



## Written Calculations Policy

|                   |             |
|-------------------|-------------|
| Last reviewed on: | Autumn 2026 |
| Next review on:   | Autumn 2028 |

## **Rationale**

This policy contains the key pencil and paper procedures that will be taught within our school. It has been written to ensure consistency and progression throughout the school and reflects a whole school agreement. The calculation policy has been devised to meet requirements of the National Curriculum 2014 for the teaching and learning of mathematics, and is also designed to give pupils a consistent and smooth progression of learning in written calculations across the school. Please note that early learning in number and calculation in Reception follows the 'Development Matters' EYFS document, and this calculation policy is designed to build on progressively from the content and methods established in the Early Years Foundation Stage.

## **Teaching and Learning**

This calculation policy should be used to support children to develop a deep understanding of number and calculation. At Grimsdyke School, we use 'White Rose' as a format as a basis for our planning and use the philosophy of: fluency, reasoning and problem solving. White Rose also follows the Concrete – Pictorial – Abstract approach to teaching maths. This policy has been designed to teach children through the use of concrete, pictorial and abstract representations. It is important that conceptual understanding, supported by the use of representation, is secure for all procedures. Reinforcement is achieved by going back and forth between these representations.

- Concrete representation - a pupil is first introduced to an idea or skill by acting it out with real objects. This is a 'hands on' component using real objects and is a foundation for conceptual understanding.
- Pictorial representation - a pupil has sufficiently understood the 'hands on' experiences performed and can now relate them to representations, such as a diagram or picture of the problem. This helps children make the connection between the physical object and abstract levels of understanding, which is the stage they move onto next.
- Abstract representation - The abstract stage brings in mathematical symbols, for example +, -, x, ÷ to indicate addition, subtraction, multiplication and division. This is used when a pupil is secure in their understanding of representing problems by using mathematical notation, for example  $12 \times 2 = 24$ .

## **Planning, Progression and Continuity**

The calculation policy is organised according to age stage expectations as set out in the National Curriculum 2014, however it is vital that pupils are taught according to the year group that they are currently working at and then given 'mastery' opportunities within their age-related expectations in order to fully embed the concepts learned. Furthermore, if a teacher feels a child is ready to move onto the next stage of a calculation which is in the next year group's expectations, then this should be facilitated.

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. Each operation is broken down into skills for the year group and shows recommended models and visuals to support the teaching of the corresponding concepts alongside.

*'Real things and structured images enables children to understand the abstract. The concrete and the images are a means for children to understand the symbolic so it's important to move between all modes to allow children to make connections'. (Morgan, D. 2016)*

# Addition

## EYFS

### Objectives

- Addition involves putting groups together or counting on
- To know the number bonds up to 10
- Say which number is one more than a given number for numbers to 20.
- They can solve addition problems for numbers to 20 using practical apparatus.

### Concrete

Use toys and general classroom resources for children to physically manipulate.



Use specific maths resources such as counters, connecting cubes, Numicon etc.



### Vocabulary

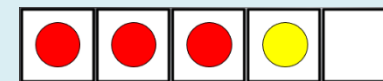
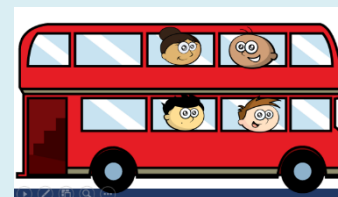
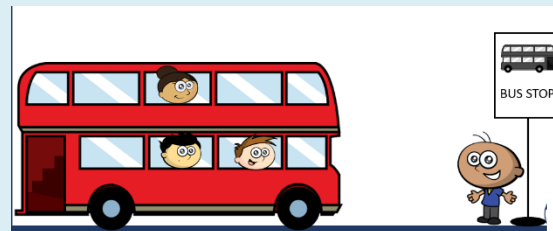
- Number
- More
- Less
- Add
- More
- Make
- Sum
- Total
- Altogether

Use visual supports such as ten frames, part part whole and addition mats, with the physical objects and manipulatives.



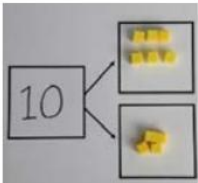
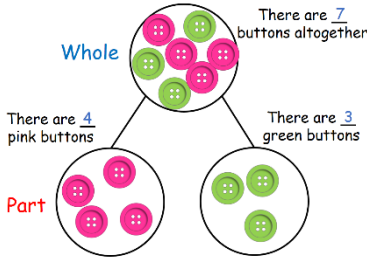
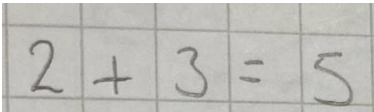
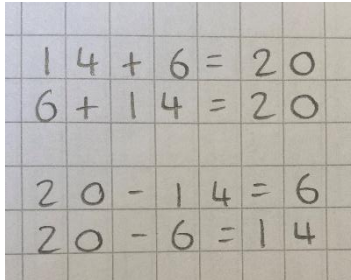
### Pictorial

Adding one more



How many have been added?



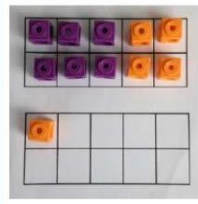
| Year 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                             |
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| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Concrete                                                                                                                                                                                                                                                                                                                                                                                       | Pictorial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Abstract                                                                                                                                                                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>To know that equals means the same as</li> <li>To know that a number bonds join numbers together to make another number</li> <li>To know the number bonds up to 20</li> <li>To know that addition is finding the total of two or more numbers or objects</li> <li>To know the mathematical symbols for addition (+)</li> <li>To know that adding a zero has no effect on the answer</li> <li>To know different terminology for addition such as put together, add, altogether, total, more than</li> <li>To identify and say one more than a given number</li> <li>To add one-digit and two-digit numbers to 20, including zero</li> <li>To read, write and interpret mathematical statements involving addition</li> </ul> | <p>Use cubes to add two numbers together as a group or in a bar.</p>  <p>Use part-part whole model</p>  <p>Adding 1 with string beads</p>  | <p>Part whole model</p>  <p>Number bonds to 10</p>  <p>Adding together</p>  <p>There are <u>3</u> <br/> There are <u>2</u> <br/> There are <u>5</u> leaves altogether.</p>  | <p>Notation for addition</p>  <p>We also teach that calculations can be represented in different ways such as <math>5=2+3</math> or <math>3+2=5</math></p> <p>Number bonds to 20</p>  |

- To solve one-step problems that involve addition using concrete objects and pictorial representations

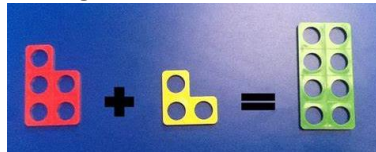
### Vocabulary

- Add
- More
- Plus
- Make
- Altogether
- Total
- Equal to
- Equals
- Count on
- Number line
- Balancing
- Part part whole

Use ten frames



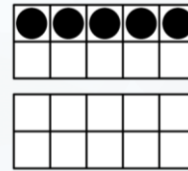
Adding with numicon



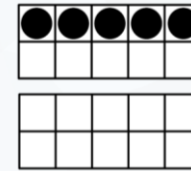
Addition with base 10



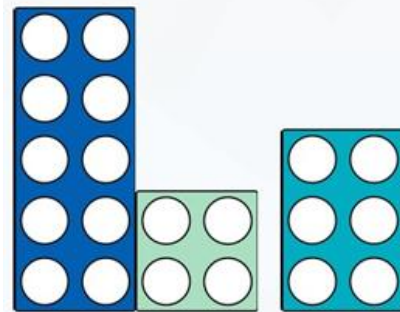
First



Then



Finding number bonds to 20



Addition with bar models



Year 2

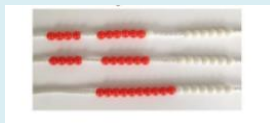
- To know and recall addition facts to 20 fluently
- To know that addition of two numbers can be done in any order (commutative)
- To know that there is a relationship between addition and we call this the inverse
- To use addition facts to 20 to derive related facts up to 100
- To add and subtract numbers 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
- To show that addition of two numbers can be done in any order

Concrete

Using multilink cubes

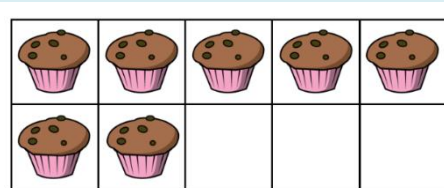


Using number bonds to make 10 and then add on.

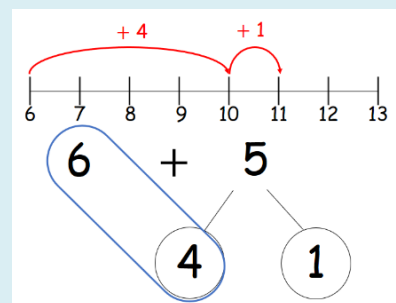


Pictorial

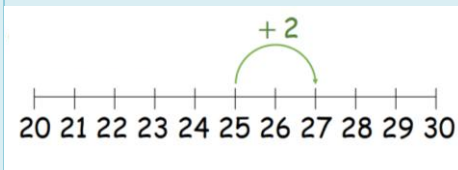
Adding two, 1-digit numbers



Adding by partitioning



Adding on a number line



Abstract

Using addition facts to derive related facts up to 100

$$6 + 3 = 9$$

$$60 + 30 = 90$$

Addition using number bonds

$$4 + 7 + 6 = 10 + 7$$

$$10 = 17$$

Addition by partitioning

$$49 + 23$$

$$40 + 9$$

$$20 + 3$$

$$60 + 12 = 72$$

Record addition in columns

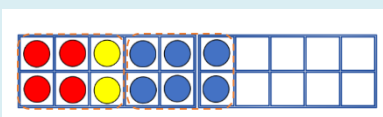
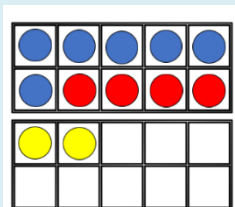
$$\begin{array}{r} 24 \\ + 15 \\ \hline 39 \end{array}$$

- To solve problems with addition and subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- To apply their increasing knowledge of mental and written methods
- To record addition in columns

#### **Vocabulary**

- Add
- More
- Plus
- Make
- Altogether
- Total
- Equal to
- Equals
- Count on
- Number line
- Sum
- Partition
- Addition
- Column
- Partition

#### **Adding across ten**



### Year 3

#### Objectives

- To know the formal written methods of columnar addition.
- To solve number problems and practical problems involving place value
- To add numbers mentally, including:
  - a three-digit number and ones
  - a three-digit number and tens
  - a three-digit number and hundreds

#### Vocabulary

- Addition
- Add
- More
- Make
- Sum
- Total
- Altogether
- Regrouping
- Exchanging

