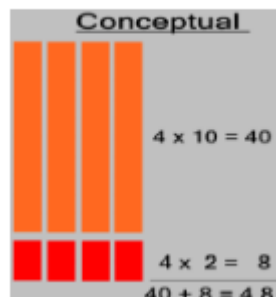
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

$3 \times 2 =$	$3 \times 7 =$
$3 \times 3 =$	$3 \times 8 =$

This is also a good opportunity to develop a familiarisation with square numbers and relate to the area of a square.



$3 \times 6 = 18$   
 $3 \text{ groups of } 6 = 18$   
 $18 \div 3 = 6$



1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

Three concepts that children need to be secure with as they move through year 3-6, in order for them to make progress at each stage are...

- knowledge/recall of multiplication facts (or a means to derive any they are not secure with).
- Understanding what happens to a number when it is multiplied by 10 (and then as they progress, 100 and 1000).
- applying both of the above to multiplying a multiple of 10 by a single digit ( $60 \times 3$ ) and then by another multiple of 10 ( $70 \times 40$ ).

Children should develop a clear understanding of the steps involved in multiplying a 2-digit number by a 1-digit number.

Their understanding of place value and their ability to multiply multiples of 10 is key in order to succeed and make progress here. We will not teach them to 'just add a zero' as this leads to misconceptions when they come to multiplying decimal numbers.

$$\begin{array}{r} 36 \times 4 \\ 30 \ \& \ 6 \\ \times 4 \\ \hline 24 \\ + 120 \\ \hline 144 \end{array}$$

The method of partitioning is a pre-step to the more compact method but is very powerful in making explicit what is actually happening. There is one additional step which can be used, where the question is kept compact, but each part is calculated separately, with both parts recorded.

When doing this, refer to the actual values of the numbers.

$$\begin{array}{r} 36 \times 4 \\ 36 \\ \times 4 \\ \hline 24 \\ + 120 \\ \hline 144 \end{array}$$

# Year 4/5

Year 4 statutory requirement:

- ✓ recall multiplication and division facts for multiplication tables up to  $12 \times 12$
- ✓ use place value, known and derived facts to multiply and divide mentally, including: multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- ✓ solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as  $n$  objects are connected to  $m$  objects.

Year 5 statutory requirement:

- ✓ multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- ✓ multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

The written method for multiplication should now become more compact, however, at every stage it is worth remembering that we can show children the links to the expanded method in order to support their understanding.

The carrying of digits further complicates this method, therefore we need to follow a very structured progression and explicitly teach the additional points at each stage. This progression is not just for Y4, but will continue into Y5.

Begin with numbers where carrying is not involved so that the conceptual understanding can be easily related to the formal method.

Estimate first!  
 $30 \times 3 = 90$

$$\begin{array}{r} 32 \times 3 \\ 32 \\ \times 3 \\ \hline 96 \end{array}$$

Then move onto carrying, but demonstrate the procedure first with the expanded method.

Make explicit that with the compact method, we still start with  $4 \times 6$ , but only record the 4 and 'carry' the 20 into the tens column. This is recorded as a 2 to represent 2 tens. This is then to be added to  $4 \times 30$  as it is an answer to some multiplication that has already been completed. We should point out that in the expanded method, this 20 is recorded below the line and becomes part of the addition.

$$\begin{array}{r} 36 \times 4 \\ 30 \ \& \ 6 \\ \times 4 \\ \hline 24 \\ + 120 \\ \hline 144 \end{array} \quad \rightarrow \quad \begin{array}{r} 36 \times 4 \\ \overset{2}{36} \\ \times 4 \\ \hline 144 \end{array}$$

3-digit numbers multiplied by a 1-digit number without carrying.  
Demonstrate and use the expanded method to support.

Estimate  
first!  
 $400 \times 3 =$   
1200

$$423 \times 3$$

$$\begin{array}{r} 400 \ \& \ 20 \ \& \ 3 \\ \times 3 \\ \hline 9 \\ + \quad 60 \\ \hline 1200 \\ \hline 1269 \end{array}$$

$$423 \times 3$$

$$\begin{array}{r} 423 \\ \times 3 \\ \hline 1269 \end{array}$$

3-digit numbers multiplied by a 1-digit number with carrying.  
Demonstrate and use the expanded method to support.  
Also relate the addition part to appropriate calculation method.

