# St. Leonard's CE Primary School Calculation Policy

# About St. Leonard's Calculation Policy

The following calculation policy has been devised to meet requirements of the National Curriculum 2014 for the teaching and learning of mathematics; it is also designed to give pupils a consistent and smooth progression of learning in calculations across the school.

**Age stage expectations:**

The calculation policy is organised according to age stage expectations as set out in the National Curriculum 2014 and the method(s) shown for each year group should be modelled to the vast majority of pupils. Pupils are taught according to the pathway that they are currently working at and are showing to have 'mastered' a pathway before moving on to the next one. Of course, pupils who are showing to be secure in a skill can be challenged to the next pathway as necessary.

**Maths Mastery:**

At the centre of the mastery approach to the teaching of mathematics is the belief that **all children have the potential to succeed**. They should have access to the same curriculum content and, rather than being extended with new learning, they should **deepen their conceptual understanding by tackling challenging and varied problems**. Similarly, with calculation strategies, children must not simply rote learn procedures but demonstrate their understanding of these procedures through the use of concrete materials and pictorial representations. This policy outlines the different calculation strategies that should be taught and used in Year 1 to Year 6 in line with the requirements of the 2014 Primary National Curriculum.

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# About St. Leonard's Calculation Policy

**Mathematical Language:**

The 2014 National Curriculum is explicit in articulating the importance of children using the correct mathematical language as a central part of their learning (*reasoning*). Indeed, in certain year groups, the non-statutory guidance highlights the requirement for children to extend their language around certain concepts. It is therefore essential that teaching using the strategies outlined in this policy is accompanied by the use of appropriate and precise mathematical vocabulary. New vocabulary should be introduced in a suitable context (for example, with relevant real objects, apparatus, pictures or diagrams) and explained carefully. High expectations of the mathematical language used are essential, with teachers only accepting what is correct.

**How to use the policy:**

This calculation policy is a guide for all staff and parents of St Leonard's Primary school and has been adapted from work by PiXL. It is expected that teachers will use their professional judgement as to when consolidation of existing skills is required or if to move onto the next concept. However, the **focus must always remain on breadth and depth rather than accelerating through concepts.** Children should not be extended with new learning before they are ready, they should deepen their conceptual understanding by tackling challenging and varied problems.
Teachers can use any teaching resources that they wish to use and the policy does not recommend one set of resources over another, rather that, a variety of resources are used. The principle of the concrete-pictorial-abstract (CPA) approach [Make it, Draw it, Write it] is for children to have a true understanding of a mathematical concept.

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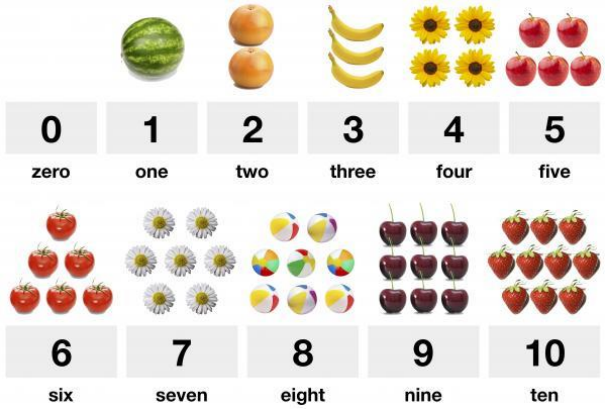
# Addition: Early Years

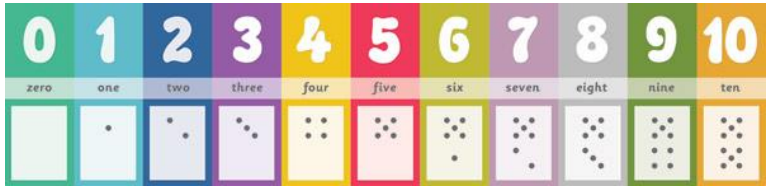
Early learning goals:

- ✓ Have a deep understanding of number to 10, including the composition of each number.
- ✓ Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

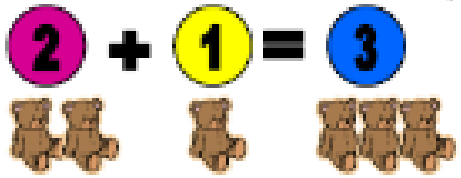
Recognise numbers up to 10 and understand the meaning of each number by recognising and knowing their clusters.



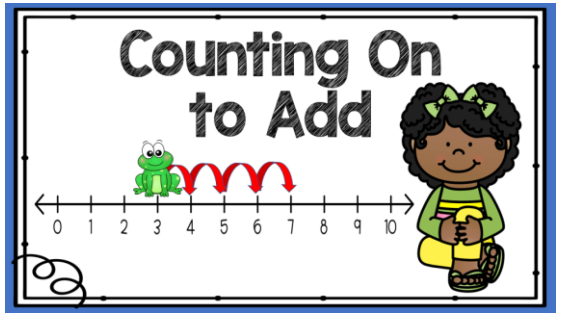

Count on in ones and say which number is one more than a given number using a number line or number track to 10.




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




Know that counting on is a strategy for addition. Use numbered number lines to 10.



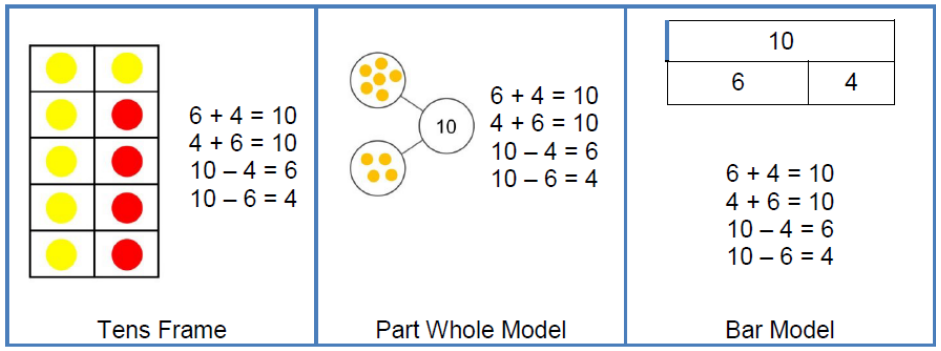
# Addition: Year One

Year 1 statutory requirements :

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

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

Memorise and reason with number bonds to 10 and 20 in several forms.

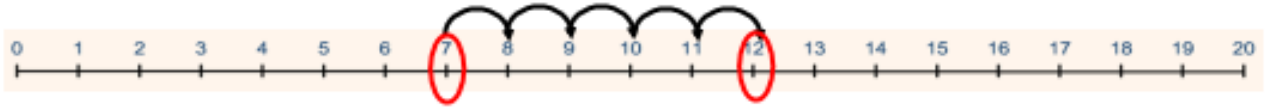



Count on in ones to and across 100 and find one more than a given number.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 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 |

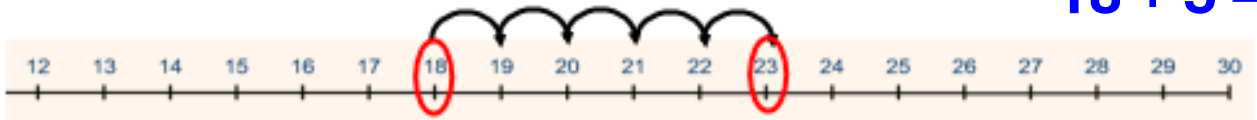
# Addition: Year One

Use concrete resources and a number line to support the addition of numbers. Know and use strategy of finding the larger number, and counting on in ones from this number.