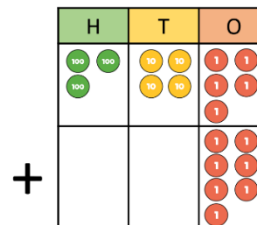
#### Concrete

Place value chart addition with counters

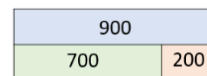


#### Pictorial

Partitioning numbers to complete addition



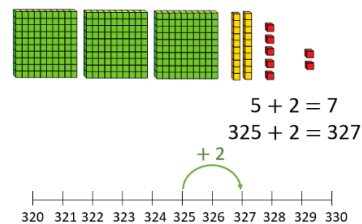
Bar model



$$\begin{array}{ll} 700 + 200 = 900 & 900 - 200 = 700 \\ 200 + 700 = 900 & 900 - 700 = 200 \\ 900 = 700 + 200 & 700 = 900 - 200 \\ 900 = 200 + 700 & 200 = 900 - 700 \end{array}$$

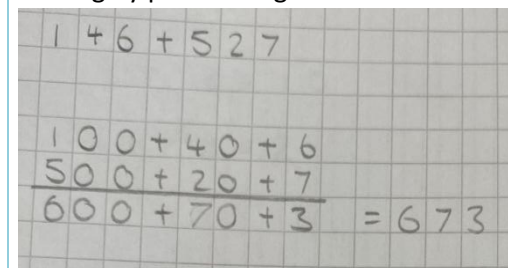
Using diene representations and number lines

Calculate  $325 + 2$

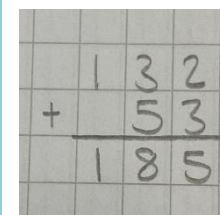


#### Abstract

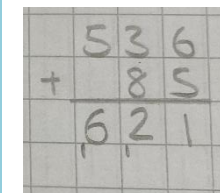
Adding by partitioning



Formal written method



With exchanging



## Year 4

### Objectives

- To find 1000 more than a given number
- To add numbers with up to 4 digits using the formal written methods of columnar addition where appropriate
- To estimate and use inverse operations to check answers to a calculation
- To solve addition two-step problems in contexts
- To add fractions with the same denominator

### Vocabulary

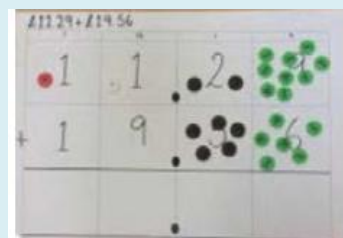
- Addition
- Add
- More
- Make
- Sum
- Total
- Altogether
- Regrouping
- Exchanging
- Decimal point

### Concrete

Place value chart with counters for addition

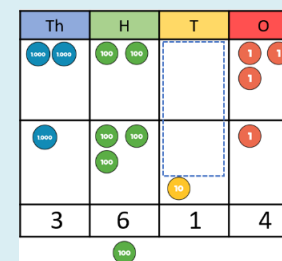
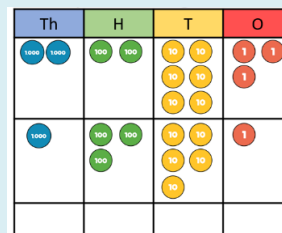


Including decimal addition

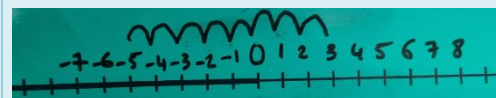


### Pictorial

Adding with exchanging

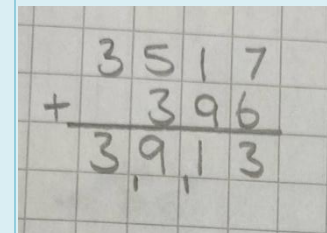


Adding negative numbers

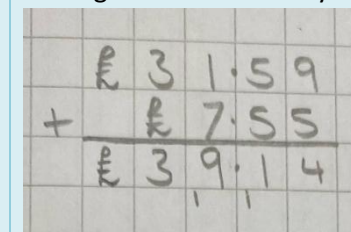


### Abstract

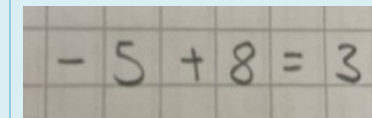
Column addition – formal written method



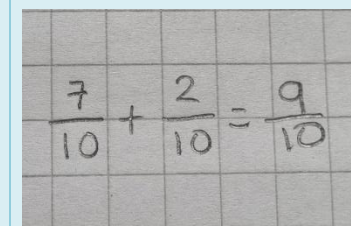
Adding decimals – money

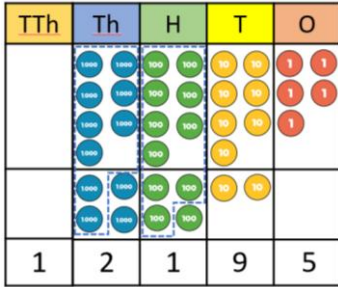
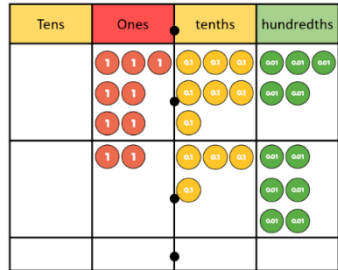
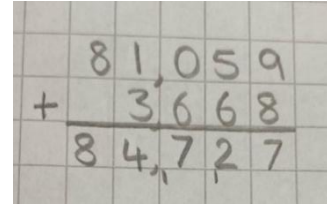
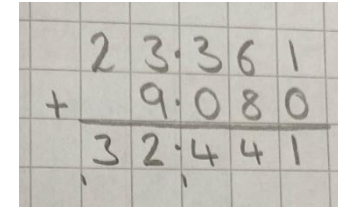
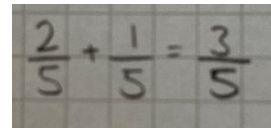


Adding negative numbers



Adding fractions with the same denominator

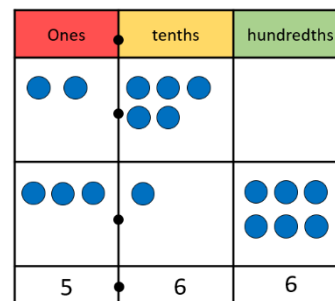


| Year 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Concrete | Pictorial                                                                                                                                                                                                                                                                            | Abstract                                                                                                                                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>To count forwards with positive and negative whole numbers, including through zero</li> <li>To add numbers mentally with increasingly large numbers</li> <li>To add whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</li> <li>To add fractions with the same denominator and multiples of the same number</li> <li>To use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling.</li> </ul> |          | <p>Large numbers addition with exchanging</p>  <p>Adding decimals with the same number of decimal places</p>  | <p>Adding larger numbers</p>  <p>Adding decimals</p>  <p>Adding fractions with the same denominator</p>  |
| Vocabulary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                    |

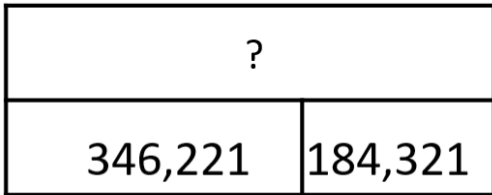
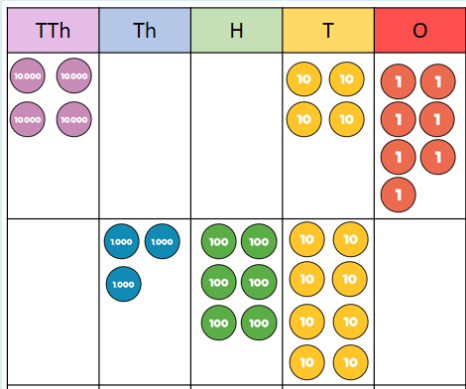
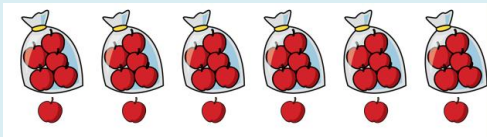
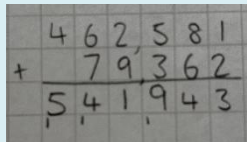
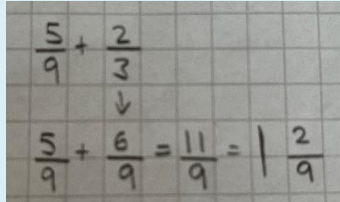
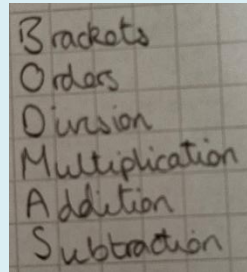
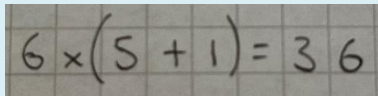
- Addition
- Add
- More
- Make
- Sum
- Total
- Altogether
- Regrouping
- Exchanging
- Decimal point

Adding decimals with a different number of decimal places

$$2.5 + 3.16 =$$



+

| Year 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Concrete | Pictorial                                                                                                                                                                                                                                                                                                                | Abstract                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <ul style="list-style-type: none"> <li>To perform mental calculations, including with mixed operations and large numbers</li> <li>To use their knowledge of the order of operations to carry out calculations involving the four operations</li> <li>To use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy</li> <li>To solve addition multi-step problems in contexts</li> <li>To explore the order of operations using brackets</li> <li>To add fractions with different denominators and mixed numbers, using the concept of equivalent fractions</li> </ul> |          | <p>Bar model</p>  <p>Adding large numbers</p>  <p>BODMAS</p>  | <p>Adding larger numbers</p>  <p>Adding fractions where one denominator is a factor of the other</p>  <p>BODMAS</p>   |
| Vocabulary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>Addition</li> <li>Add</li> <li>More</li> <li>Make</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

- |                                                                                                                                                                                                                                |  |  |  |
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| <ul style="list-style-type: none"><li>• <i>Sum</i></li><li>• <i>Total</i></li><li>• <i>Altogether</i></li><li>• <i>Regrouping</i></li><li>• <i>Exchanging</i></li><li>• <i>Decimal point</i></li><li>• <i>BODMAS</i></li></ul> |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|

# Subtraction

## EYFS

### Objectives

- Subtraction involves removing items from a group or counting back
- To know the number bonds up to 10
- Can count on or back to find the answer when adding or subtracting.
- They can solve subtraction problems for numbers to 20 using practical apparatus.

### Vocabulary

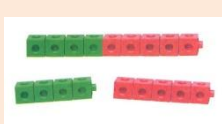
- Number
- Less
- Take away

### Concrete

Use toys and general classroom resources for children to physically manipulate.

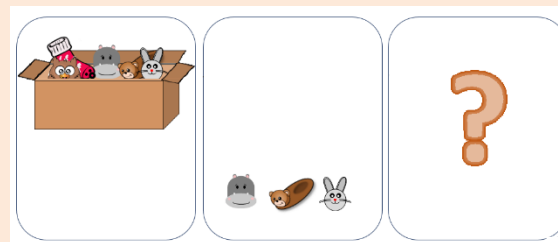


Use specific maths resources such as counters, connecting cubes, Numicon etc.