Estimate  
first!  
 $600 \times 8 =$   
4800

$$643 \times 8$$

$$\begin{array}{r} 600 \ \& \ 40 \ \& \ 3 \\ \times 8 \\ \hline 24 \\ + \quad 1 \ 320 \\ \hline 4800 \\ \hline 5144 \end{array}$$

$$643 \times 8$$

$$\begin{array}{r} \overset{3}{\phantom{0}} \ \overset{2}{\phantom{0}} \\ 643 \\ \times 8 \\ \hline 5144 \end{array}$$

Understanding the rule /process for multiplying a number by either 10, 100 or 1000 is a key skill that needs developing correctly.

Through their understanding of place value, they should be shown that as a digit moves to a column to the left, the value of the digit is increasing by 10 times.

Therefore, when multiplying by 10, we move each digit one place to the left and if it is a whole number, a zero will then be needed to fill in the ones column (as a place holder).

It is extremely important that we do not teach them to 'add a zero' as this causes huge misconceptions, especially when it comes to multiplying a decimal number. Also, we move the digits, not the decimal point.



# Year 6

Key statutory requirement:

- ✓ multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- ✓ multiply one-digit numbers with up to two decimal places by whole numbers
- ✓ multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.

Estimate first!  
 $600 \times 8 = 4800$   
 $643 \times 8$  will be more but less than 5600  
( $700 \times 8$ )

$$\begin{array}{r} 643 \times 8 \\ \phantom{6}3 \phantom{2} \\ \phantom{6}643 \\ \times 8 \\ \hline 5144 \end{array}$$

Estimate first!  
 $600 \times 50 = 30000$   
 $643 \times 54$  will be more but less than 35000  
( $700 \times 50$ )

$$\begin{array}{r} 643 \times 54 \\ \phantom{6}2 \phantom{1} \\ \phantom{6}1 \phantom{1} \\ \phantom{6}643 \\ \times 54 \\ \hline \phantom{6}2572 \\ +32150 \\ \hline 34722 \end{array}$$

Begin by multiplying the unit/ones number with each of the digits in the other number, recording any carrying as before and adding on to the next step of multiplication. Children can be shown to cross these out in order to prevent them from adding them a second time, when completing the rest of the calculation.

Children need to be taught that a zero is inserted in the ones column of the 2<sup>nd</sup> row, as we are multiplying a multiple of 10. This zero is a 'place holder'.

Where children are ready to deal with multiplying decimals, they should be shown that by multiplying by 10, 100 etc, they will create whole numbers to work with. The answer can then be calculated by dividing by 10, 100, 100 etc.

Use compact short multiplication to multiply decimal number by whole number.

Estimate first!

This gives a feel for the size of the answer. In this case,  $8 \times 4 = 32$ , therefore if you complete the calculation but put the decimal in the wrong place, you would see that either 3.072 or 307.2 would not be possible answers.

$$\begin{array}{r} 23 \\ 7.68 \\ \times \quad 4 \\ \hline 30.72 \\ \hline \end{array}$$

When using this method, the place value columns are not required to be in line. However, it is important to make sure that the decimal point is in line between the question and the answer.

It would also be acceptable to demonstrate to the children that, due to them already being able to multiply whole numbers using this method, that they could remove the decimal point and treat it as a whole number. It is essential though that they understand that, in the above case for example, you are making the question 100 times larger, therefore the answer would need to then be divided by 100.

# Division

## Mental skills to embed...

Counting back in different steps

Quickly recall halves of numbers

Understand that division is repeated subtraction

Develop and rehearse quick recall of division facts

Derive unknown facts using strategies (including known facts)

Divide numbers (inc. decimals) by 10, 100 and 1000, and understand and explain the effects.