1 digit + 1 digit

**7 + 5 = 12**



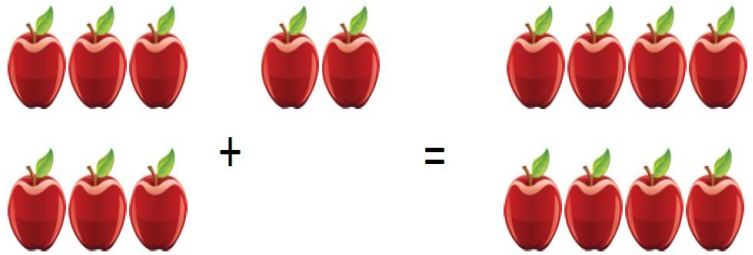

2 digit + 1 digit

**18 + 5 = 23**

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

Solve one-step problems using concrete objects and pictorial representations.

Tom picks 6 apples and Raj picks 2 apples.
How many apples do they have altogether?

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# Addition: Year Two

Year 2 statutory requirements :

✓ Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts to 100.

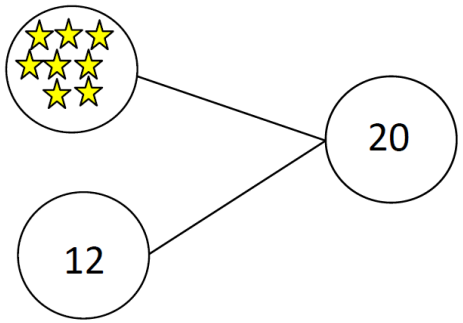
✓Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

✓ Add 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 including those involving numbers, quantities and measures.

Memorise and reason with number facts to 20 in several forms.



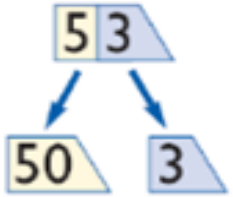

8 + 12 = 20

12 + 8 = 20

20 – 12 = 8

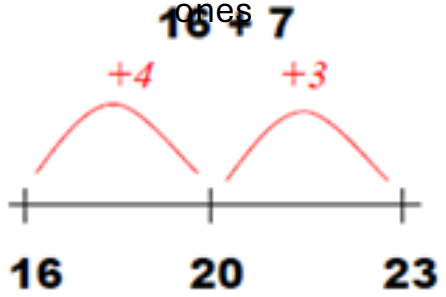
20 – 8 = 12

Partition two 2-digit numbers using a variety of models and images.

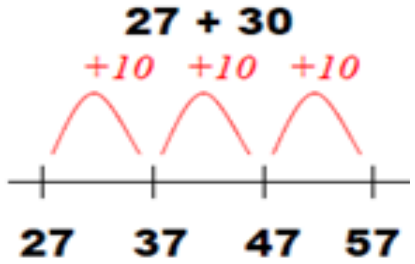


# Addition: Year Two

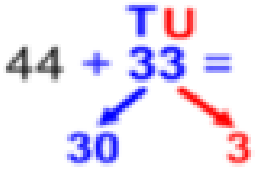
Add 2 digit number and ones

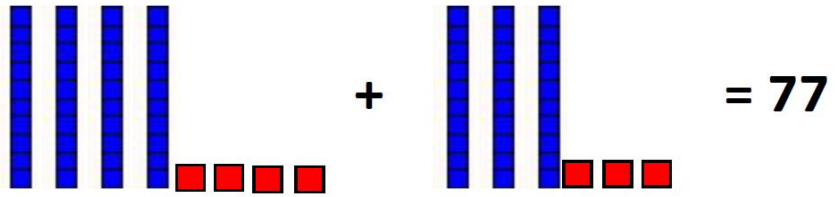


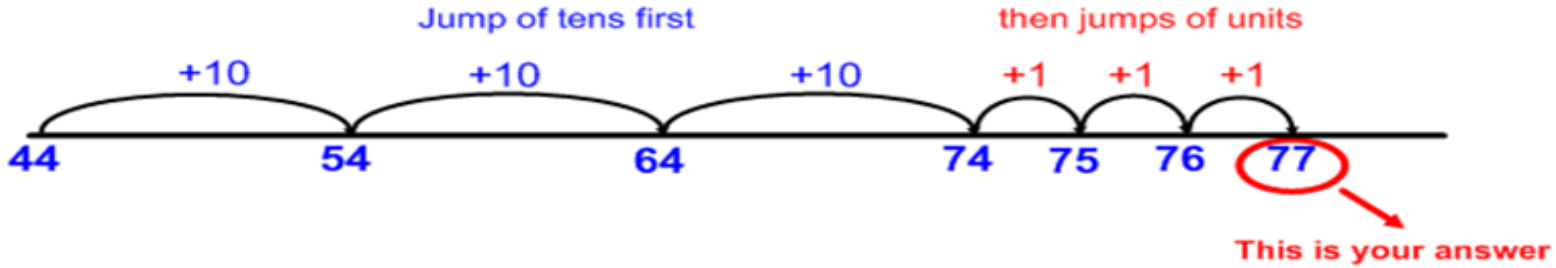

Add 2 digit number and tens




Use partitioning to add two 2-digit numbers using concrete resources and/or a numbered number line and then progressing to an empty number line.




As children gain confidence with adding on tens and ones, they should be taught to combine the jumps on an empty number line.

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# Addition: Year Three

Year 3 statutory requirements :

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

Use expanded column method with place value resources to support the conceptual understanding of adding numbers up to three digits ***with no carrying***.