### Pictorial

Subtracting



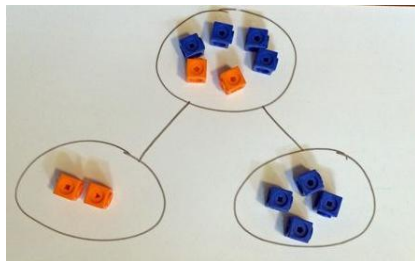
Year 1

**Objectives**

- To know that subtraction means taking away to find how many are left.
- To know the mathematical symbols for subtraction (-) and equals (=) signs
- To know that subtracting a zero has no effect on the answer
- To know different terminology for subtractions such as take away, distance between, difference between and less than
- To use number bonds and related subtraction facts within 20
- To subtract one-digit and two-digit numbers to 20, including zero
- To read, write and interpret mathematical statements involving the subtraction (-) and equals (=) signs
- To solve one-step problems that involve subtraction, using concrete objects and pictorial

**Concrete**

Part whole model

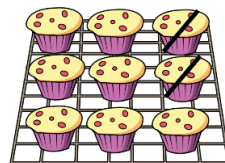


Tens frame



**Pictorial**

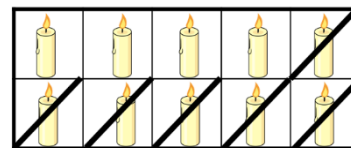
Subtraction by crossing out – how many left?



First there were 9 cupcakes.

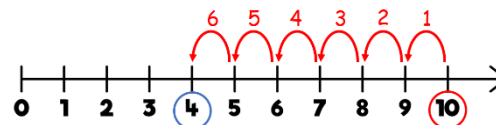
Then Chase ate 2 cupcakes.

Now there are 7 cupcakes.

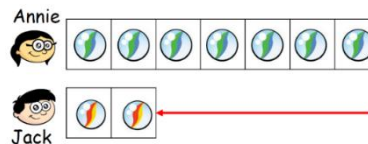


Subtraction by counting back

How many more to make 10? (link with addition)

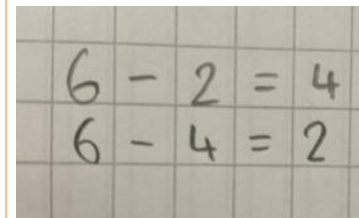


Finding the difference



**Abstract**

Subtract 1-digit numbers

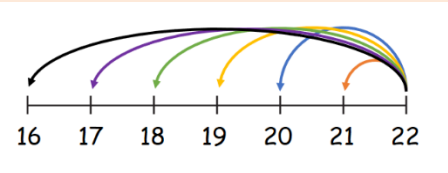
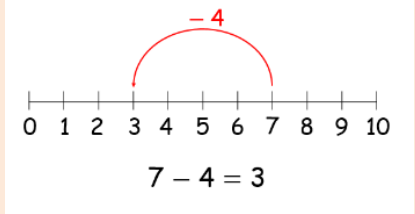
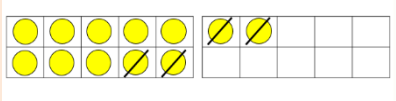
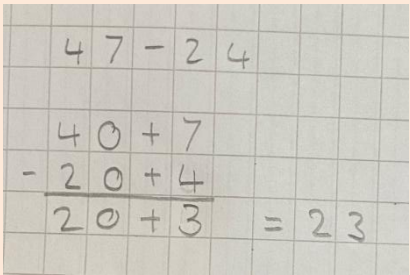


We also teach that calculations represented as  $6 = 4 - 2$  will lead to the same answer.

representations, and  
missing number problems  
such as  $7 = \square - 9$

### **Vocabulary**

- Subtraction
- Take away
- Difference between
- Less
- Less than
- Fewer
- Fewer than
- Minus

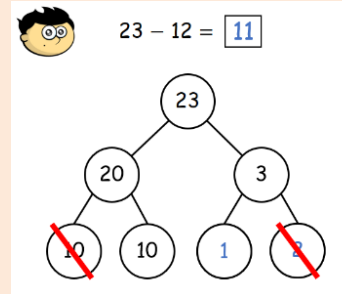
| Year 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Concrete                                                                                                   | Pictorial                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Abstract                                                                                                               |
| <ul style="list-style-type: none"> <li>To know and recall addition subtraction facts to 20 fluently</li> <li>To know that subtraction is not commutative</li> <li>To know that there is a relationship between subtraction and we call this the inverse</li> <li>To know that when we subtract using columns, the place value of digits need to be lined up</li> <li>To use subtraction facts to 20 to derive related facts up to 100</li> <li>To subtract numbers using concrete To show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot</li> <li>To use the inverse relationship between addition and subtraction to check calculations and solve missing number problems.</li> </ul> | <p>Subtracting cubes</p>  | <p>Subtracting ones</p>   <p>Subtracting across tens</p>   <p>Subtracting a two digit number from a two digit number</p> | <p>Subtraction by partitioning</p>  |

- To solve problems with addition and subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- To apply their increasing knowledge of mental and written methods
- To record subtraction in columns

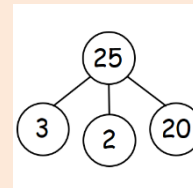
#### Vocabulary

- Subtraction
- Take away
- Difference between
- Less
- Less than
- Fewer
- Fewer than
- Minus
- Count backwards

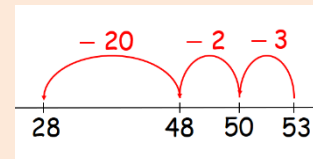
#### Part-whole model



#### Partitioning for subtraction



#### Using a number line



### Year 3

#### Objectives

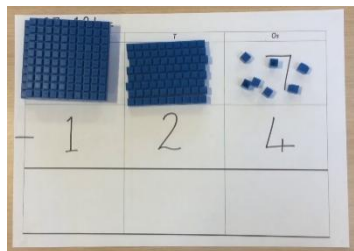
- To know the formal written methods of columnar subtraction
- To subtract numbers mentally, including:
  - a three-digit number and ones
  - a three-digit number and tens
  - a three-digit number and hundreds
- To subtract numbers with up to three digits, using formal written methods of columnar subtraction

#### Vocabulary

- Hundreds
- Thousands
- Less
- Less than
- Fewer
- Fewer than
- Take away
- Subtract
- Column
- Count on
- Partition

#### Concrete

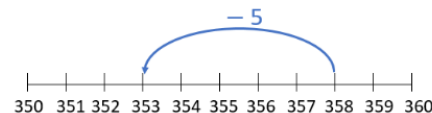
Using base 10 resources in formal column method



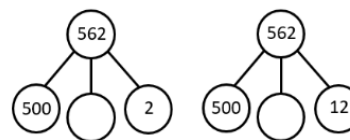
#### Pictorial

Using number lines for subtraction

$$358 - 5 = 353$$



Part-whole models

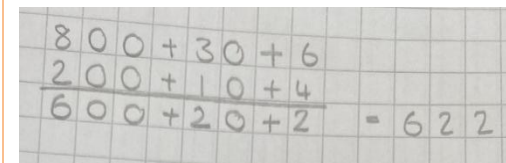


Place value chart for subtraction

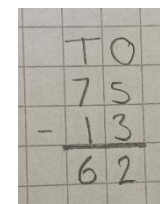
| Hundreds | Tens | Ones |
|----------|------|------|
|          |      |      |

#### Abstract

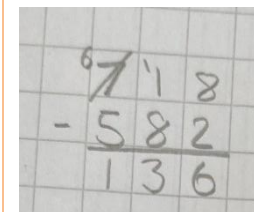
Subtraction with partitioning



Formal standard written method



Formal written method with exchanging



## Year 4

### Objectives

- To find 1000 more or less than a given number
- To count backwards through zero to include negative numbers
- To subtract numbers with up to 4 digits using the formal written methods of columnar subtraction where appropriate
- To estimate and use inverse operations to check answers to a calculation
- To solve subtraction two-step problems in contexts, deciding which operations and methods to use and why
- To subtract fractions with the same denominator

### Vocabulary

- Less than /Fewer than
- Subtract
- Column
- Count on
- Partition
- Exchanging
- Decimal

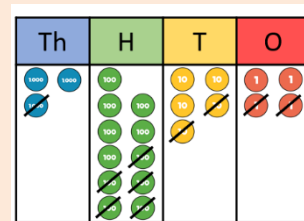
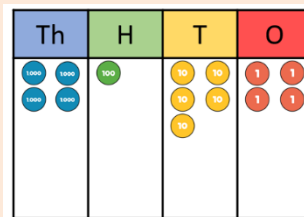
### Concrete

Place value chart with counters for subtraction

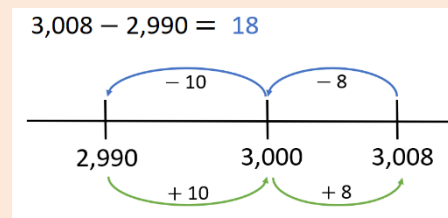


### Pictorial

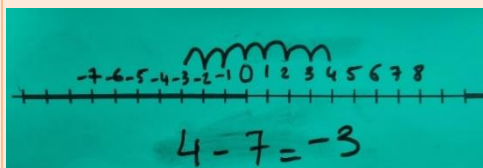
Subtracting with exchanging



Counting on or counting back

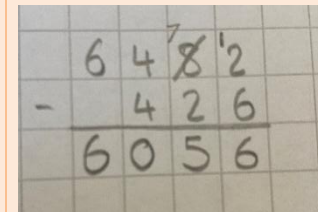


Subtracting negative numbers

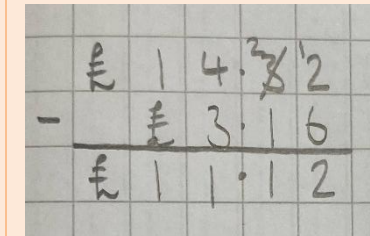


### Abstract

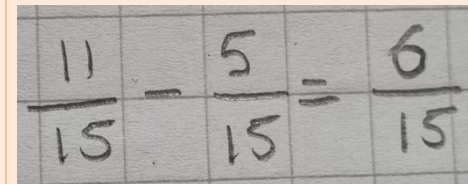
Formal written method

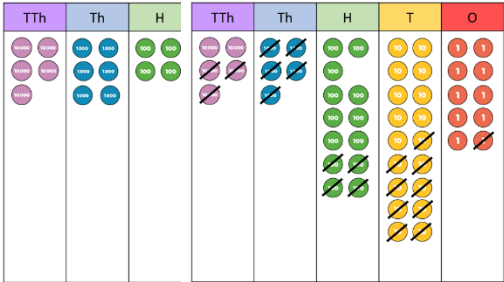
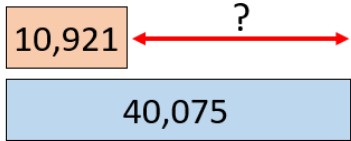
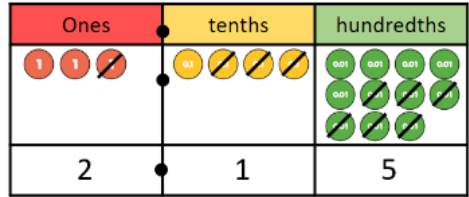
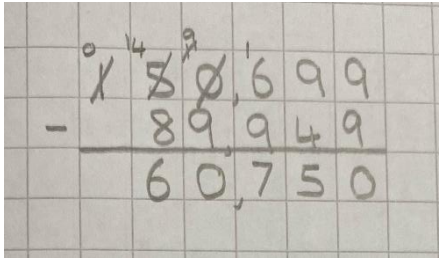
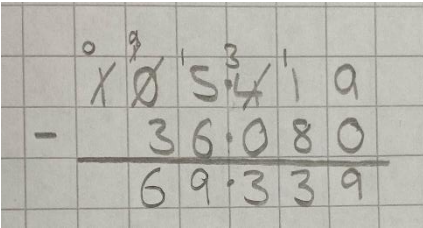
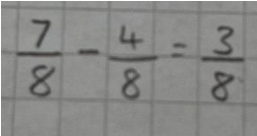


