

# Berrycoombe Primary School

## Calculation Policy



This Policy was developed on: June 2018 by Lucinda Jerome-Snell

This Policy was ratified on:

This Policy will be reviewed on: June 2019

### **Calculation Policy**

This policy is intended to demonstrate how we teach different forms of calculation at Berrycoombe Primary School. It is organised by year group and covers calculation method progression from EYFS through to Year 6.

This policy is designed to help teachers and staff members at the school ensure that calculation is taught consistently across the school and that representation is consistent and progressive from EYFS to Year 6.

This policy is also designed to help parents, carers and other family members to support children's learning by letting them know the expectations for their child's year group and by providing an explanation of the methods used at Berrycoombe.

Agreed Visual Maths Symbols to be used from EYFS through to Year 6

These are the symbols consistently used from EYFS through to Year 6 when the children are engaging with the ***Draw It*** element of calculation progression.

100,000s	10,000s	1,000s	100s	10s	1s	0.1s	0.01s
○	△	⊠	□	┆	×	⊘	⊗

# Addition

**Statutory Requirements**

- 1. Children count reliably with numbers from 1 to 20, place them in order and say which number is one more than a given number.
- 2. Using quantities and objects, they add two single-digit numbers and count on to find the answer.

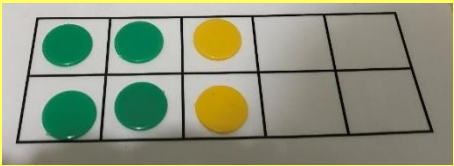
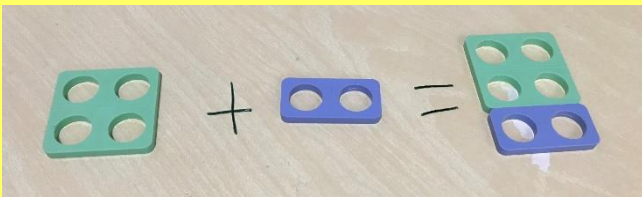
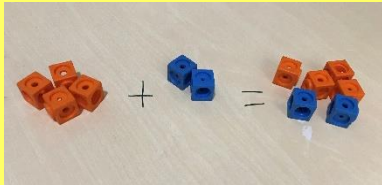
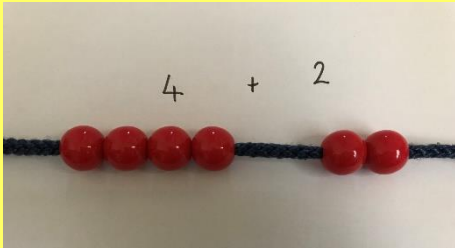
**What I need to know already**

- Order numbers to 20 accurately
- Count accurately from 0 to 21
- Count up to 20 objects accurately and attribute the correct numeral to label the set

**Key Resources**

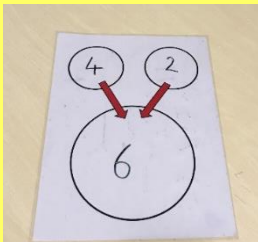
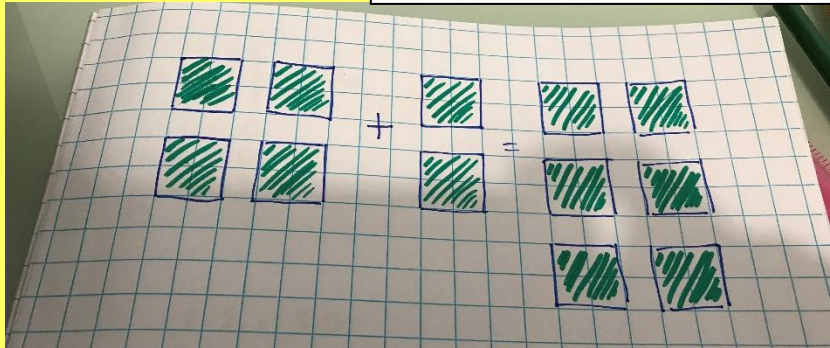
Numicon, Bead Strings, Dienes, Counters, Ten Frames, Part/Part/Whole Model, Bar Model

**Build it**



**Draw it**

Pictorial representations of any object



**Year R**

Add two single digit numbers, counting on to find the answer

**Write it**

Any abstract form would most likely be jottings alongside a practical activity.

I had 4 apples. I bought 2 more. How many do I have altogether?