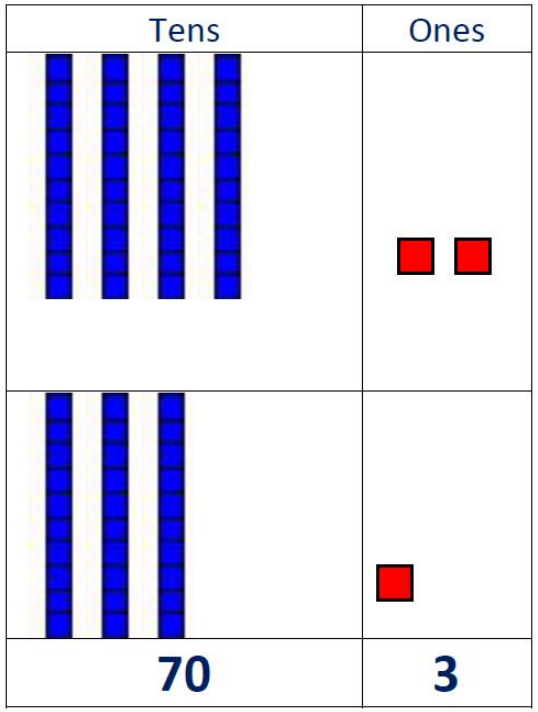
**42 + 31 = 73**

**40 + 2**

**+ 30 + 1**

**70 + 3**

**OR**

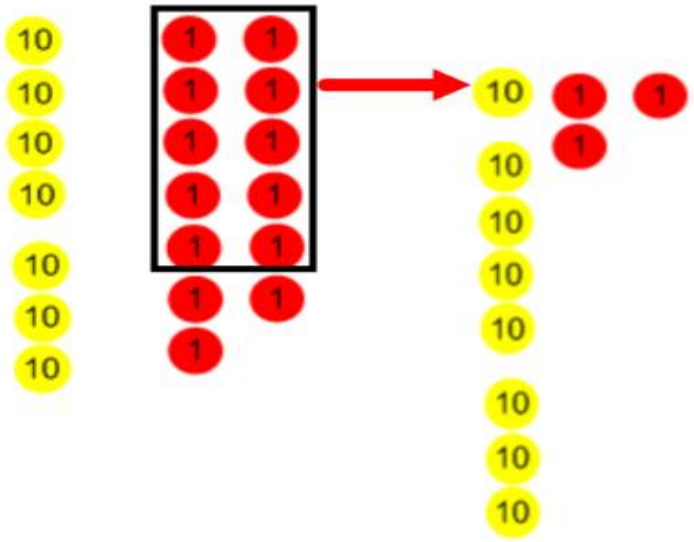


# Addition: Year Three

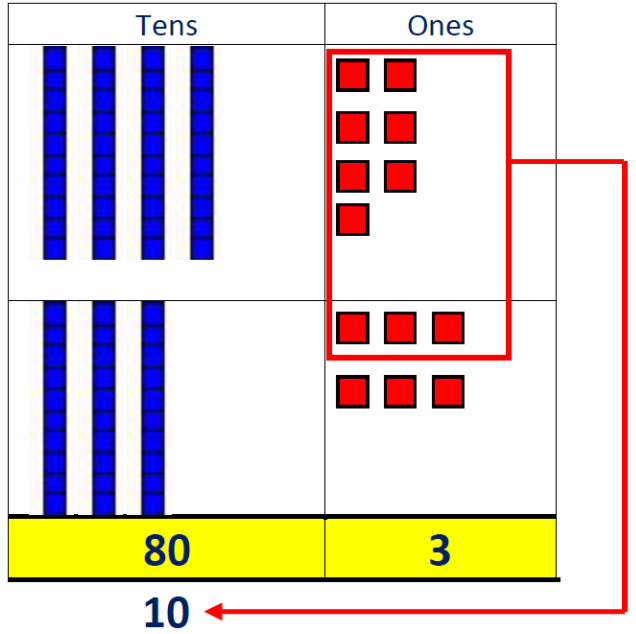
Progress to using the expanded column method with place value resources to support the conceptual understanding of adding numbers up to three digits ***with carrying***.

**47 + 36 = 83**

**40 + 7**
**+ 30 + 6**
**80 + 3**
**10**




OR




Extend to using the expanded column method to add three digit numbers + three digit numbers ***with carrying***.

**367 + 185 = 552**

**300 + 60 + 7**
**+ 100 + 80 + 5**
**500 + 50 + 2**
**100 10**

**Note:** The carried ten or carried hundred 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 **bottom** of the column in which it is to be added.

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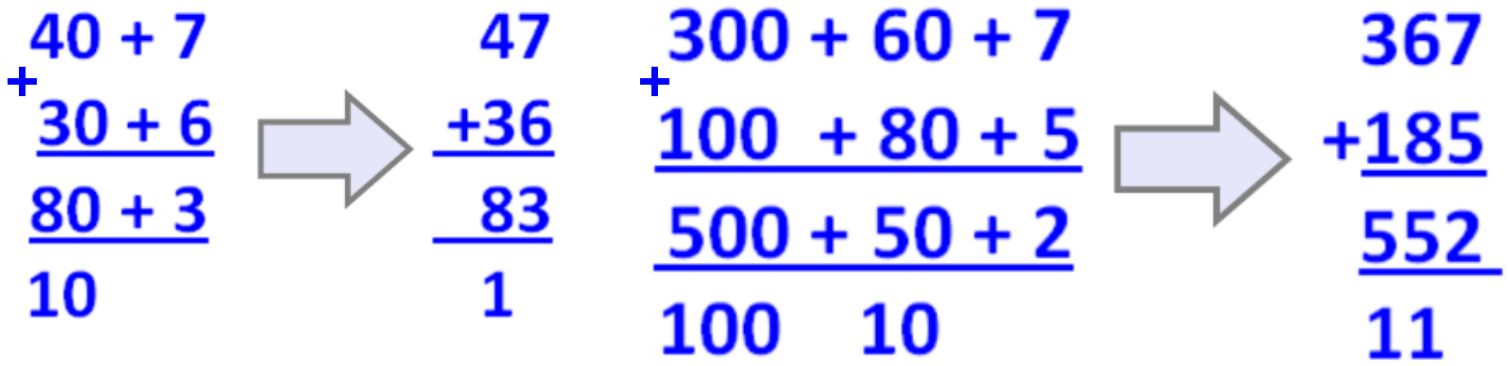
# Addition: Year Four

Year 4 statutory requirements :

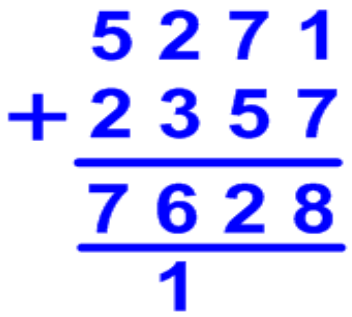
- Find 1000 more than a given number.
- Add numbers with up to 4 digits using the formal written methods of columnar addition where appropriate.
- Solve addition two-step problems in contexts, deciding which operations and methods to use and why,

Build on learning from Year 3 and model how expanded method links to compact column addition method.




**Note:** The carried ten or carried hundred 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 **bottom** of the column in which it is to be added.

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



# Addition: Years Five and Six

Year 5 statutory requirements :

- Add whole numbers with more than 4 digits using formal written methods of columnar addition.
- Add numbers mentally, with increasingly large numbers.
- Solve addition multi-step problems in contexts, deciding which operations and methods to use and why.
- Solve problems involving numbers up to three decimal places

Year 6 statutory requirements :

- Pupils are expected to solve more complex addition and subtraction problems

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 **bottom** of the column in which it is to be added.

$$\begin{array}{r} 46892 \\ +\ 32758 \\ \hline 79650 \\ \hline 111 \end{array}$$

When adding decimals, it is essential that the decimal point does not move and kept in line.

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

12.5 + 23.7

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

34.5 + 27.43

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

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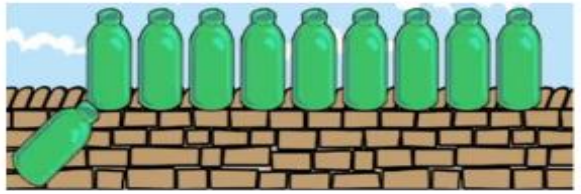
# Subtraction: Early Years

Early learning goals:
✓Have a deep understanding of number to 10, including the composition of each number.
✓ Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts

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

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

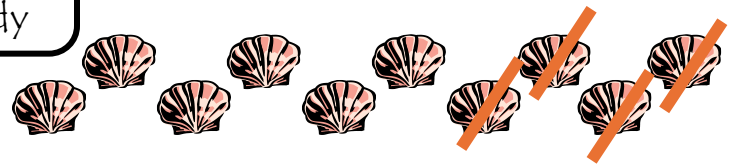


10 Green Bottles sitting on the wall
…

5 little ducks went swimming one day…

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

Three teddies take away two teddies leaves one teddy



If I take away four shells there are six left

Count backwards along a number line to 'take away'

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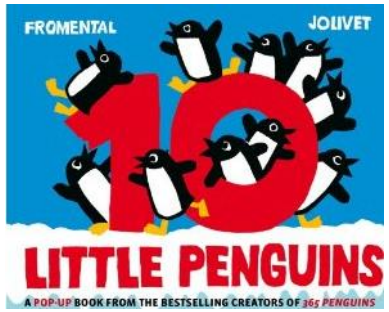
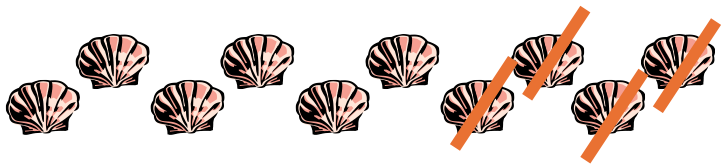
# Subtraction: Year One

Year 1 statutory requirements:

- ✓ Say which number is one less than a given number.
- ✓ Represent and use number bonds and related subtraction facts within 20.
- ✓ Read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs.
- ✓ Subtract one-digit and two-digit numbers to 20, including zero.
- ✓ Solve one-step problems that involve subtraction using concrete objects and pictorial representations, and missing number problems.

Understand subtraction as take away. Use practical resources, pictorial representations, role play, stories and rhymes.