Subtraction with decimals - money

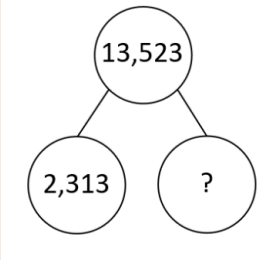
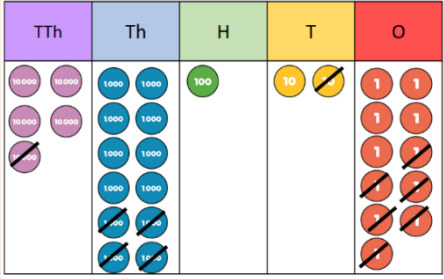
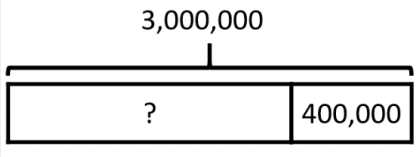
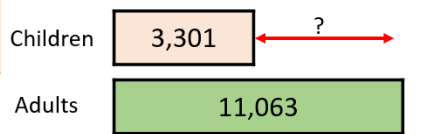
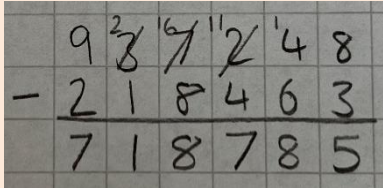
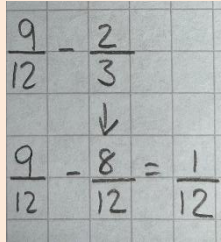
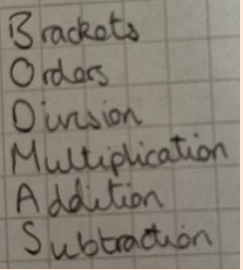


Subtracting fractions with the same denominator



| Year 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Concrete | Pictorial                                                                                                                                                                                                                                                                                                                                                                                                                                | Abstract                                                                                                                                                                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>To count backwards with positive and negative whole numbers, including through zero</li> <li>To subtract numbers mentally with increasingly large numbers</li> <li>To subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction)</li> <li>To use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy</li> <li>To solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why</li> <li>To subtract fractions with the same denominator and multiples of the same number</li> </ul> |          | <p>Subtraction with exchanging</p>  <p>Visualising subtraction</p>  <p>Subtracting decimals with the same number of decimal places.<br/> <math>3.51 - 1.36 = 2.15</math></p>  | <p>Subtracting larger numbers</p>  <p>Subtracting decimals</p>  <p>Subtracting fractions with the same denominator</p>  |
| Vocabulary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>Hundreds</li> <li>Thousands</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                   |

| Ones | tenths | hundredths |
|------|--------|------------|
|      |        |            |
| 4    | 9      | 3          |

| Year 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Concrete | Pictorial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Abstract                                                                                                                                                                                                                                                                                                                                                                                 |
| <ul style="list-style-type: none"> <li>To subtract numbers mentally with increasingly large numbers</li> <li>To subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction)</li> <li>To use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy</li> <li>To solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why</li> <li>To subtract fractions with the same denominator and multiples of the same number</li> <li>To know the order of operations (BODMAS) to carry out calculations involving the four operations</li> <li>To perform mental calculations, including with</li> </ul> |          | <p>Part whole model</p>  <p>Subtracting large numbers with exchanging</p>  <p>Bar model subtractions</p>  <p>Finding the difference</p>  <p> <math>8 - 3 \times 2 = 2</math> </p> | <p>Subtracting larger numbers</p>  <p>Subtracting fractions where one denominator is a factor of the other</p>  <p>BODMAS</p>  |

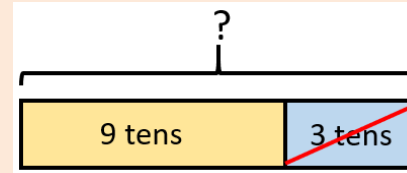
*mixed operations and large numbers*

- To use their knowledge of the order of operations to carry out calculations involving the four operations
- To use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
- To solve subtraction multi-step problems in contexts
- To subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions

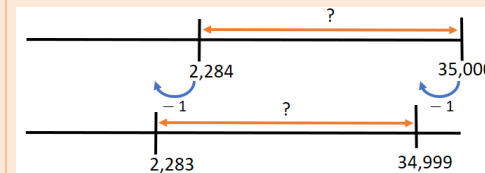
#### **Vocabulary**

- Less / Less than
- Fewer/ Fewer than
- Take away
- Subtract
- Column
- Count on
- Partition
- Exchanging
- Decimal
- BODMAS

Finding missing numbers



Number line for subtraction



# Multiplication

## EYFS

### Objectives

- Doubling involves combining two equal groups
- They can double numbers to 10.
- Can solve simple problems using apparatus that involve doubling

### Vocabulary

- Double
- Groups

### Concrete

Doubling one - eyes



Doubling with fingers



Use toys and general classroom resources for children to physically manipulate.

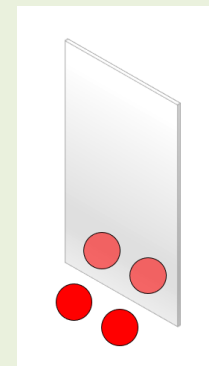
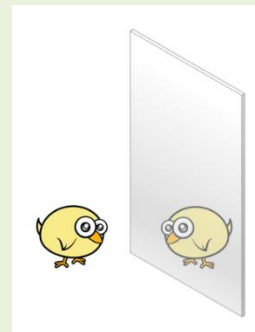


Use specific maths resources such as counters, connecting cubes, Numicon etc.



### Pictorial

Doubling



## Year 1

### Objectives

- To know that even numbers are numbers ending in 2,4,6,8 and 0
- To know that odd numbers are numbers ending in 1,3,5,7 and 9
- To know the twos, fives and ten times tables
- To know that multiplication is repeated addition
- To count in multiples of twos, fives and tens
- To solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher

### Vocabulary

- Even
- Odd
- Twos, Fives, Tens
- Times
- Multiply
- Groups of
- Lots of
- Array

### Concrete

Counting in multiples



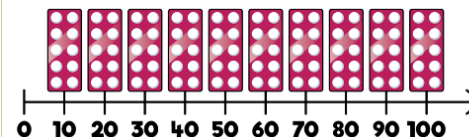
Repeated addition



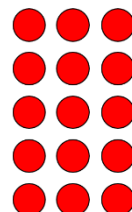
### Pictorial

Counting in 10s

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



Using arrays



### Abstract

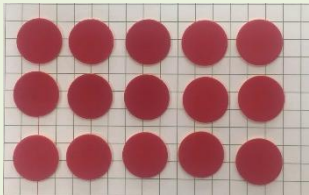
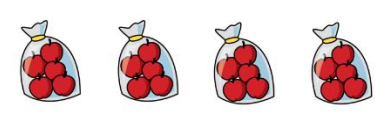
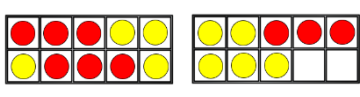
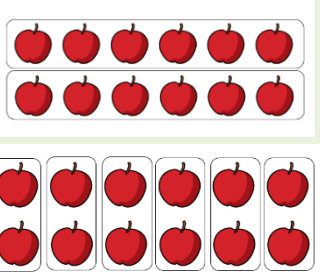
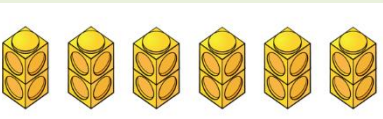
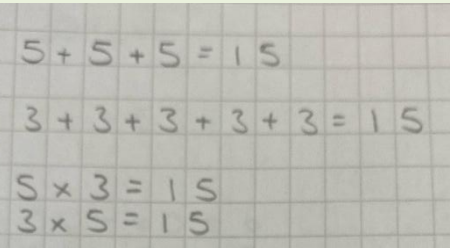
Repeated addition

$$2 + 2 + 2 = 6$$

Counting in twos

$$2, 4, 6, 8, 10$$

Year 2

| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Concrete                                                                                                                                                                                                                                                   | Pictorial                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Abstract                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>To recall multiplication facts for the two, five and ten multiplication tables, including recognising odd and even numbers</li> <li>To know that multiplication of two numbers can be done in any order (commutative)</li> <li>To know the multiplication (<math>\times</math>)</li> <li>To know that an array is an arrangement of objects, numbers or pictures in equal columns or rows</li> <li>To know that multiplication are the inverse of each other (for example, <math>4 \times 5 = 20</math> and <math>20 \div 5 = 4</math>)</li> <li>To use multiplication facts for the 2, 5 and 10 multiplication tables</li> <li>To show that multiplication of two numbers can be done in any order (commutative)</li> <li>To calculate mathematical statements for multiplication within the</li> </ul> | <p>Counters for arrays</p>  <p>Counters to show that multiplication is commutative</p>  | <p>Groups of</p>  <p>Counting in groups</p>  <p>Arrays</p>  <p>Multiplying by 2</p>  <p>Multiplying by 5</p> | <p>Repeated addition</p>  |

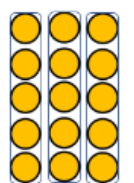
*multiplication tables and write them using the multiplication ( $\times$ ), and equals (=) signs*

- To solve problems involving multiplication, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts*

- To connect the 5 multiplication table to the divisions on the clock face*
- To relate multiplication to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition*

#### **Vocabulary**

- Lots of*
- Groups of*
- Times*
- Multiply*
- Multiplied by multiple of*
- Repeated addition*
- Array*
- Row*
- Column*
- Commutative*