Divide by multiples of 10

## Models and Images that will help support learning...

Arrays

Multiplication squares

100 square

Number lines

Blank number lines

Counting apparatus

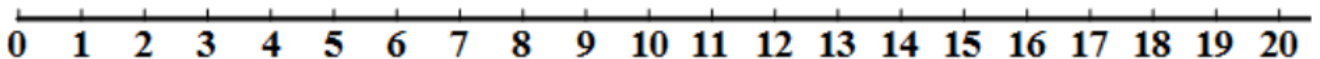
Counting stick

Bead strings

Place value apparatus



1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100



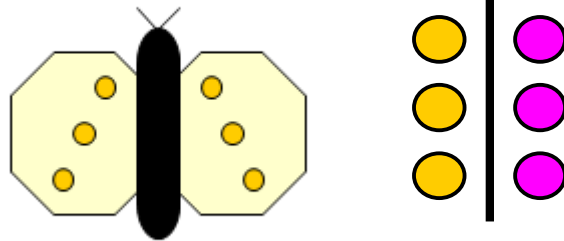
divided by group  
into lots of  $\bullet$  into groups of  
 $\text{---}$  halve  
 $\bullet$   
divisible remainder  
half factor

# Reception

Early learning goal statutory requirement:

✓ They solve problems, including doubling, halving and sharing.

Begin to halve numbers to 20.



Begin to share quantities using practical resources, role play, stories and songs.



***Role play example:***

***It is the end of the party and the final two teddies are waiting for their party bags. Provide empty party bags and a small collection of items such as gifts, balloons and cake. Ask the children to share the objects between the two bags.***

# Year 1

Key statutory requirements -

- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

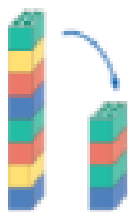
(Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.

They make connections between arrays, number patterns, and counting in twos, fives and tens.)

Children to have regular opportunities to count in 2s, 5s and 10s (forwards and backwards). This can start at 0 or any of its multiples. A 100 square can be used to help and provides the opportunity to discuss any patterns that are recognised.

Begin to recall halves and recognise the patterns.

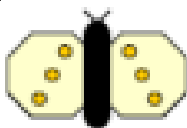
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



Half of 8 is 4  
 $8 \div 2 = 4$



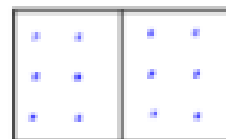
Half of 6 is 3  
 $6 \div 2 = 3$



Half of 12 is 6

$$6 \div 2 = 3$$

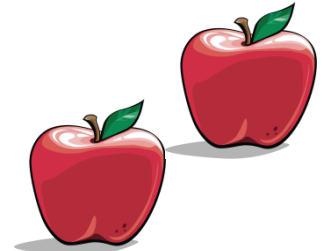
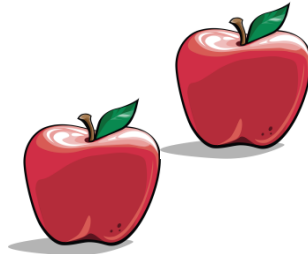
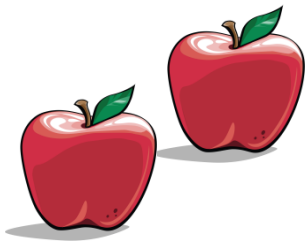
Share the dots equally  
one by one



Children should learn to share amounts of objects practically.

6 apples shared equally between 3 people.

$$6 \div 3 = 2$$



$$12 \div 2$$



$$12 \div 3$$



$$12 \div 4$$

Pictorial representation of sharing **12 gold coins** between 2, 3 and 4 pirates!

Children should use jottings and visual drawings/recordings, especially when the objects can't be physically grouped. Dots can be used to represent the number of objects and then these can be grouped together by drawing around the number of dots making each group. Children then count the number of groups to obtain an answer.

12 divided into groups of 2

$$12 \div 2 = 6$$



10 pencils put (divided) into groups of 2

How many groups?

$$10 \div 2 = 5$$



Children use grouping to solve problems involving division. Use practical apparatus and real life objects/contexts, including, laminated sheets. Children place the given number of objects into groups using the correct mathematical vocabulary.

This concept can be highlighted, when doing things like 'grouping' children for activities in class, for example, 'today we are going to work in groups of 3'. This is different to saying, 'we are going to divide you into 3 groups'.