$4 + 2 = 6$

**Discuss it**

*Addition is finding the total amount by combining two or more numbers.*

Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, numberline

**Statutory Requirements**

1. Read, write and interpret mathematical statements involving addition (+) and equals (=) signs and relate this to balance sums and scales
2. Represent and use number bonds and related subtraction facts within 20
3. Add one -digit and two -digit numbers to 20, including zero
4. Solve one -step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as  $9 = \square + 7$

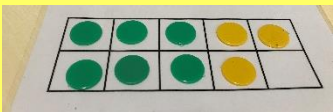
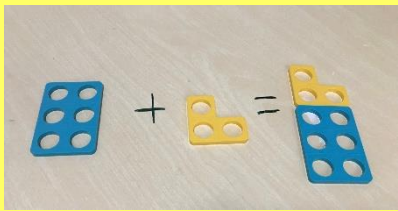
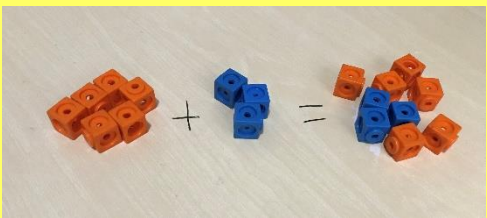
**What I need to know already**

- Order numbers to 20 accurately
- Count accurately from 0 to 21
- Count up to 20 objects accurately and attribute the correct numeral to label the set
- Subsidise small groups of objects
- Understand the 'cardinal' value of a set/ array. (Once it has been counted they understand that they don't need to count again.)

**Key Resources**

Numicon, Bead Strings, Dienes, Counters, Ten Frames, Part/Part/Whole Model, Bar Model

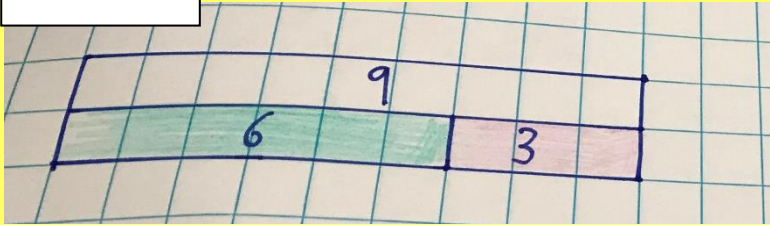
**Build it**



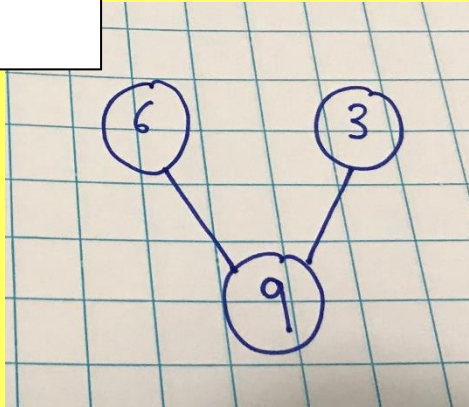
Using a range of concrete resources

**Draw it**

Bar Model



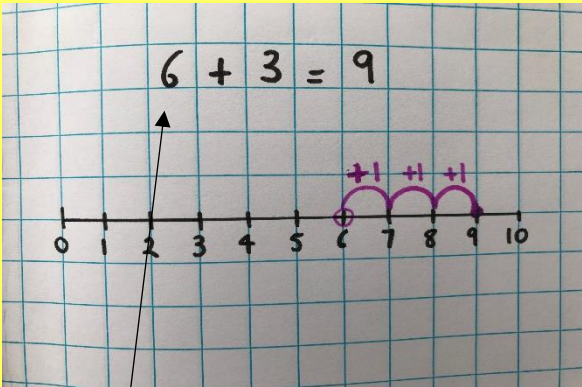
Part Part Whole Model



**Year 1**

Add one-digit and two-digit numbers to 20, including zero

**Write it**



Tips: Start with the larger number and count on

**Discuss it**

*Addition is finding the total amount by combining two or more numbers.*

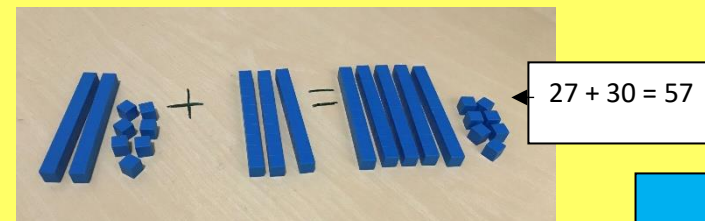
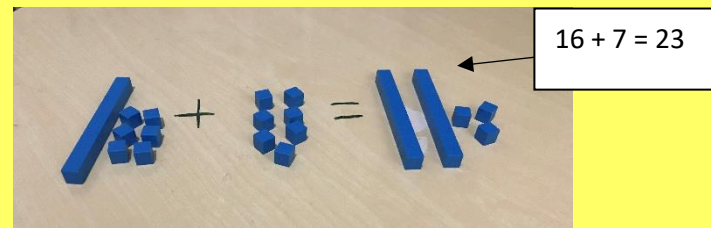
Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, number line