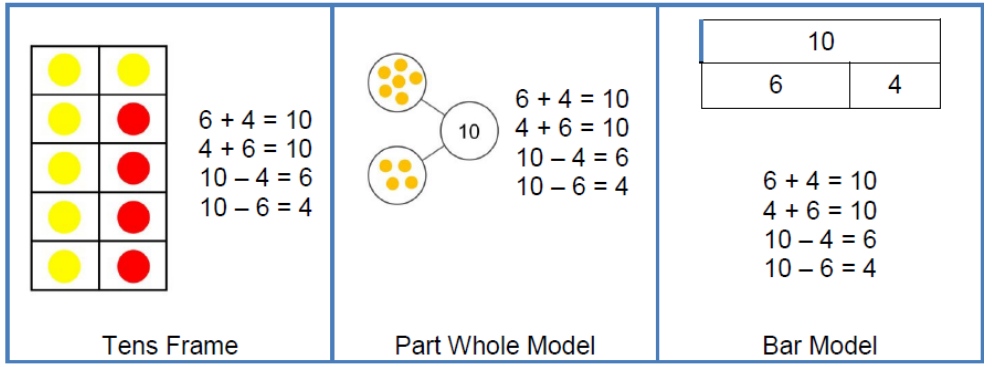


Use number bonds and related subtraction facts within 20.

16 – ☐ = 10

20 – ☐ = 15




Count back in ones and find one less than a given number.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 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 |

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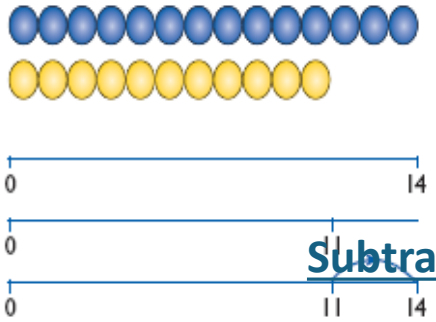
# Subtraction: Year One

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



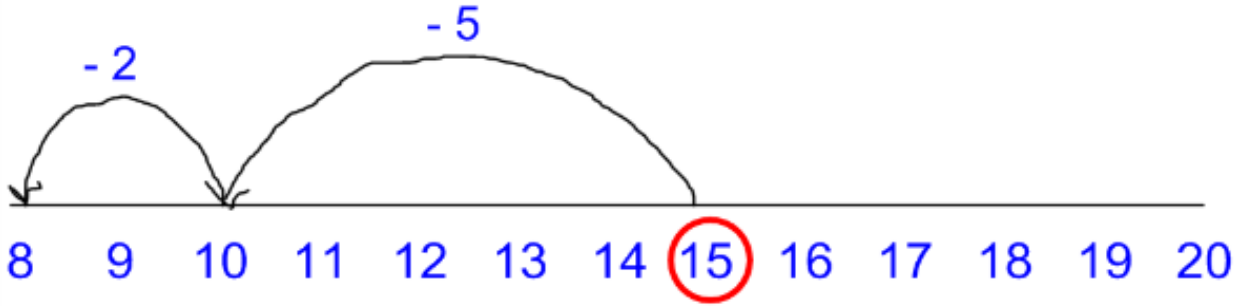

The difference between 11 and 14 is 3.

14 – 11 = 3

11 + ☐ = 14

Subtraction: Year One

Use number line to support the subtraction of numbers. Know and use strategy of **counting back** to subtract one-digit and two-digit numbers to 20.



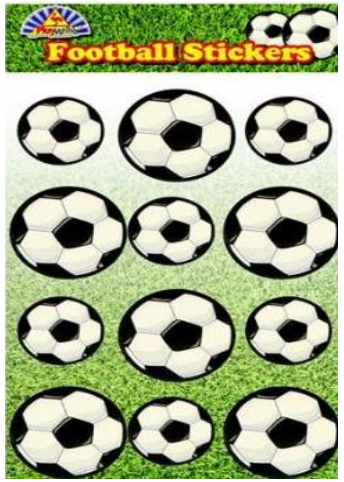

**15 – 7 = 8**

Solve one-step problems using concrete objects and pictorial representations.

Dan has 12 football stickers.

He gives 4 to Ben.

How many stickers does he have left?



**12 - 4 = 8**

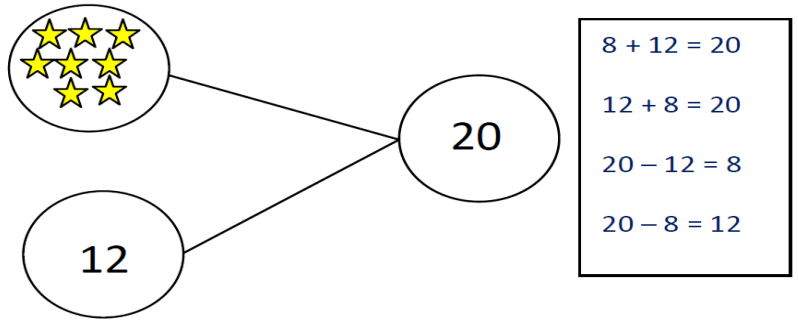
Begin to use the - and = signs to write calculations in a number sentence.

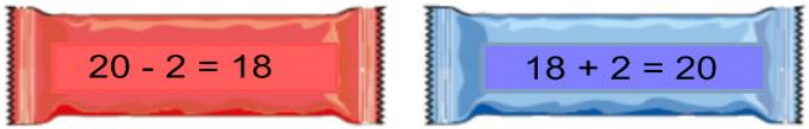
# Subtraction: Year Two

Year 2 statutory requirements:

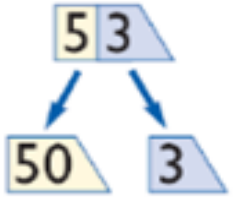
- Recall and use subtraction facts to 20 fluently, and derive and use related facts to 100.
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.
- Subtract numbers using concrete objects, pictorial representations,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

Memorise and reason with number facts to 20 in several forms.





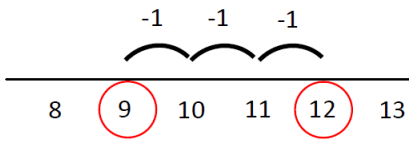

Partition two 2-digit numbers using a variety of models and images.



# Subtraction: Year Two

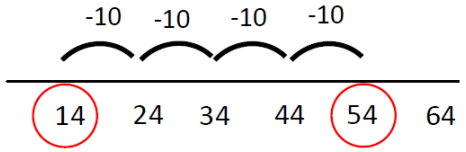
Subtract 2 digit and ones

**12 – 3**

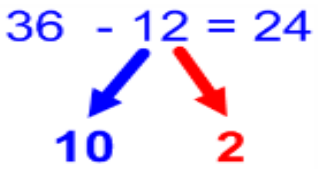


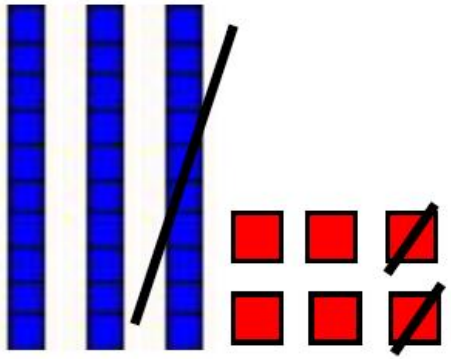

Subtract 2 digit and tens

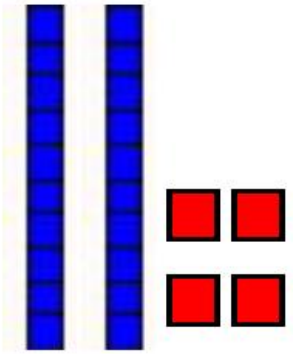
**54 – 40**




Use partitioning to subtract two 2-digit numbers using concrete resources and/or a numbered number line and then progressing to an empty number line.





| 36 - 12 | = | 24 |
|---|---|---|

OR

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# Subtraction: Year Three

Year 3 statutory requirement:

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

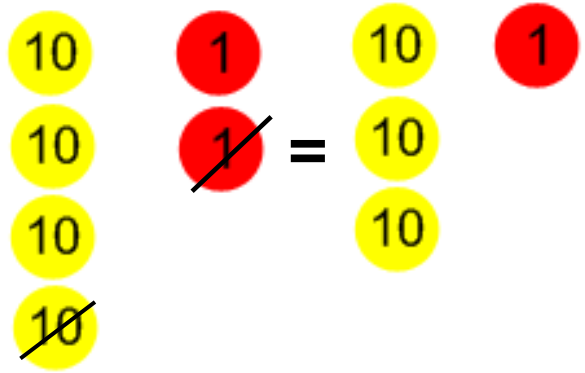
Use expanded column method with place value resources to support the conceptual understanding of subtracting numbers with up to three digits ***with no exchanging.***

**42 - 11 = 31**

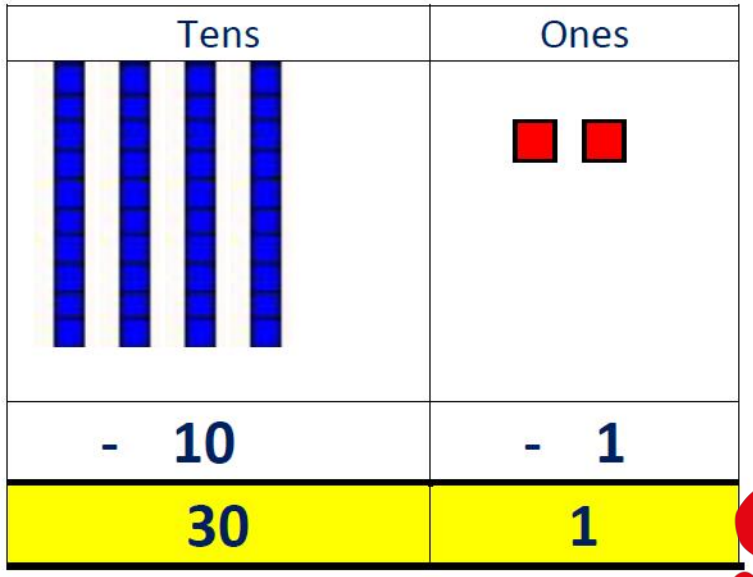
**40 + 2**

**- 10 + 1**

**30 + 1**




**OR**



# Subtraction: Year Three

Progress to using the expanded column method with place value resources to support the conceptual understanding of subtracting numbers with up to three digits ***with exchanging tens and/or hundreds***.

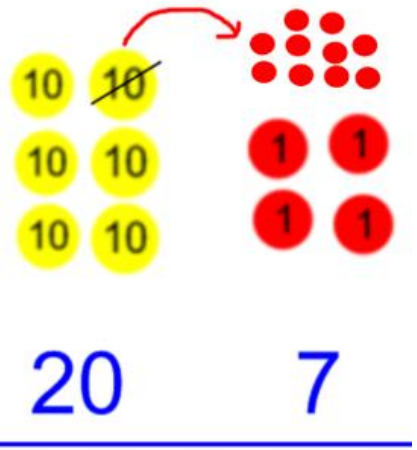
**74 - 27 = 47**

60 + 14

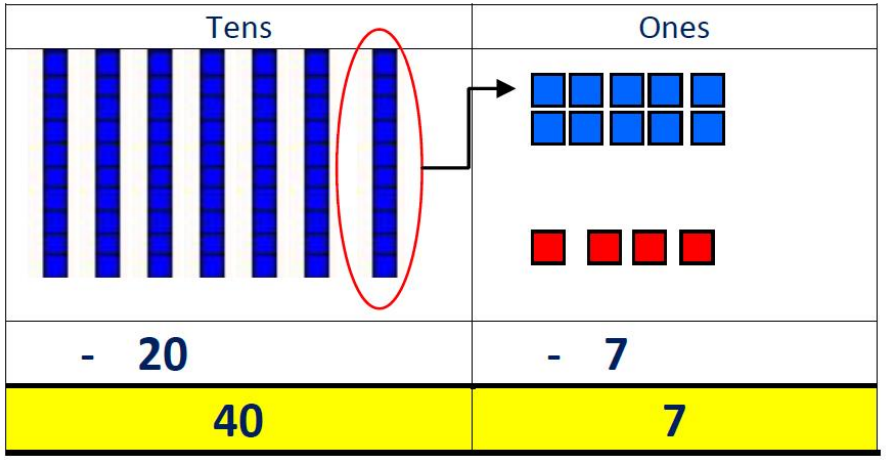
~~70~~ + ~~4~~

- 20 + 7

40 + 7




**OR**




In this example to subtract 7 ones from 4 ones we need to **exchange** a ten for ten ones. We now can subtract 7 ones from 14 ones.

Extend to using the expanded column method to subtract three digit numbers from three digit numbers.

**537 – 254 = 283**

400 + 130

~~500~~ + ~~30~~ + 7

- 200 + 50 + 4

200 + 80 + 3

**Note:** The exchanged ten or hundred 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 which has been adjusted.

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# Subtraction: Year Four

Year 4 statutory requirements:

- Find 1000 less than a given number.
- Subtract numbers with up to four digits, using formal written methods of columnar subtraction where appropriate.
- Solve subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Build on learning from Year 3 and model how expanded method links to compact column subtraction method.

$$\begin{array}{rrrr} 60 & + & 14 \\ \cancel{70} & + & \cancel{4} \\ -\ 20 & + & 7 \\ \hline 40 & + & 7 \end{array}$$

$$\begin{array}{r} 6\,{}^{1}\!\cancel{7}\,4 \\ -\ 2\,7 \\ \hline 4\,7 \end{array}$$

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

$$\begin{array}{r} 4\,\cancel{5}\,{}^{1}\!\cancel{3}\,7 \\ -\ 2\,5\,4 \\ \hline 2\,8\,3 \end{array}$$

By the end of year 4, pupils should be subtracting numbers up to 4 digits using compact column subtraction method.

$$\begin{array}{r} 7\,8\,\overset{3}{\cancel{4}}\,{}^{1}\!2 \\ -\ 1\,8\,2\,9 \\ \hline 6\,0\,1\,3 \end{array}$$

**Note:** The exchanged ten or hundred 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 which has been adjusted.

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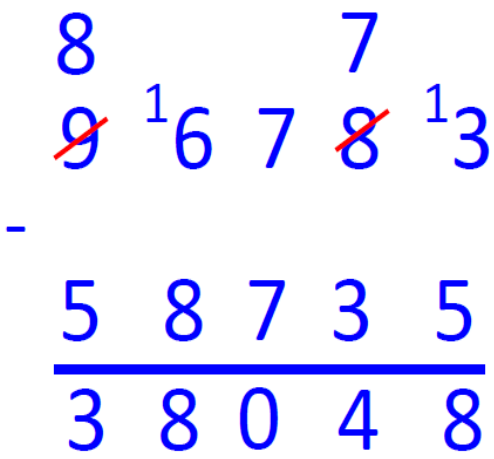
# Subtraction: Years Five and Six

Year 5 statutory requirements :

- Subtract whole numbers with more than 4 digits using formal written methods of columnar subtraction.
- 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.