# Year 2

Key statutory requirement:

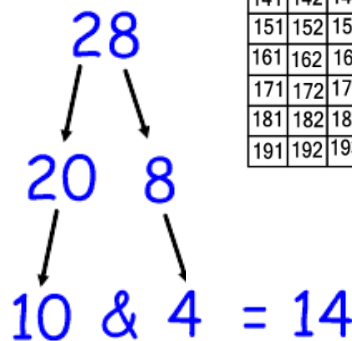
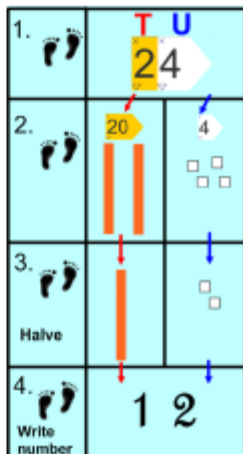
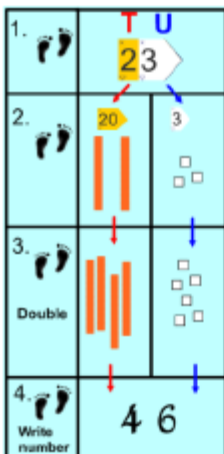
- ✓ Recall and use division facts for 2, 5 and 10 multiplication tables.
- ✓ Calculate mathematical statements for multiplication and division within the multiplication tables and write then using the multiplication (x), division ( / ) and equals (=) signs.
- ✓ Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
- ✓ **Find  $1/3$ ;  $1/4$ ;  $2/4$ ;  $3/4$  of a length, shape, set of objects or quantity**

Counting – count in steps of 2, 3, 5, 10 and 20, forward and backwards, from 0 and any of its multiples, using the 100/200 square.

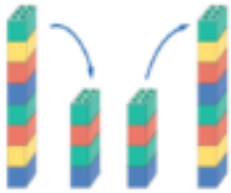
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Know doubles and corresponding halves and use to double and halve 2-digit numbers by partitioning.

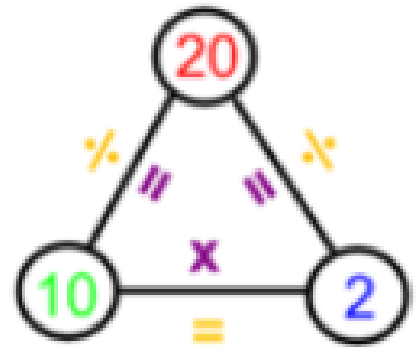
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200



Use known multiplication facts to work out corresponding division facts, including doubles and halves.

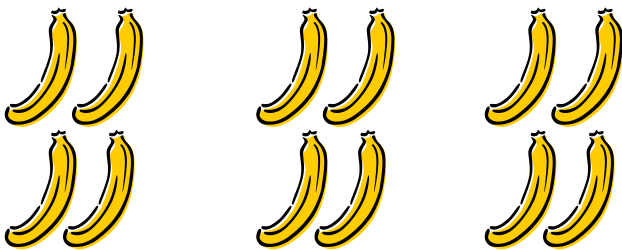


Use fingers to work out doubles up to double 5.



It is important to give children plenty of opportunities to continue to develop an understanding of division as both sharing and grouping, using concrete materials and physical resources.

12 bananas, shared equally between 3 people. How many will each person get?



12 divided between 3  
 $12 \div 3 = 4$

18 pencils need to put into groups (packets) of 3. How many groups will there be?



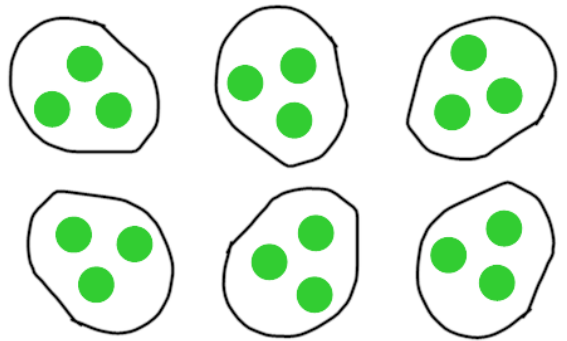
18 divided into groups of 3  
 $18 \div 3 = 6$

The emphasis on grouping should also be supported through the use of drawings/jottings, especially as they can't be taught to rely on physically moving objects. This is achieved easily and effectively through using dots to represent the number being divided and drawing circles around them to show each group.

Children will not know the number of groups before calculating, therefore, they can't draw the correct number of circles first and then fill them with the correct number of dots. They need to draw the correct number of dots to represent the number in each group.