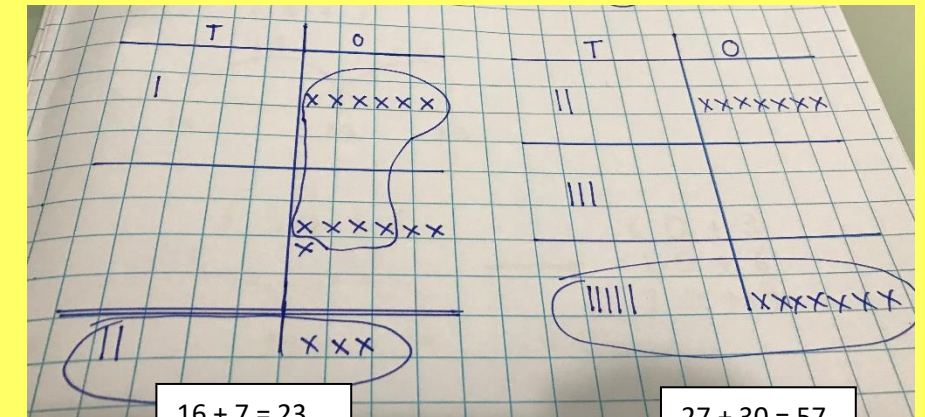
## Statutory Requirements

1. Solve problems with addition using concrete objects and pictorial representations, including those involving numbers, quantities and measures, and applying their increasing knowledge of mental and written methods
2. Recall and use addition facts to 20 fluently, and derive and use related facts up to 100
3. Add numbers using concrete objects, pictorial representations and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers
4. Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
5. Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

## Build it



## Draw it



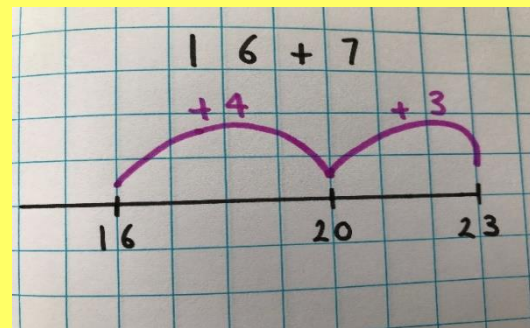
Agreed visual maths symbols

## Year 2

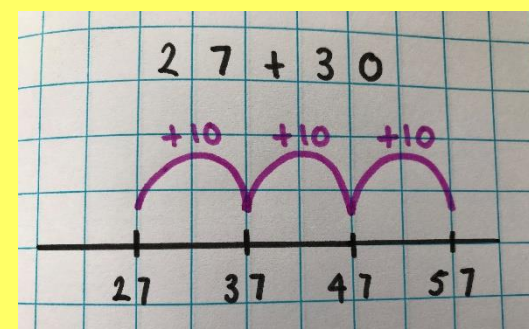
Add a 2-digit number and ones

Add a 2-digit number and tens

## Write it



Tips: Use empty number lines, concrete equipment, hundred squares etc. to build confidence and fluency in mental addition skills.



## Discuss it

*Addition is finding the total amount by combining two or more numbers.*

Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, number line, sum, tens, ones, partition, addition, column, tens boundary