Multiplying by 10 – repeated addition

|    |    |    |
|----|----|----|
| 30 |    |    |
| 10 | 10 | 10 |

### Year 3

#### Objectives

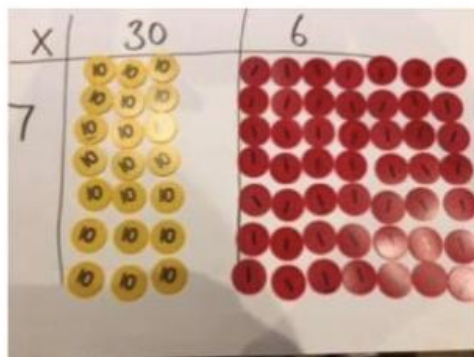
- To recall multiplication facts for the 3, 4 and 8 multiplication tables
- To know the formal written method for multiplication
- To use multiplication facts for the 3, 4 and 8 multiplication tables
- To write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- To solve problems, including missing number problems, involving multiplication

#### Vocabulary

- Multiply
- Repeated addition
- Product
- Equation
- Inverse
- Commutative

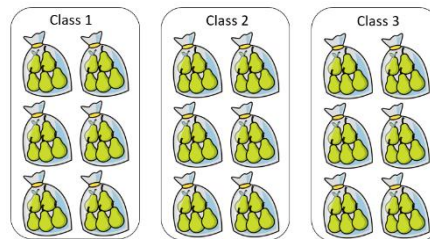
#### Concrete

Place value counters



#### Pictorial

Arrays



Place value chart to support formal written method

$$3 \times 31$$

| T | O |
|---|---|
|   |   |
|   |   |
|   |   |

|   | T | O |
|---|---|---|
|   | 3 | 1 |
| x | 3 |   |
|   | 9 | 3 |

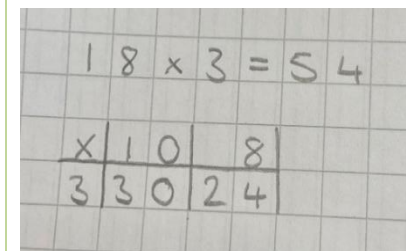
Partitioning

$$\begin{array}{c}
 24 \\
 \swarrow \quad \searrow \\
 20 \quad 4
 \end{array}$$

$4 \times 20 = 80$      $4 \times 4 = 16$      $4 \times 24 = 96$   
 There are 96 rolls in total.

#### Abstract

Multiplication with partitioning



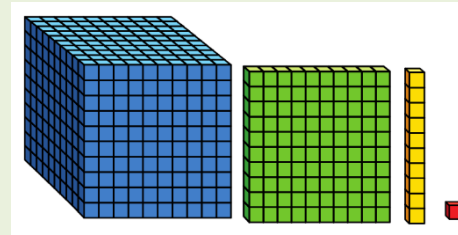
## Objectives

- To recall multiplication facts for multiplication tables up to  $12 \times 12$  including the six, seven and nine times tables
- To know that commutativity is when 2 numbers can be added or multiplied & the same answer will be found no matter what order they are in
- To know the formal written method for multiplication
- To know that when you multiply by zero, the answer is zero
- To know that multiplying a number by a group of numbers is the same as doing each multiplication separately (distributed law)
- To use place value, known and derived facts to multiply and divide mentally, including multiplying by 0 and 1;

## Multiplication square

| ×  | 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 |

## Getting ten times bigger



## Multiplying by 10

| Th | H | T   | O          |
|----|---|-----|------------|
|    |   | ● ● | ● ●<br>● ● |

10 times the size      10 times the size      10 times the size

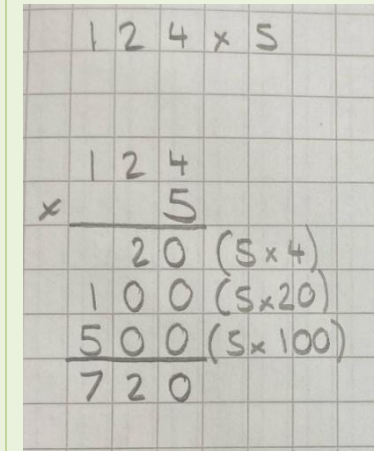
$24 \times 10 =$

| Th | H   | T          | O |
|----|-----|------------|---|
|    | ● ● | ● ●<br>● ● |   |

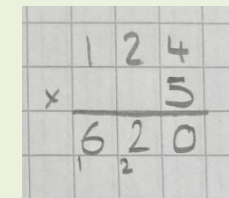
10 times the size      10 times the size      10 times the size

$$24 \times 10 = 240$$

## Expanded written method



## Formal written method



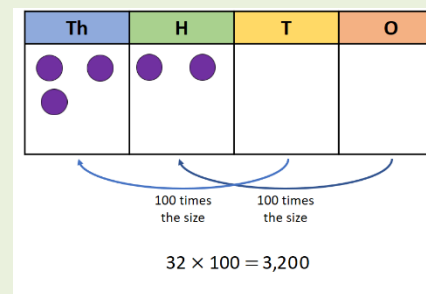
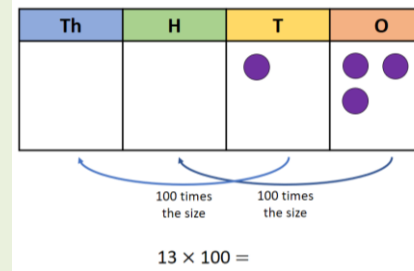
dividing by 1; multiplying together three numbers

- To use factor pairs and commutativity in mental calculations
- To multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- To estimate and use inverse operations to check answers to a calculation
- Use mental methods and extend this to three-digit numbers to derive facts, (for e.g.  $600 \div 3 = 200$  can be derived from  $2 \times 3 = 6$ )
- To use knowledge of number facts and rules of arithmetic to solve mental and written calculations e.g.  $2 \times 6 \times 5 = 10 \times 6 = 60$

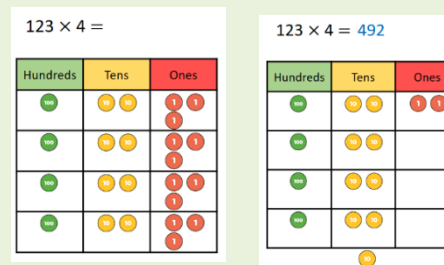
#### Vocabulary

- Groups of
- Lots of
- Factor
- Multiple
- Distributive
- Repeated addition
- Array

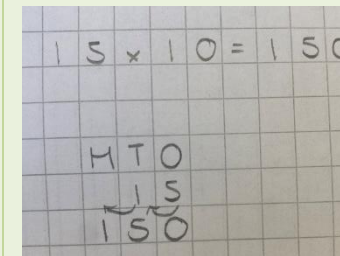
#### Multiplying by 100



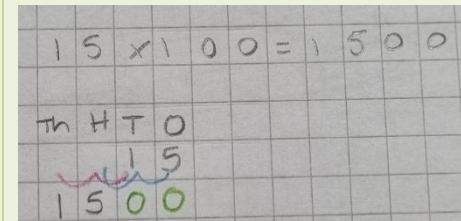
#### Multiplying 3-digits by 1-digit

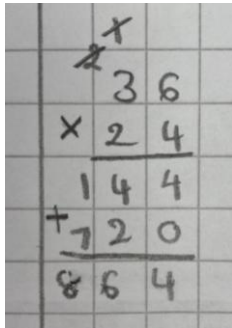
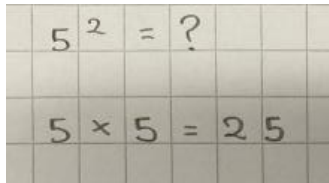
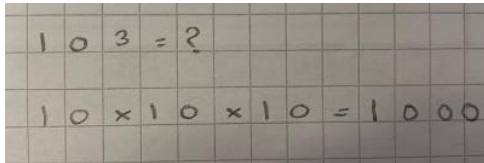