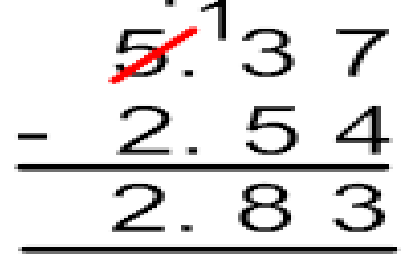
Year 6 statutory requirements: pupils are expected to solve more complex addition and subtraction problems

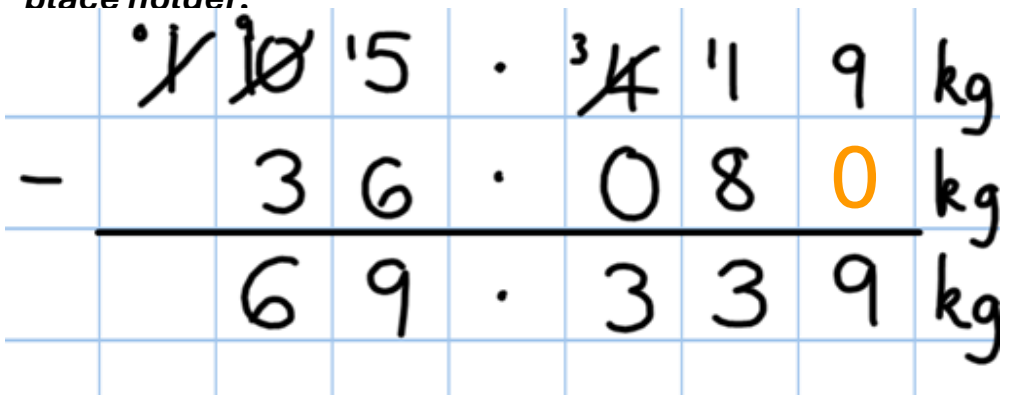
In year 5 and 6 pupils should be subtracting numbers using compact column subtraction method. **Note:** The exchanged ten or hundred is just as important as any other number. Therefore, it should be written as clear and as large as any other number, and placed at the **top** of the column which has been adjusted.




When subtracting decimals, it is essential that the decimal point does not move and kept in line.

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

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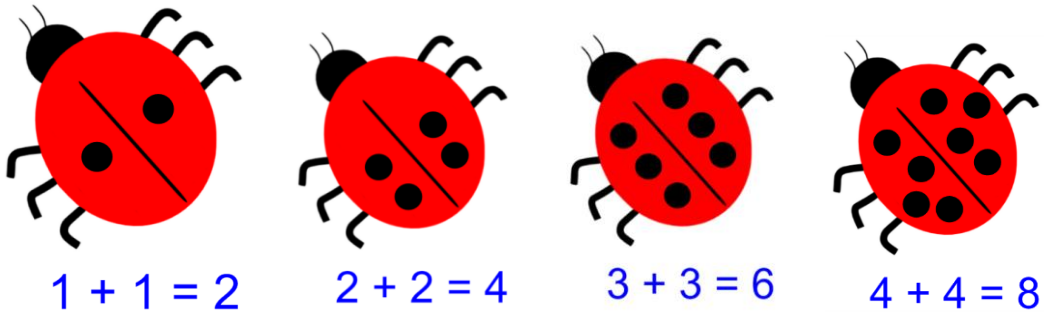
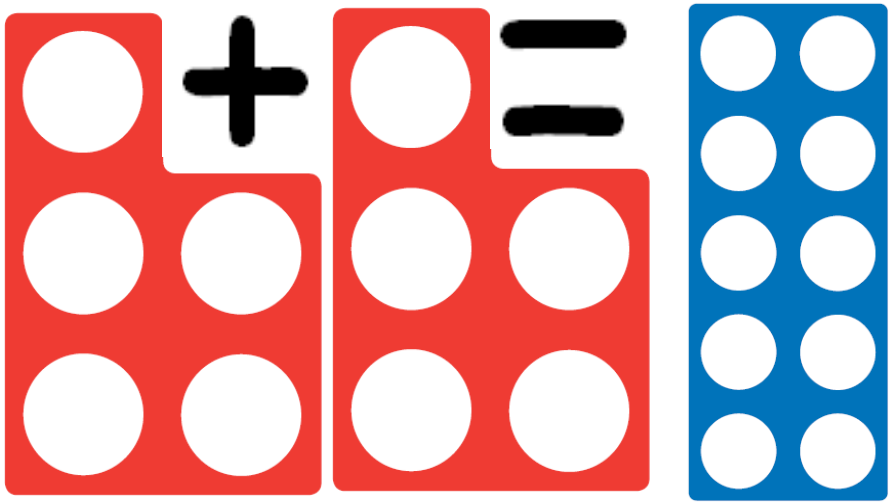
# Multiplication: Early Years

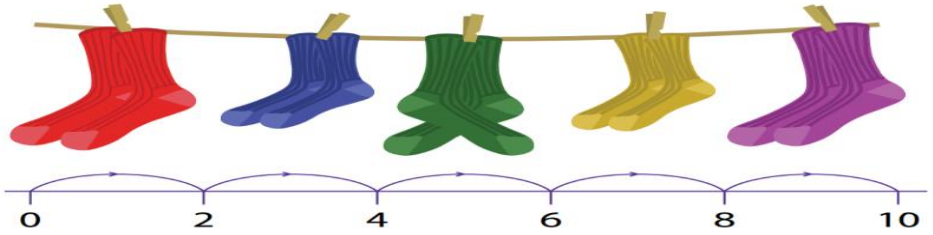
Early learning goal statutory requirement:
✓Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

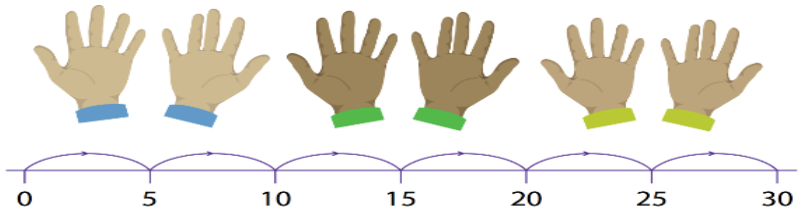
Use pictorial representations and concrete resources to double numbers to 10.



*Use concrete sources, role play, stories and songs to begin counting in twos, fives and tens.*

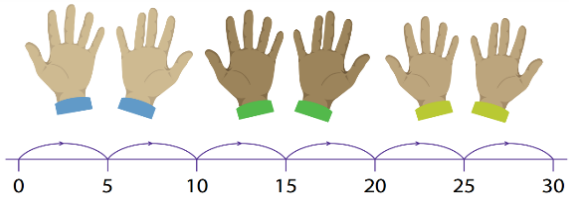


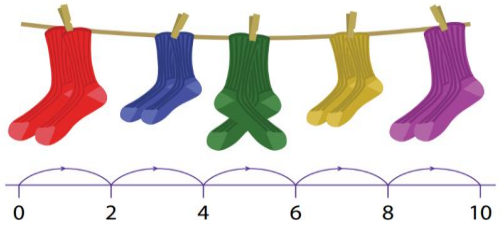



# Multiplication: Year One

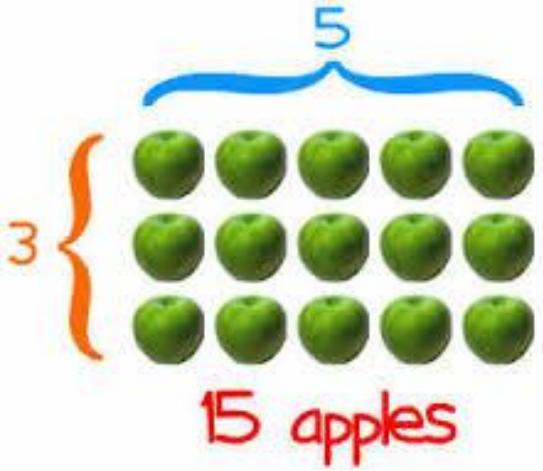
Year 1statutory requirement:
✓Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support
of the teacher.

*Count in twos, fives and tens using practical resources, role play, stories and songs.*




Use arrays




Understand multiplication as repeated addition – use concrete objects to support understanding.

2 + 2 + 2 + 2

5 + 5 + 5
or
3 x 5

Use pictorial representations

3 x 5

3 groups of 5

# Multiplication: Year Two

Year 2 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 (×), division (÷) 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.

Further develop understanding multiplication as repeated addition.