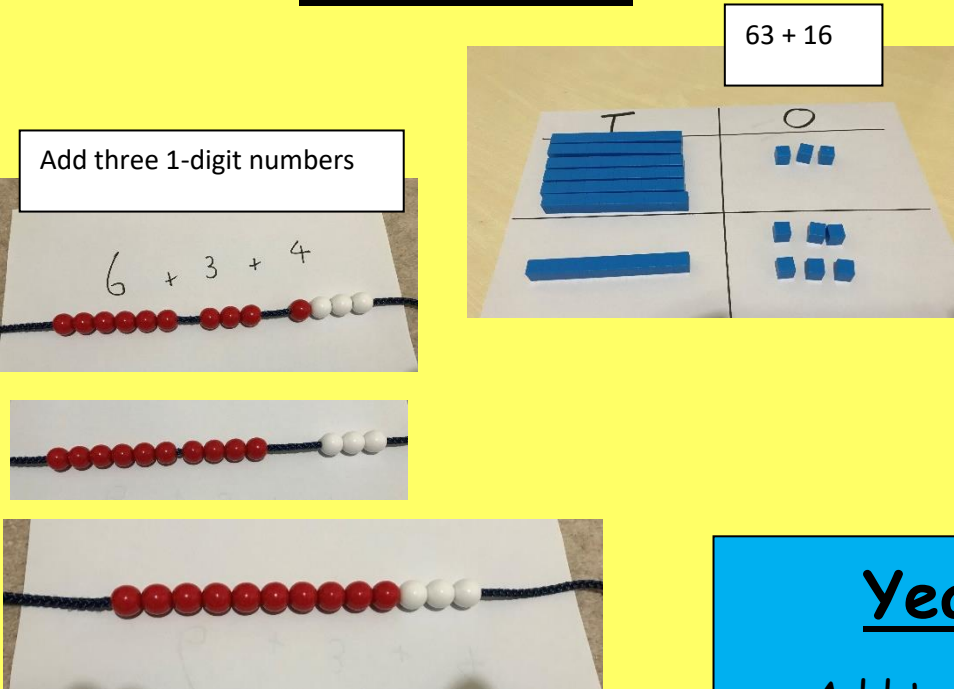
What I need to know already

- Understand the value of digits in two-digit numbers
- Interpret a mathematical statement involving the symbols + and = or - and =
- Add one- and two-digit numbers to 20, including 0

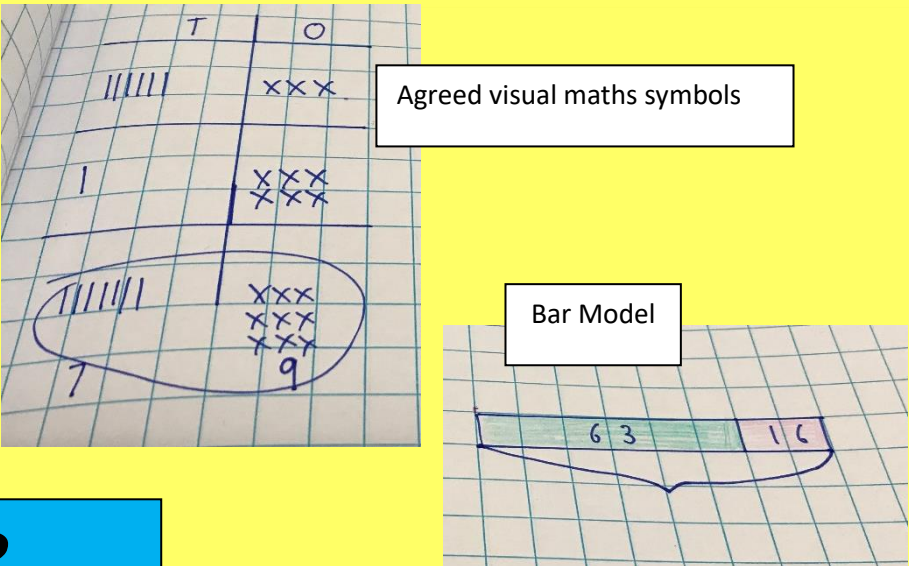
Key Resources

Numicon, Bead Strings, Dienes, Counters, Ten Frames, Part/Part/Whole Model, Bar Model

Build it



Draw it



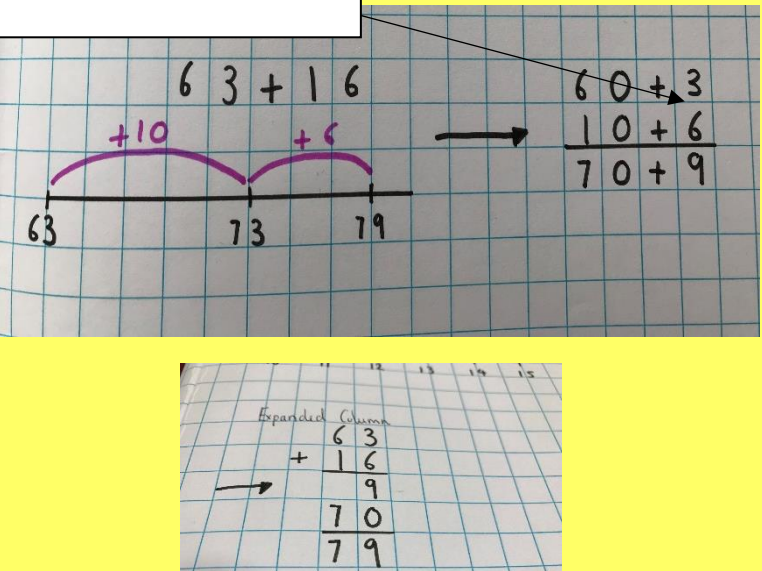
Year 2

Add two 2-digit numbers

Add three 1-digit numbers

Write it

Tips: Choose numbers that don't go over the tens barrier until secure



Discuss it

Addition is finding the total amount by combining two or more numbers.

Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, number line, sum, tens, ones, partition, addition, column, tens boundary



**Statutory Requirements**

1. Add numbers mentally including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds
  - a 3-digit number and thousands
2. Add numbers with up to three digits, using formal written methods of columnar addition
3. Estimate the answer to a calculation and use inverse operations to check answers
4. Solve problems, including missing number problems, using number facts, place value, and more complex addition.

**What I need to know already**

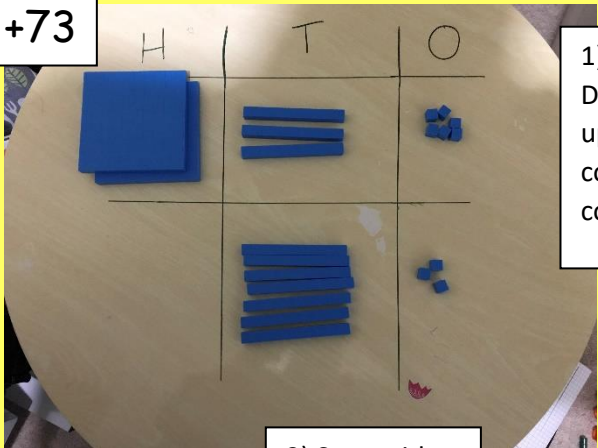
- Know that addition and subtraction are inverse operations
- Recall addition facts to 20
- Derive addition facts to 100
- Add two-digit numbers and ones (or tens) mentally

**Key Resources**

Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters

**Build it**

236  
+73

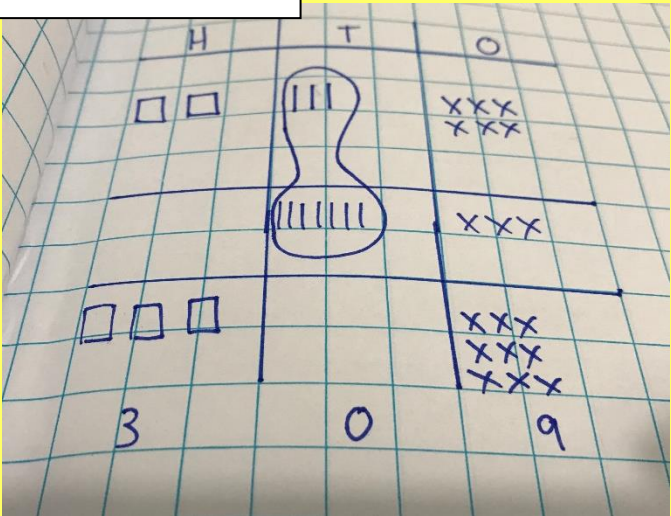


1) Set the Dienes blocks up in the correct columns

2) Start with the *ones*

**Draw it**

Agreed visual maths symbols

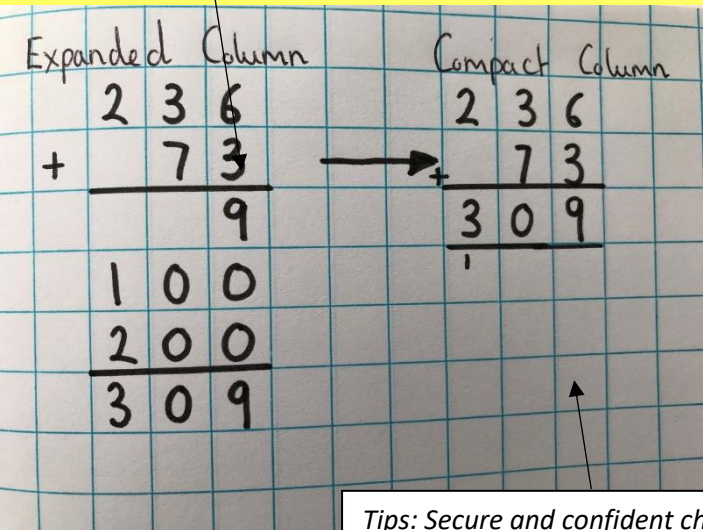


**Year 3**

Add numbers with 3 digits  
*e.g 236+73*

**Write it**

*Tips: Focus on starting with the ones*



*Tips: Secure and confident children can move to this method*

**Discuss it**

*Addition is finding the total amount by combining two or more numbers.*

Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, number line, sum, tens, ones, partition, addition, column, tens boundary, hundreds boundary, increase, vertical, carry, expanded, compact

**Statutory Requirements**

- 1. Add numbers with up to 4 digits using the formal written methods of columnar addition
- 2. Estimate and use inverse operations to check answers to a calculation.
- 3. Solve addition two-step problems in contexts, deciding which operations and methods to use and why