#### Multiplying by 10



#### Multiplying by 100



| Year 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |   |   |   |  |  |   |   |    |   |   |   |  |   |   |   |    |   |   |   |   |   |   |   |     |    |   |   |   |   |   |   |   |   |   |    |   |    |     |    |   |    |   |                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---|---|---|--|--|---|---|----|---|---|---|--|---|---|---|----|---|---|---|---|---|---|---|-----|----|---|---|---|---|---|---|---|---|---|----|---|----|-----|----|---|----|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Concrete                                                                                                                                 | Pictorial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Abstract |   |   |   |  |  |   |   |    |   |   |   |  |   |   |   |    |   |   |   |   |   |   |   |     |    |   |   |   |   |   |   |   |   |   |    |   |    |     |    |   |    |   |                                                                                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"><li>To count forwards in steps of powers of 10 for any given number up to 1000 000</li><li>To know the formal written method of long multiplication</li><li>To know that factors are numbers that divide exactly into another number.</li><li>To know that a multiple is the product result of one number multiplied by another number.</li><li>To know that prime numbers are numbers which only have two factors</li><li>To recall prime numbers up to 19</li><li>To know that squaring a number means multiplying it by itself and it is notated as ( )<sup>2</sup></li><li>To know that cubing a number is multiplying it by itself three times it is notated as ( )<sup>3</sup></li></ul> | <p>100 square with counters to find prime numbers</p>  | <p>Multiplying by 10, 100 &amp; 1000</p> <table><tr><th>Th</th><th>H</th><th>T</th><th>O</th></tr><tr><td></td><td></td><td>7</td><td>8</td></tr></table><br><table><tr><th>Th</th><th>H</th><th>T</th><th>O</th></tr><tr><td></td><td>7</td><td>8</td><td>0</td></tr></table><br><table><tr><th>Th</th><th>H</th><th>T</th><th>O</th></tr><tr><td>7</td><td>8</td><td>0</td><td>0</td></tr></table><br><table><tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr><tr><td>7</td><td>8</td><td>0</td><td>0</td><td>0</td></tr></table><br><p>Multiplying 2-digits by 2-digits</p> <p>23 × 31</p> <table><tr><th>×</th><th>20</th><th>3</th></tr><tr><th>30</th><td>600</td><td>90</td></tr><tr><th>1</th><td>20</td><td>3</td></tr></table><br><p>600 + 90 + 20 + 3 = 713</p> | Th       | H | T | O |  |  | 7 | 8 | Th | H | T | O |  | 7 | 8 | 0 | Th | H | T | O | 7 | 8 | 0 | 0 | TTh | Th | H | T | O | 7 | 8 | 0 | 0 | 0 | × | 20 | 3 | 30 | 600 | 90 | 1 | 20 | 3 | <p>Multiplying 2-digits by 2-digits</p> <br><p>Square numbers</p> <br><p>Cube numbers</p>  |
| Th                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | H                                                                                                                                        | T                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | O        |   |   |   |  |  |   |   |    |   |   |   |  |   |   |   |    |   |   |   |   |   |   |   |     |    |   |   |   |   |   |   |   |   |   |    |   |    |     |    |   |    |   |                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                          | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 8        |   |   |   |  |  |   |   |    |   |   |   |  |   |   |   |    |   |   |   |   |   |   |   |     |    |   |   |   |   |   |   |   |   |   |    |   |    |     |    |   |    |   |                                                                                                                                                                                                                                                                                                                                                      |
| Th                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | H                                                                                                                                        | T                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | O        |   |   |   |  |  |   |   |    |   |   |   |  |   |   |   |    |   |   |   |   |   |   |   |     |    |   |   |   |   |   |   |   |   |   |    |   |    |     |    |   |    |   |                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 7                                                                                                                                        | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0        |   |   |   |  |  |   |   |    |   |   |   |  |   |   |   |    |   |   |   |   |   |   |   |     |    |   |   |   |   |   |   |   |   |   |    |   |    |     |    |   |    |   |                                                                                                                                                                                                                                                                                                                                                      |
| Th                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | H                                                                                                                                        | T                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | O        |   |   |   |  |  |   |   |    |   |   |   |  |   |   |   |    |   |   |   |   |   |   |   |     |    |   |   |   |   |   |   |   |   |   |    |   |    |     |    |   |    |   |                                                                                                                                                                                                                                                                                                                                                      |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 8                                                                                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0        |   |   |   |  |  |   |   |    |   |   |   |  |   |   |   |    |   |   |   |   |   |   |   |     |    |   |   |   |   |   |   |   |   |   |    |   |    |     |    |   |    |   |                                                                                                                                                                                                                                                                                                                                                      |
| TTh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Th                                                                                                                                       | H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | T        | O |   |   |  |  |   |   |    |   |   |   |  |   |   |   |    |   |   |   |   |   |   |   |     |    |   |   |   |   |   |   |   |   |   |    |   |    |     |    |   |    |   |                                                                                                                                                                                                                                                                                                                                                      |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 8                                                                                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0        | 0 |   |   |  |  |   |   |    |   |   |   |  |   |   |   |    |   |   |   |   |   |   |   |     |    |   |   |   |   |   |   |   |   |   |    |   |    |     |    |   |    |   |                                                                                                                                                                                                                                                                                                                                                      |
| ×                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20                                                                                                                                       | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |   |   |   |  |  |   |   |    |   |   |   |  |   |   |   |    |   |   |   |   |   |   |   |     |    |   |   |   |   |   |   |   |   |   |    |   |    |     |    |   |    |   |                                                                                                                                                                                                                                                                                                                                                      |
| 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 600                                                                                                                                      | 90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |   |   |   |  |  |   |   |    |   |   |   |  |   |   |   |    |   |   |   |   |   |   |   |     |    |   |   |   |   |   |   |   |   |   |    |   |    |     |    |   |    |   |                                                                                                                                                                                                                                                                                                                                                      |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20                                                                                                                                       | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |   |   |   |  |  |   |   |    |   |   |   |  |   |   |   |    |   |   |   |   |   |   |   |     |    |   |   |   |   |   |   |   |   |   |    |   |    |     |    |   |    |   |                                                                                                                                                                                                                                                                                                                                                      |

- To multiply numbers mentally drawing upon known facts
- To multiply whole numbers and those involving decimals by 10, 100 and 1000
- To 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
- To identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.
- To establish whether a number up to 100 is prime and
- To work out square numbers and cube numbers
- To solve problems involving multiplication including using their knowledge of factors and multiples, squares and cubes

### Multiplying 4-digits by 2-digits

$$2,313 \times 32 =$$

| ×  | 2,000  | 300   | 10  | 3  |
|----|--------|-------|-----|----|
| 30 | 60,000 | 9,000 | 300 | 90 |
| 2  | 4,000  | 600   | 20  | 6  |

$$60,000 + 9,000 + 4,000 + 600 + 300 + 90 + 20 + 6 =$$

### Multiplying fractions with whole numbers

$$\frac{4}{5} \times 3 = ?$$

$$\frac{4}{5} \times \frac{3}{1} = \frac{12}{5} = 2\frac{2}{5}$$

Answer:  $2\frac{2}{5}$

- To solve problems involving multiplication including scaling by simple fractions and problems involving simple rates
- To multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams

#### **Vocabulary**

- Factor
- Multiple
- Square number
- Prime number
- Repeated addition
- Inverse
- Factor pairs
- Composite numbers
- Prime number
- Squared
- Cubed

## Year 6

### Objectives

- To know the order of operations (BODMAS) to carry out calculations involving the four operations
- To know that orders show how many times a number or letter has been multiplied by itself
- To perform mental calculations, including with mixed operations and large numbers
- To explore the order of operations using brackets
- To multiply and divide numbers mentally drawing upon known facts
- To multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- To multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

### Concrete

Multilink cubes to investigate square numbers:



Multilink cubes to investigate cube numbers



### Pictorial

Repeated addition

| Thousands | Hundreds | Tens  | Ones  |
|-----------|----------|-------|-------|
| 1000 1000 | 100      | 10 10 | 1 1 1 |
| 1000 1000 | 100      | 10 10 | 1 1 1 |
| 1000 1000 | 100      | 10 10 | 1 1 1 |

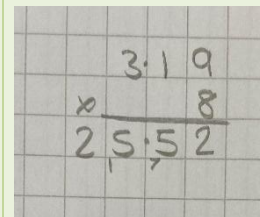
Multiplying two digits by two digits.

$$13 \times 13 =$$

|                |                     |                |
|----------------|---------------------|----------------|
| ×              | 10 10 10 10 10      | 1 1 1          |
| 10 10 10 10 10 | 100 100 100 100 100 | 10 10 10 10 10 |
| 1 1 1          | 10 10 10            | 1 1 1          |

### Abstract

Formal written method for multiplying decimals



Multiplication square

|    |     |    |
|----|-----|----|
| ×  | 10  | 3  |
| 10 | 100 | 30 |
| 3  | 30  | 9  |

- To identify common factors, common multiples and prime numbers
- To use their knowledge of the order of operations to carry out calculations involving the four operations
- To use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
- To multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g.  $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ )
- To multiply one-digit numbers with up to two decimal places by whole numbers
- To multiply one-digit numbers with up to two decimal places by whole numbers
- To multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
- To multiply and divide numbers with up to two

Multiplying by 10, 100 and 1000.

|      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|
| 100  | 200  | 300  | 400  | 500  | 600  | 700  | 800  | 900  |
| 10   | 20   | 30   | 40   | 50   | 60   | 70   | 80   | 90   |
| 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    |
| 0.1  | 0.2  | 0.3  | 0.4  | 0.5  | 0.6  | 0.7  | 0.8  | 0.9  |
| 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |

3.12 × 10 =

| Th | H | T | O   | • | tth | hth |
|----|---|---|-----|---|-----|-----|
|    |   |   | ••• | • | ••  | ••  |
|    |   |   | •   |   |     |     |
|    |   |   | 3   | • | 1   | 2   |

*decimal places by one-digit and two-digit whole numbers*

- *To multiply decimals by whole numbers, starting with the simplest cases, such as  $0.4 \times 2 = 0.8$ , and in practical contexts, such as measures and money*

#### **Vocabulary**

- *Factor*
- *Multiple*
- *Square number*
- *Prime number*
- *Repeated addition*
- *Inverse*
- *Factor pairs*
- *Composite numbers*
- *Prime number*
- *Squared*
- *Cubed*
- *Prime factor*
- *Discount*
- *Profit*
- *BODMAS*

# Division

## EYFS

### Objectives

- Halving involves splitting something into two equal groups or pieces
- Sharing mathematically involves being fair and giving an equal amount to each group
- They can halve numbers to 20.
- Can solve simple problems using apparatus that involve halving
- They can share out an amount in a fair, mathematical way.

### Vocabulary

- Half
- Share
- Fair

### Concrete

Physical items halved

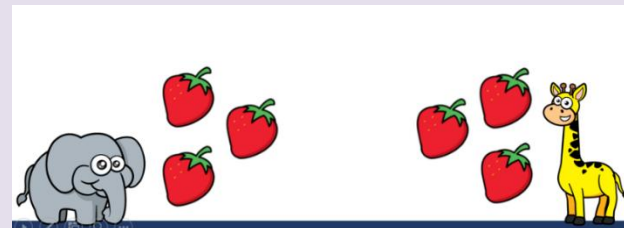
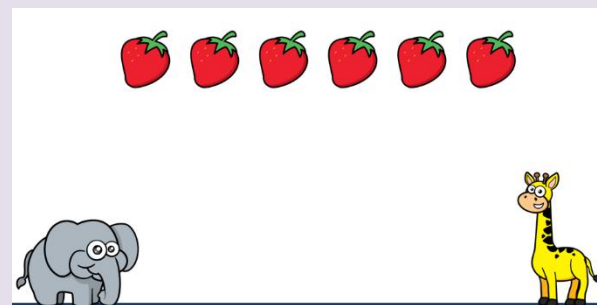


Sharing physical objects

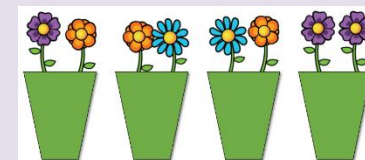


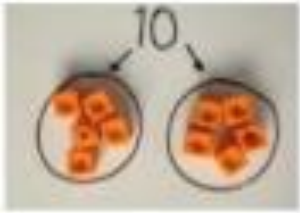
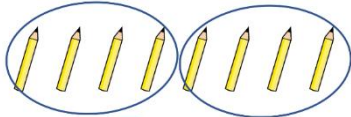
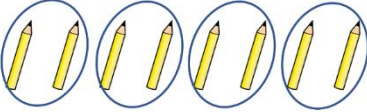
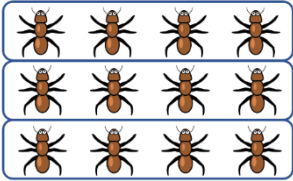
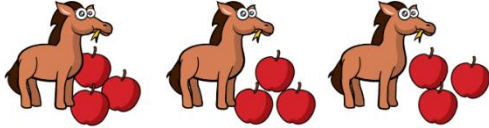
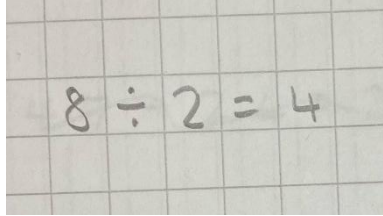
### Pictorial