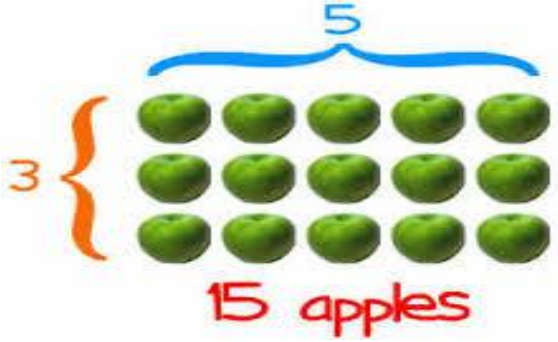
5 + 5 + 5
or
5 x 3

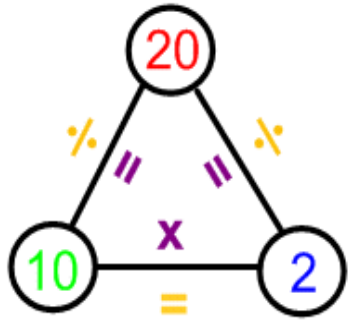
Use pictorial representations

3 x 5

3 groups of 5

Use arrays

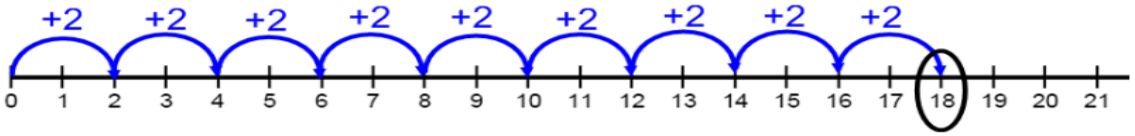



*Recall multiplication and division facts for 2, 5, 10*

Model and bridge link from repeated addition to solving multiplication problems using a number line.

9 groups of 2 = 18
9 jumps of 2 = 18
9 x 2 = 18

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# Multiplication: Year Three

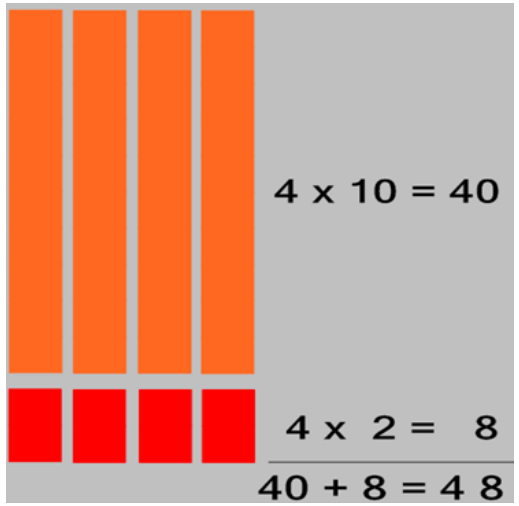
Year 3 statutory requirements:
✓Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.
✓Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental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

Develop recall of multiplication facts (alongside inverse of the corresponding division facts).

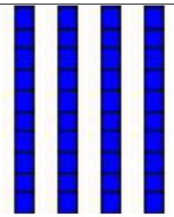
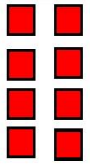
| x | 3 | 4 | 8 |
|---|---|---|---|
| 5 | | | |
| 6 | | | |
| 4 | | | |

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

**12 x 4 = 48**




Use concrete resources to develop conceptual understanding of the compact method introduced in Year 4.

| x | 10 | 2 |
|---|---|---|
| 4 |  |  |

**OR**

| x | 10 | 2 |
|---|---|---|
| 4 | 40 | 8 |

5cm

?cm

*The yellow ribbon is 4 times as long as the red ribbon. What is it's length?*

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# Multiplication: Year Four

Year 4 statutory requirement:
✓ Recall multiplication and division facts for multiplication tables up to 12 × 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.

| X | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 2 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 3 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
| 4 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 5 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 6 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| 7 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 84 |
| 8 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 9 | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 99 | 108 |
| 10 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| 11 | 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99 | 110 | 121 | 132 |
| 12 | 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |

Develop recall of multiplication facts (alongside the inverse of the corresponding division facts).

Build on learning from Year 3 and model how grid method and/or expanded method links to compact short multiplication.

| x | 30 | 6 |
|---|---|---|
| 4 | 10 10 10<br>10 10 10<br>10 10 10<br>10 10 10 | 1 1 1 1 1 1<br>1 1 1 1 1 1<br>1 1 1 1 1 1<br>1 1 1 1 1 1 |

30 + 6
x 4
24
+ 120
144

$\overset{2}{3}6 \times 4 = 144$

2 eggs
150g flour
180g sugar

Use knowledge of times tables to solve scaling problems.

Susie wants to bake 12 cupcakes people.
The ingredients given are for four cupcakes.
How much flour will she need?

| Cupcakes | Flour |
|---|---|
| 4 | 150g |
| 12 | 900g |

x3

x3

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# Multiplication: Year Five

Year 5 statutory requirements:
✓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

Build on learning from Year 4 and use concrete resources if needed to multiply numbers up to 4 digits by **one digit** using compact short multiplication.

643 x 8

```
   6  4  3
x           8
-------------
5  1  4  4
   3  2
```

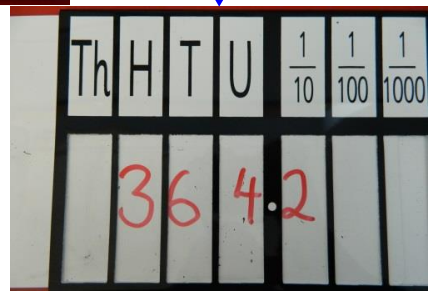
| x | 600 | 40 | 3 |
|---|---|---|---|
| 50 | 30,000 | 2,000 | 150 |
| 4 | 2,400 | 160 | 12 |

Reinforce the connection between the grid method to multiply numbers up to 4 digits by **two digit** using long multiplication.

```
      6  4  3
x        5  4
-------------
   2  5  7  2
   2  1
+  3  2  1  5  0
   1  1
-------------
   3  4  7  2  2
      1
```

To multiply by 10, 100, 1000 children should use place value charts to show that the digit moves a column (s) to the left .The value of the digit is increasing by 10, 100 or 1000 times.

X 10

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# Multiplication: Year Six

Year 6 statutory requirements:
✓ 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.

Build on learning from Year 5 multiplying numbers using compact short multiplication and long division.

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

643 x 8

```
  6 4 3
x     8
-------
5 1 4 4
  3 2
```

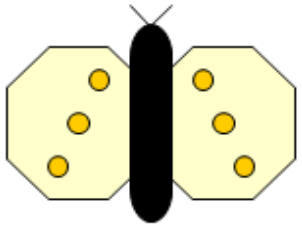
```
    6 4 3
x     5 4
---------
  2 5 7 2
  2 1
+ 3 2 1 5 0
---------
  3 4 7 2 2
    1
---------
```

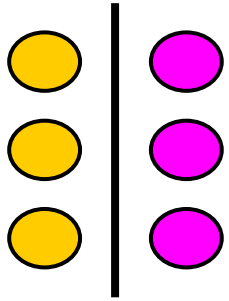
```
    7 . 6 8
x           4
-----------
3 0 . 7 2
  2   3
```

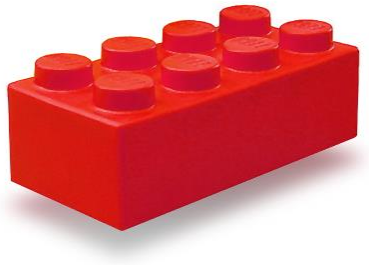
# Division: Early Years

Early learning goal statutory requirement:
✓Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally..

Use pictorial representations and concrete resources to halve numbers to 10.