**What I need to know already**

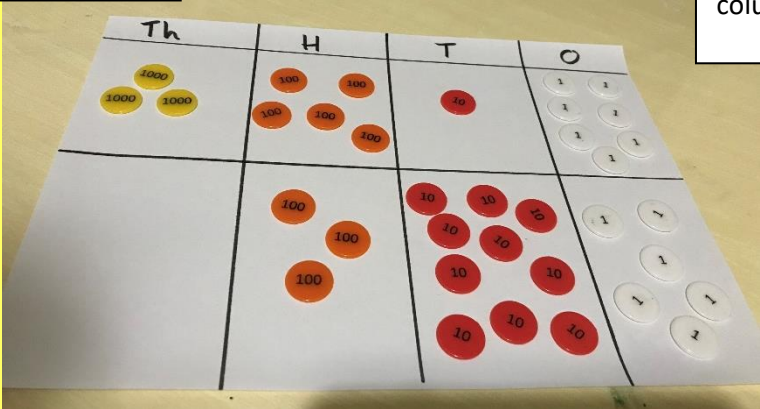
- Find 100 more than a given number
- Use column addition for numbers up to three digits

**Key Resources**

Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters

**Build it**

3517  
+396

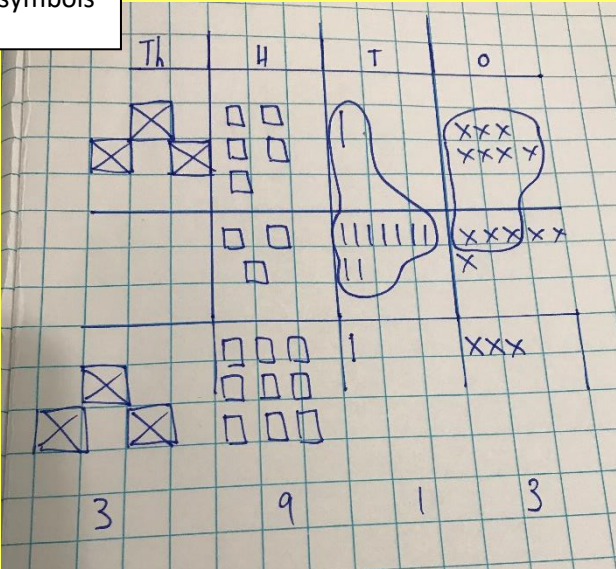


1) Set the place value counters up in the correct columns

2) Start with the *ones*

**Draw it**

Agreed visual maths symbols

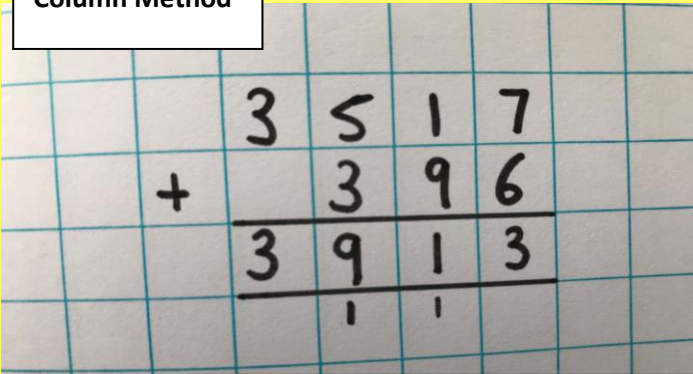


**Year 4**

Add numbers with 4 digits

**Write it**

Column Method



Tips: Focus on why we start with the ones and carrying

**Discuss it**

*Addition is finding the total amount by combining two or more numbers.*

Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, number line, sum, tens, ones, partition, addition, column, tens boundary, hundreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse



**Statutory Requirements**

- 1. add whole numbers with more than 4 digits, including using formal written methods (columnar addition)
- 2. add numbers mentally with increasingly large numbers
- 3. use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- 4. solve addition multi-step problems in contexts, deciding which operations and methods to use and why

**What I need to know already**

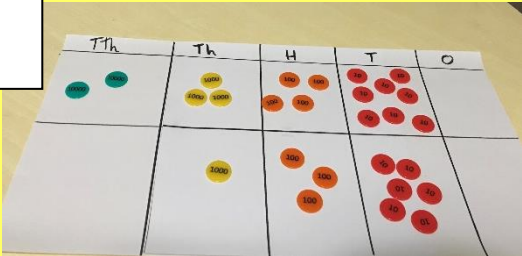
- Add numbers mentally, including a three-digit number and ones, tens or hundreds
- Use column addition for numbers up to four digits
- Estimate the answer to a calculation