Sharing



Grouping

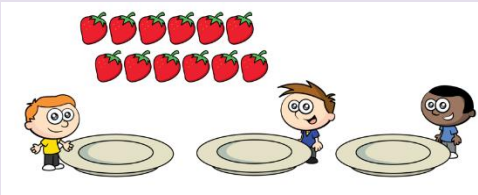
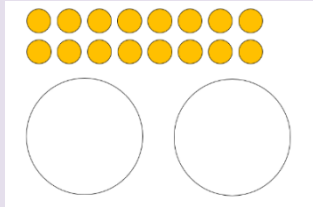
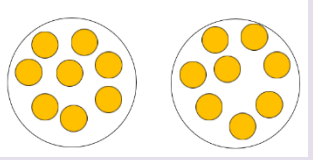
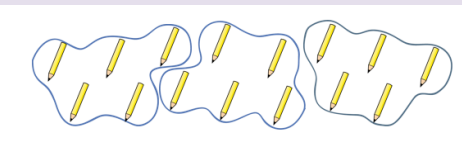
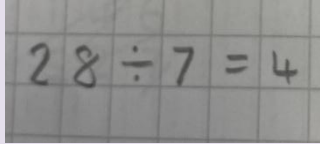


| Year 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Concrete                                                                                                         | Pictorial                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Abstract                                                                                                         |
| <ul style="list-style-type: none"> <li>To know that division is breaking a number up into equal parts, and finding out how many equal parts can be made</li> <li>To know different terminology for division such as sharing, grouping</li> <li>To know that a half is one of two equal parts of an object, shape or quantity</li> <li>To know that a quarter is one of four equal parts of an object, shape or quantity</li> <li>To know that a fractions is splitting a whole (number/shape etc) into parts</li> <li>To solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher</li> <li>To find and name quarter of an object, shape or quantity</li> </ul> | <p>Share into equal groups</p>  | <p>Making equal groups</p>    <p>Sharing</p>  <p>9 apples shared equally between 3 horses is <input type="text"/></p> | <p>Notation for division</p>  |

- To find half a length, quantity, set of objects or shape

#### **Vocabulary**

- Groups
- Share
- Equal
- Half
- Quarter
- Array

| Year 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Concrete | Pictorial                                                                                                                                                                                                                                                                                                                                                                        | Abstract                                                                                                              |
| <ul style="list-style-type: none"> <li>To recall and division facts for the two, five and ten multiplication tables, including recognising odd and even numbers</li> <li>To know that division is not commutative</li> <li>To know that an array is an arrangement of objects, numbers or pictures in equal columns or rows</li> <li>To know that division are the inverse of each other (for example, <math>4 \times 5 = 20</math> and <math>20 \div 5 = 4</math>)</li> <li>To know that a fractions is splitting a whole (number/shape etc.) into parts</li> <li>To use division facts for the 2, 5 and 10 multiplication tables</li> <li>To show that of two numbers can be done in any order (commutative) and division of one number by another cannot</li> <li>To calculate mathematical statements for division within the multiplication</li> </ul> |          | <p>Sharing</p>    <p>Grouping</p>  | <p>Notation of division facts</p>  |

tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals ( $=$ ) signs

- To solve problems involving division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts
- To relate division to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition

#### Vocabulary

- Share
- Share equally
- Group
- Groups of
- Lots of
- Array
- Divide
- Divided by
- Divided into
- Division
- Grouping
- Left
- Left over

#### Dividing by 2



#### Dividing by 5

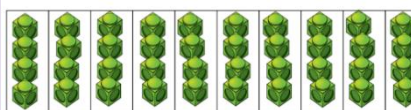
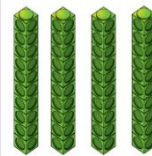
Here are 15 conkers.

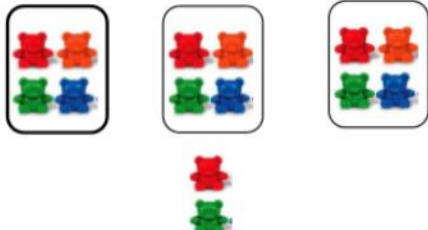
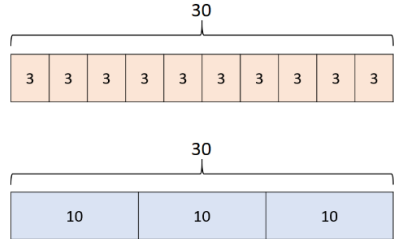
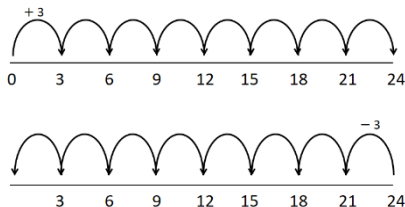
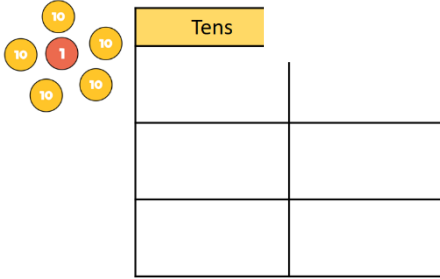
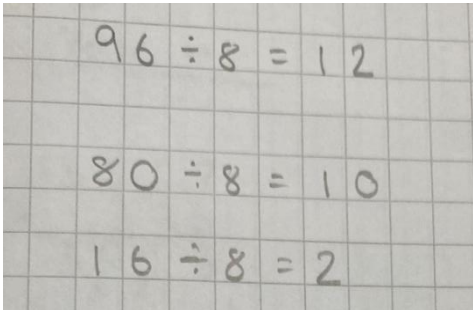
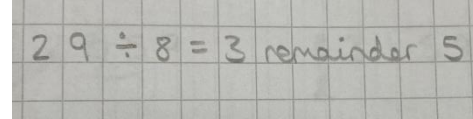


The conkers are shared into 5 equal groups.

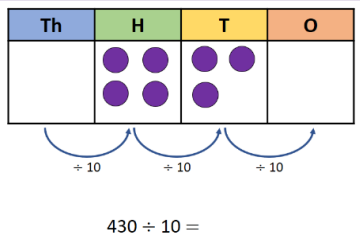
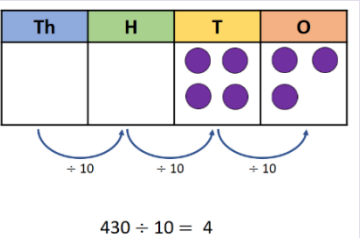
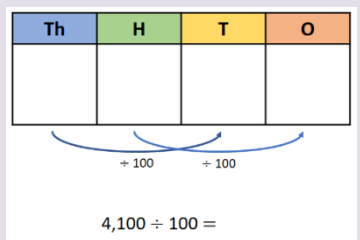
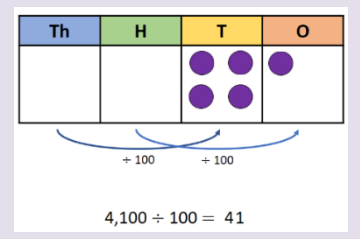
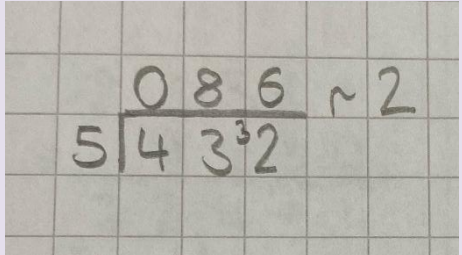
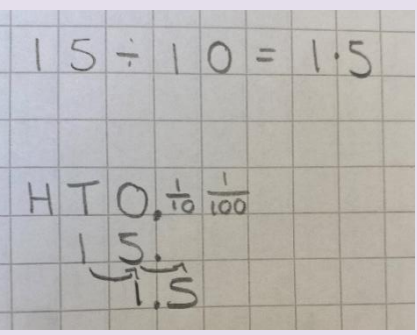
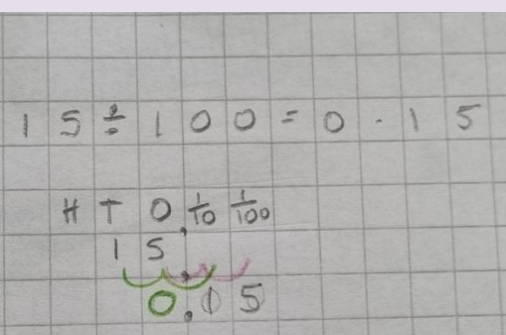


#### Dividing by 10



| Year 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Concrete                                                                                                                                                                                                                                          | Pictorial                                                                                                                                                                                                                                                                                                                                                                                                          | Abstract                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>To know that tenths arise from dividing an object into 10 equal parts and in dividing one – digit numbers or quantities by 10.</li> <li>To use division facts for the 3, 4 and 8 multiplication tables</li> <li>To 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</li> <li>To solve problems, including missing number problems, involving division</li> </ul> | <p>Arrays</p>  <p>Diving with remainders<br/><math>14 \div 3 = 4r2</math></p>  | <p>Different ways of dividing by 3/4/8 etc</p>  <p>Dividing by counting up or back</p>  <p>Dividing 2-digits by 1-digit<br/><math>51 \div 3</math></p>  | <p>Dividing with partitioning</p>  <p>Dividing with remainders</p>  |
| Vocabulary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Remainder</li> <li>Equation</li> <li>Share</li> <li>Share equally</li> <li>Group</li> <li>Groups of</li> <li>Lots of</li> </ul>                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                           |

- *Array*
- *Divide*
- *Divided by*
- *Divided into*
- *Left*
- *Left over*

| Year 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Concrete | Pictorial                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Abstract                                                                                                                                                                                                                                                                                                                                                |
| <ul style="list-style-type: none"> <li>To recall division facts for multiplication tables up to <math>12 \times 12</math> including the six, seven and nine times tables</li> <li>To know that when you divide by 1, the answer is the same</li> <li>To know the formal written method of division</li> <li>To know that hundredths arise when dividing an object by one hundred and dividing tenths by ten</li> <li>To use place value, known and derived facts to multiply and divide mentally, including multiplying by 0 and 1; dividing by 1; multiplying together three numbers</li> </ul> |          | <p>Dividing by 10</p>  <p>430 ÷ 10 = 43</p>  <p>430 ÷ 10 = 43</p> <p>Dividing by 100</p>  <p>430 ÷ 100 = 4.3</p>  <p>430 ÷ 100 = 4.3</p> | <p>Formal written method with remainders</p>  <p>Dividing by 10</p>  <p>Dividing by 100</p>  |
| Vocabulary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>Quotient</li> <li>Divisor</li> <li>Dividend</li> <li>Divisible by</li> <li>Inverse</li> <li>Remainder</li> <li>Equation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                        |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                         |

- Share
- Share equally
- Group
- Groups of
- Lots of
- Array
- Divide
- Divided by
- Divided into
- Left
- Left over