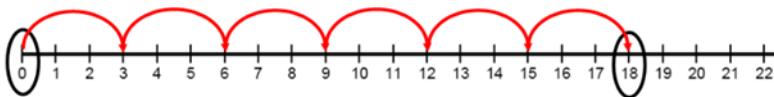
## 18 divided into groups of 3

$18 \div 3 = 6$

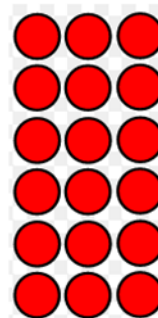


Model division as grouping on a number line (ITP 'Grouping')

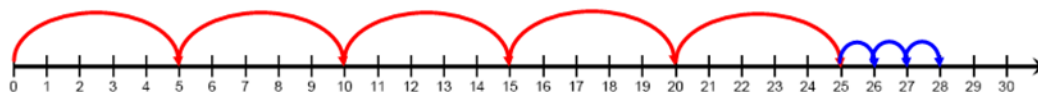
18 into **groups of 3** = 6 **groups**  
 18 **into jumps of 3** = 6 **jumps**  
 $18 \div 3 = 6$



**28 children into groups of 5**  
**How many children left without a group?**  
 $28 \div 5 = 5 \text{ r } 3$



Reinforce division as grouping through the use of arrays



Children use numbered number lines to divide using grouping.

# Year 3

Key statutory requirement:

- ✓ recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- ✓ write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- ✓ solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which  $n$  objects are connected to  $m$  objects.

If I know that

$$3 \times 8 = 24$$

and

$$8 \times 3 = 24,$$

then I also

know that...

$$24 \div 3 = 8$$

and

$$24 \div 8 = 3$$

If I know that

$$30 \times 4 = 120$$

and

$$4 \times 30 = 120$$

then I also

know that...

$$120 \div 3 = 40$$

and

$$120 \div 4 = 30$$

Some children will be ready to be introduced to the short division method (see Y4 for an example), within multiplication/division facts they are familiar with and where there are no remainders.

Children will be taught that division is often based on the concept of grouping, usually more so than sharing.

Sentence structures like this will help...

'20 divided by 4 is the same as dividing 20 into groups of 4.'

We will get 5 groups of 4.

Using equipment will help to show this practically.

# Year 4

Year 4 statutory requirement is for MULTIPLICATION. **However, we will teach DIVISION in year 4!!**

- ✓ recall multiplication and division facts for multiplication tables up to  $12 \times 12$
- ✓ multiply two-digit and three-digit numbers by a one-digit number using formal written layout **(Therefore, we will teach children to divide a two-digit and three digit by a one-digit number using formal written layout)**

We want to ensure that at this stage, children understand the process and experience success as they become more familiar with the method. In order to achieve this, there are a few things to bear in mind...

- Start by dividing by numbers for which they have a good recall of multiplication facts.
- Choose the numbers carefully – low 2 digit numbers to start with, so they fall within their capability.
- If the numbers used become a barrier to the process, then they will struggle with this.

$$\begin{array}{r} 27 \\ 3 \overline{)81} \end{array}$$

# Year 5

Key statutory requirement:

✓ divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context

Children to use compact short division.

$$218 \div 8 =$$

$$\begin{array}{r} 27 \text{ r } 2 \\ 8 \overline{) 2158} \end{array}$$

Extend to expressing results in different ways according to the context, including with remainders as fractions, as decimals or by rounding. For example:

- Whole number remainder =  $27 \text{ r } 2$
- Fraction remainder =  $27\frac{2}{8} = 27\frac{1}{4}$
- Decimal remainder =  $27\frac{1}{4} = 27\frac{25}{100} = 27.25$

# Year 6

Key statutory requirement:

✓ divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

Continue to use compact short division to divide numbers up to 4 digits by a 1-digit whole number.

$$218 \div 8 =$$

$$\begin{array}{r} 27 \text{ r } 2 \\ 8 \overline{) 2158} \end{array}$$

- Whole number remainder =  $27 \text{ r } 2$
- Fraction remainder =  $27\frac{2}{8} = 27\frac{1}{4}$
- Decimal remainder =  $27\frac{1}{4} = 27\frac{25}{100} = 27.25$

Use long division to divide numbers up to 4 digits by a 2-digit whole number.

$$\begin{array}{r} 024 \text{ r } 12 \\ 24 \overline{) 588} \\ - 48 \phantom{0} \\ \hline 108 \\ - 96 \\ \hline 12 \end{array}$$