**Key Resources**

Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters

**Build it**

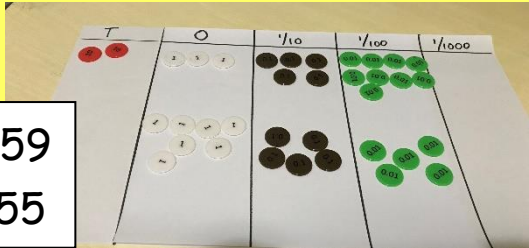
23481  
+1362



1) Set the place value counters up in the correct columns

2) Start from the right

23.59  
+7.55

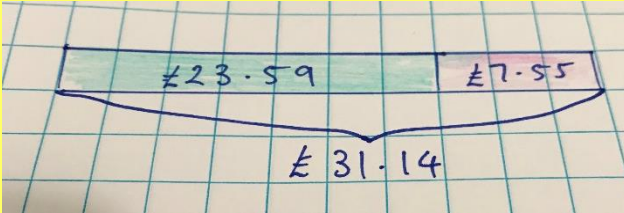
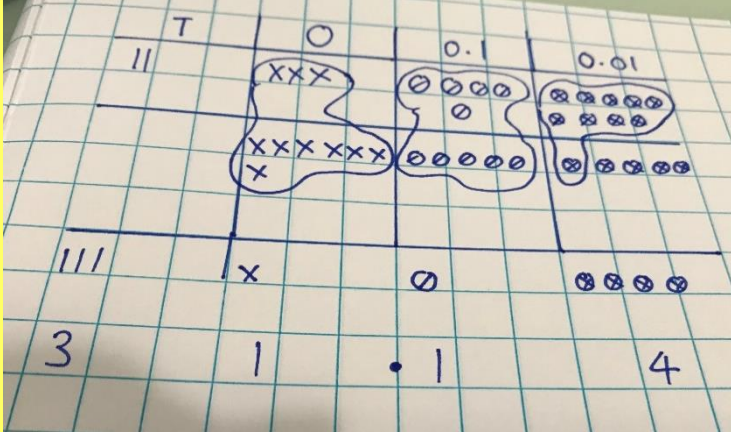


**Year 5**

Add numbers with more than 4 digits.

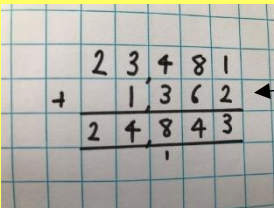
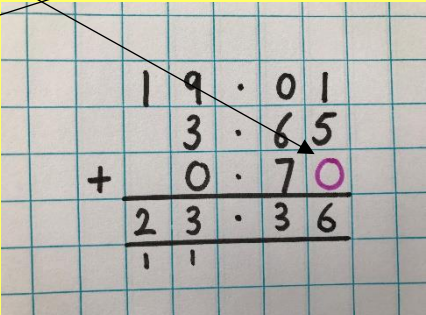
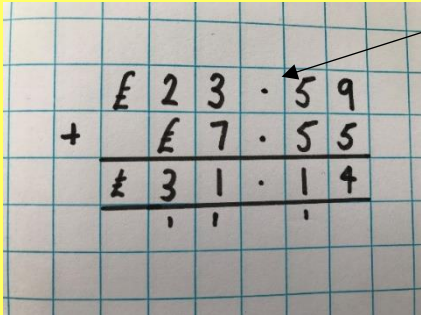
Add decimals with 2 decimal places, including money.

**Draw it**



**Write it**

Tips: Zeros added to support place value. Line decimal point up



Children working with numbers greater than 4 digits

**Discuss it**

Addition is finding the total amount by combining two or more numbers.

Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, number line, sum, tens, ones, partition, addition, column, tens boundary, hundreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse, decimal place, decimal point, tenths, hundredths, thousandths.

**Statutory Requirements**

- 1. Solve addition multi-step problems in contexts, deciding which operations and methods to use and why
- 2. Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