### Diving 3-digits by 2-digits

$$609 \div 3 =$$



| H | T | O |
|---|---|---|
|   |   |   |
|   |   |   |
|   |   |   |

$$609 \div 3 = 203$$

| H       | T | O     |
|---------|---|-------|
| 100 100 |   | 1 1 1 |
| 100 100 |   | 1 1 1 |
| 100 100 |   | 1 1 1 |

| Year 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                     |    |   |   |   |   |   |   |   |   |     |    |   |   |   |  |   |   |   |   |     |    |   |   |   |  |  |   |   |   |     |    |   |   |   |  |  |  |   |   |           |          |      |      |                                                                                                 |                                              |  |                                                     |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|----|---|---|---|---|---|---|---|---|-----|----|---|---|---|--|---|---|---|---|-----|----|---|---|---|--|--|---|---|---|-----|----|---|---|---|--|--|--|---|---|-----------|----------|------|------|-------------------------------------------------------------------------------------------------|----------------------------------------------|--|-----------------------------------------------------|---------------------------------------|
| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Concrete                                     | Pictorial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Abstract                                            |    |   |   |   |   |   |   |   |   |     |    |   |   |   |  |   |   |   |   |     |    |   |   |   |  |  |   |   |   |     |    |   |   |   |  |  |  |   |   |           |          |      |      |                                                                                                 |                                              |  |                                                     |                                       |
| <ul style="list-style-type: none"><li>To know the formal written method of division</li><li>To know that factors are numbers that divide exactly into another number.</li><li>To recall prime numbers up to 19</li><li>To multiply and divide numbers mentally drawing upon known facts</li><li>To multiply and divide whole numbers and those involving decimals by 10, 100 and 1000</li><li>To 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</li><li>To identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.</li><li>To establish whether a number up to 100 is prime</li></ul> |                                              | <p>Dividing by 10, 100 &amp; 1000</p> <table><tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr><tr><td>4</td><td>7</td><td>0</td><td>0</td><td>0</td></tr></table><br><table><tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr><tr><td></td><td>4</td><td>7</td><td>0</td><td>0</td></tr></table><br><table><tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr><tr><td></td><td></td><td>4</td><td>7</td><td>0</td></tr></table><br><table><tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr><tr><td></td><td></td><td></td><td>4</td><td>7</td></tr></table> <p>Dividing 4-digits by 1-digit</p> <p>9306 ÷ 3</p> <table><tr><th>Thousands</th><th>Hundreds</th><th>Tens</th><th>Ones</th></tr><tr><td><div>1000</div><div>1000</div><div>1000</div><div>1000</div><div>1000</div><div>1000</div></td><td><div>100</div><div>100</div><div>100</div></td><td></td><td><div>1</div><div>1</div><div>1</div><div>1</div></td></tr></table> | TTh                                                 | Th | H | T | O | 4 | 7 | 0 | 0 | 0 | TTh | Th | H | T | O |  | 4 | 7 | 0 | 0 | TTh | Th | H | T | O |  |  | 4 | 7 | 0 | TTh | Th | H | T | O |  |  |  | 4 | 7 | Thousands | Hundreds | Tens | Ones | <div>1000</div> <div>1000</div> <div>1000</div> <div>1000</div> <div>1000</div> <div>1000</div> | <div>100</div> <div>100</div> <div>100</div> |  | <div>1</div> <div>1</div> <div>1</div> <div>1</div> | <p>Short division with remainders</p> |
| TTh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Th                                           | H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | T                                                   | O  |   |   |   |   |   |   |   |   |     |    |   |   |   |  |   |   |   |   |     |    |   |   |   |  |  |   |   |   |     |    |   |   |   |  |  |  |   |   |           |          |      |      |                                                                                                 |                                              |  |                                                     |                                       |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 7                                            | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0                                                   | 0  |   |   |   |   |   |   |   |   |     |    |   |   |   |  |   |   |   |   |     |    |   |   |   |  |  |   |   |   |     |    |   |   |   |  |  |  |   |   |           |          |      |      |                                                                                                 |                                              |  |                                                     |                                       |
| TTh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Th                                           | H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | T                                                   | O  |   |   |   |   |   |   |   |   |     |    |   |   |   |  |   |   |   |   |     |    |   |   |   |  |  |   |   |   |     |    |   |   |   |  |  |  |   |   |           |          |      |      |                                                                                                 |                                              |  |                                                     |                                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4                                            | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0                                                   | 0  |   |   |   |   |   |   |   |   |     |    |   |   |   |  |   |   |   |   |     |    |   |   |   |  |  |   |   |   |     |    |   |   |   |  |  |  |   |   |           |          |      |      |                                                                                                 |                                              |  |                                                     |                                       |
| TTh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Th                                           | H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | T                                                   | O  |   |   |   |   |   |   |   |   |     |    |   |   |   |  |   |   |   |   |     |    |   |   |   |  |  |   |   |   |     |    |   |   |   |  |  |  |   |   |           |          |      |      |                                                                                                 |                                              |  |                                                     |                                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                              | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 7                                                   | 0  |   |   |   |   |   |   |   |   |     |    |   |   |   |  |   |   |   |   |     |    |   |   |   |  |  |   |   |   |     |    |   |   |   |  |  |  |   |   |           |          |      |      |                                                                                                 |                                              |  |                                                     |                                       |
| TTh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Th                                           | H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | T                                                   | O  |   |   |   |   |   |   |   |   |     |    |   |   |   |  |   |   |   |   |     |    |   |   |   |  |  |   |   |   |     |    |   |   |   |  |  |  |   |   |           |          |      |      |                                                                                                 |                                              |  |                                                     |                                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4                                                   | 7  |   |   |   |   |   |   |   |   |     |    |   |   |   |  |   |   |   |   |     |    |   |   |   |  |  |   |   |   |     |    |   |   |   |  |  |  |   |   |           |          |      |      |                                                                                                 |                                              |  |                                                     |                                       |
| Thousands                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Hundreds                                     | Tens                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ones                                                |    |   |   |   |   |   |   |   |   |     |    |   |   |   |  |   |   |   |   |     |    |   |   |   |  |  |   |   |   |     |    |   |   |   |  |  |  |   |   |           |          |      |      |                                                                                                 |                                              |  |                                                     |                                       |
| <div>1000</div> <div>1000</div> <div>1000</div> <div>1000</div> <div>1000</div> <div>1000</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <div>100</div> <div>100</div> <div>100</div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <div>1</div> <div>1</div> <div>1</div> <div>1</div> |    |   |   |   |   |   |   |   |   |     |    |   |   |   |  |   |   |   |   |     |    |   |   |   |  |  |   |   |   |     |    |   |   |   |  |  |  |   |   |           |          |      |      |                                                                                                 |                                              |  |                                                     |                                       |

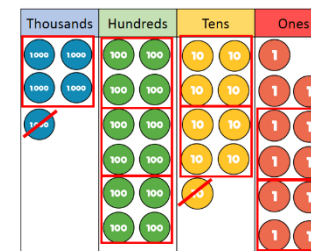
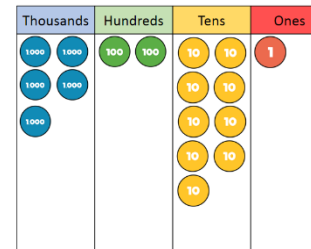
- To solve problems involving division including using their knowledge of factors and multiples, squares and cubes
- To solve problems involving division, including scaling by simple fractions and problems involving simple rates
- To interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding

#### Vocabulary

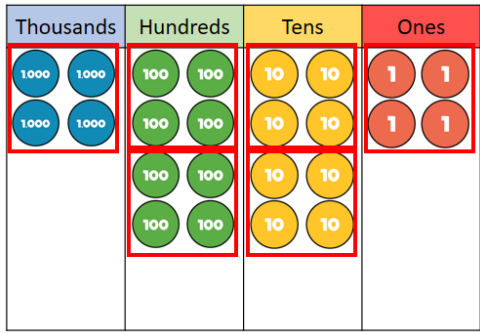
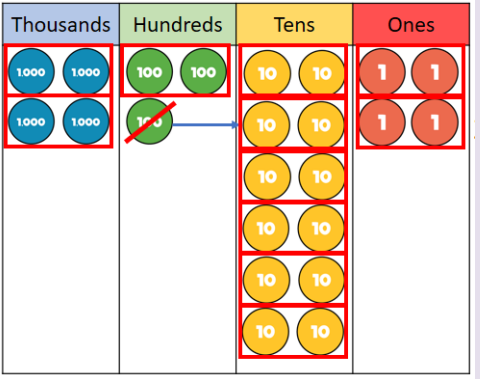
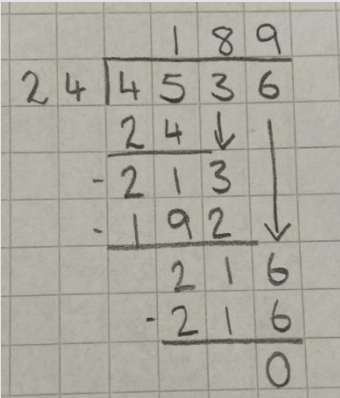
- Quotient
- Divisor
- Dividend
- Divisible by
- Inverse
- Remainder
- Equation
- Share
- Share equally
- Group
- Groups of
- Lots of

#### Dividing with remainders

$$5,291 \div 4 = 1,322 \text{ r}3$$



- *Array*
- *Divide*
- *Divided by*
- *Divided into*
- *Left*
- *Left over*

| Year 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |                                                                                                                                                                                                                                                    |                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Concrete | Pictorial                                                                                                                                                                                                                                          | Abstract                                                                                                 |
| <ul style="list-style-type: none"> <li>To know the order of operations (BODMAS) to carry out calculations involving the four operations</li> <li>To know that fractions are a result of division</li> <li>To explore the order of operations using brackets</li> <li>To multiply and divide numbers mentally drawing upon known facts</li> <li>To multiply and divide whole numbers and those involving decimals by 10, 100 and 1000</li> <li>To divide numbers up to 4-digits by a two-digit whole number using the formal written method of short division where appropriate for the context divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division</li> <li>To interpret remainders as whole number remainders, fractions, or by rounding,</li> </ul> |          | <p>Dividing a 4-digit number by 1-digit number</p>  <p>With remainders</p>  | <p>Long division</p>  |

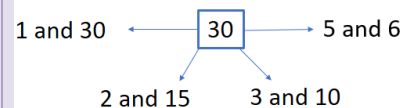
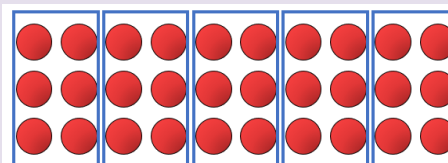
as appropriate for the context

- To use written division methods in cases where the answer has up to two decimal places
- To identify common factors, common multiples and prime numbers
- To use their knowledge of the order of operations to carry out calculations involving the four operations
- To use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy

#### Vocabulary

- Quotient
- Divisor
- Dividend
- Divisible by
- Inverse
- Remainder
- Equation
- Share
- Share equally
- Group
- Groups of

#### Finding factors



- |                                                                                                                                                                                                                                                    |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| <ul style="list-style-type: none"><li>• <i>Lots of</i></li><li>• <i>Array</i></li><li>• <i>Divide</i></li><li>• <i>Divided by</i></li><li>• <i>Divided into</i></li><li>• <i>Left</i></li><li>• <i>Left over</i></li><li>• <i>BODMAS</i></li></ul> |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|