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 slices of cake. Ask the children to share the objects between the two bags.***

# Division: Year One

Year 1 statutory requirement:

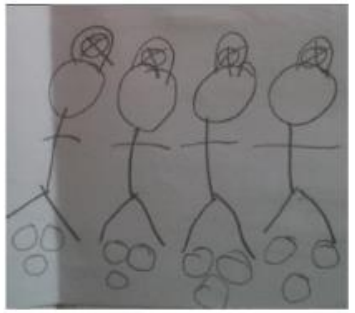
- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Understand division as **sharing** using concrete resources.

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

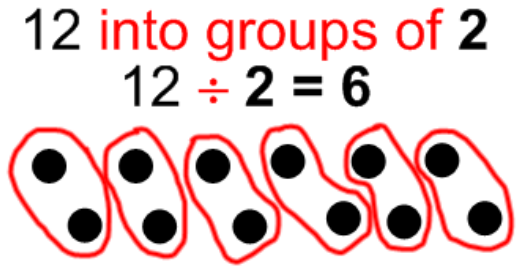
12 ÷ 2

12 ÷ 3



12 ÷ 4

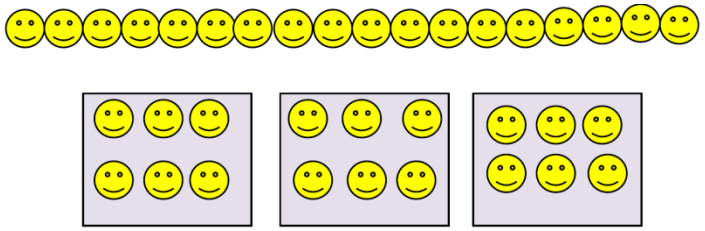
Begin to understand division as **grouping** using concrete resources.



# Division: Year Two

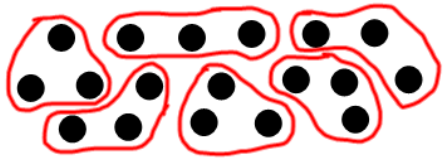
Year 2 statutory requirement:
✓Recall and use division facts for 2, 5 and 10 multiplication tables.
✓Calculate mathematical statements for multiplication and division within the multiplication tables and write then using the multiplication (x), division ( ) and equals (=) signs.
✓Solve problems involving 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; ¾ of a length, shape, set of objects or quantity***

Further develop understanding of difference between **sharing and grouping** using concrete resources.

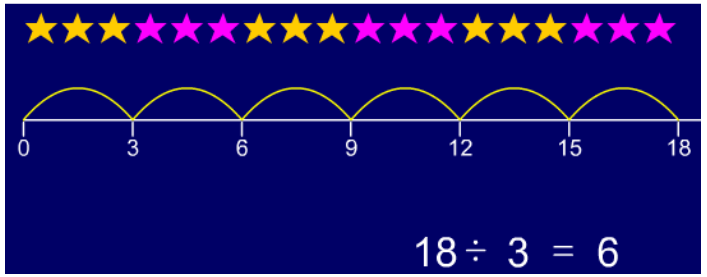


18 smiley faces shared between 3 classes.

18 into groups of 3
18 ÷ 3 = **6**

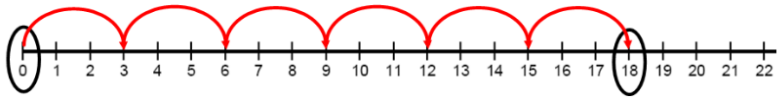


Model division as grouping on a number line (ITP 'Grouping')

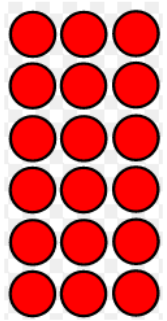



Children use numbered number lines to divide using grouping.

18 into groups of 3 = 6 groups
18 into jumps of 3 = 6 jumps
18 ÷ 3 = 6




Reinforce division through the use of arrays.



18 ÷3 = 6

18 ÷6 = 3

**Remember** to develop connections between fractions and division and rephrase this calculation as 1/3 of 18 is the same as 18 ÷ 3 = 6.

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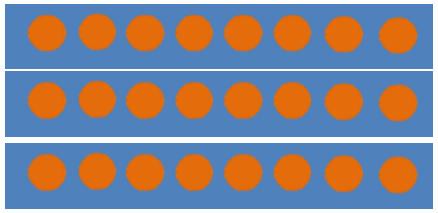
# Division: Year Three

Year 3 statutory requirement:
✓Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
✓Write and calculate mathematical statements for 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 division including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

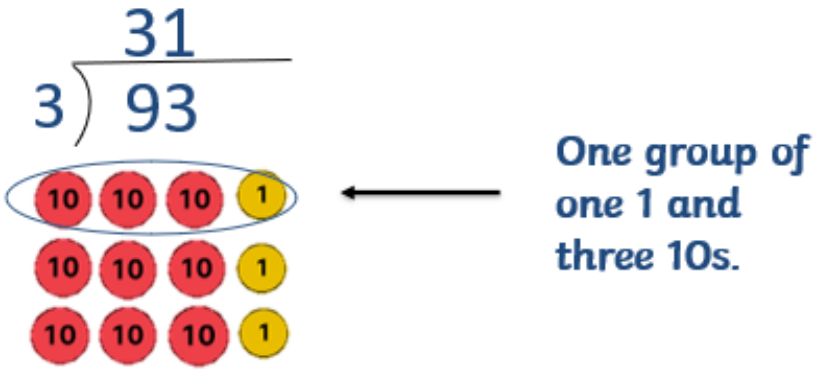
24 ÷ 8 = 3



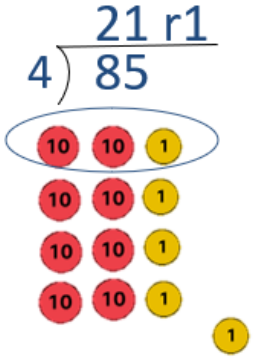
| 24 | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

Limit numbers to NO remainders in the answer OR carried (each digit must be a multiple of the divisor).

93 ÷ 3 =




85 ÷ 4




Limit to 1 remainder initially and then extend to multiple remainders.

**Remember** to develop connections between fractions and division and rephrase these calculations as 1/3 of 96; ¼ of 72, ¼ of 872 and 1/5 of 185. Note: Year 3 fraction objective - *Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators;*

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# Division: Year Four

Year 4 statutory requirement: Note - there isn't a statutory objective for division. However, Y4 statutory multiplication objectives are to (1) recall multiplication and division facts for multiplication tables up to 12 × 12 and (2) multiply two-digit and three-digit numbers by a one-digit number using formal written layout so we will build on the connections between multiplication and division.

$$3\overline{)96} = 32 \qquad 4\overline{)7^{3}2} = 18 \qquad 4\overline{)8\,7^{3}2} = 218 \qquad 5\overline{)1\,8^{3}5} = 037$$

Limit numbers to NO remainders in the answer OR carried (each digit must be a multiple of the divisor).

Limit numbers to NO remainders in the final answer, but with remainders occurring within the calculation.

Extend to 3-digit number first where the divisor can go into the first number and then progress to when the divisor cannot go into the first number.

**Remember** to develop connections between fractions and division and rephrase these calculations as 1/3 of 96; ¼ of 72, ¼ of 872 and 1/5 of 185. Work should be built on from Year Three and processes continued where children are not ready to move on to these more formal methods. Note: Year 4 fraction objective: *solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.*

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# Division: Year Five

Year 5 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.

Further secure pupils' understanding of compact short division.

$$218 \div 8 =$$

$$\begin{array}{r} 27 \text{ r } 2 \\ 8\overline{)21^{5}8} \end{array}$$

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

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# Division: Year Six

Year 6 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.

$218 \div 8 =$

$$\begin{array}{r} 027 \text{ r } 2 \\ 8\overline{)2\,1^{5}8} \end{array}$$

- Whole number remainder = 27 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.

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

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