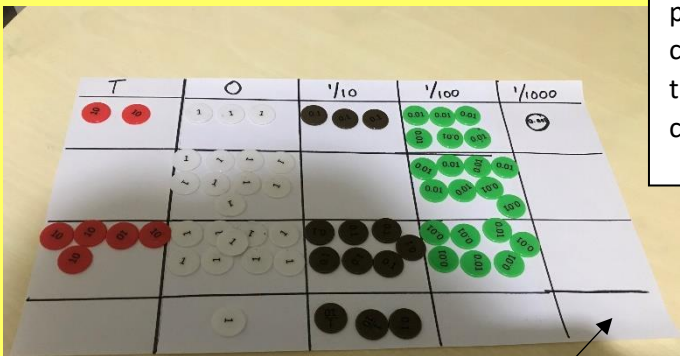
**What I need to know already**

- How to use column addition for numbers above 4-digits

**Key Resources**

Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters

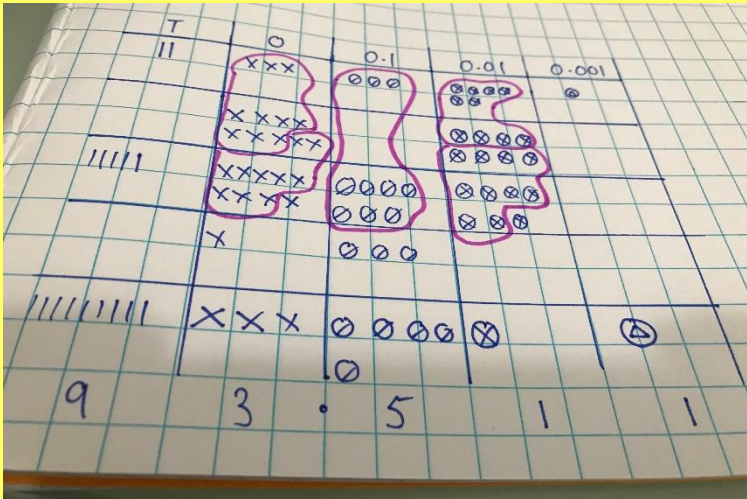
**Build it**



1) Set the place value counters up in the correct columns

2) Start with the 1/1000's

**Draw it**

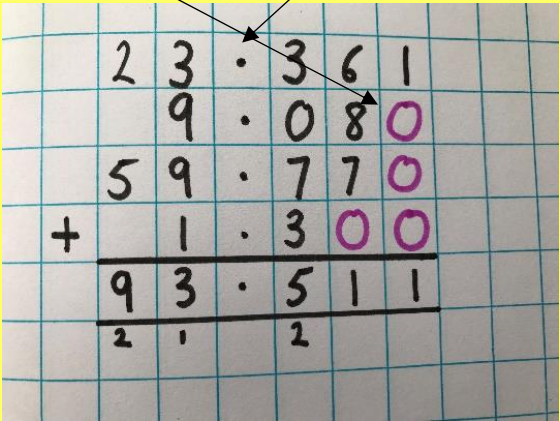


**Year 6**

Add several numbers of increasing complexity

**Write it**

Tips: Zeros added to support place value. Line decimal point up



Continue to add multiple *integers* with 4-digits or more.

**Discuss it**

*Addition is finding the total amount by combining two or more numbers.*

Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, number line, sum, tens, ones, partition, addition, column, tens boundary, hundreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse, decimal place, decimal point, tenths, hundredths, thousandths, integer



# Subtraction

**Statutory Requirements**

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

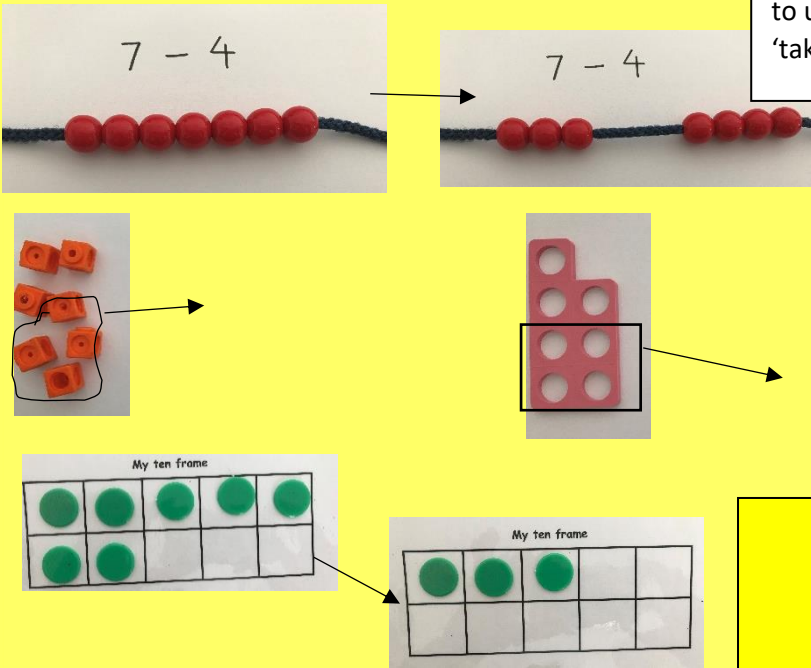
**What I need to know already**

- Order numbers to 20 accurately
- Count accurately from 0 to 21
- Count up to 20 objects accurately and attribute the correct numeral to label the set

**Key Resources**

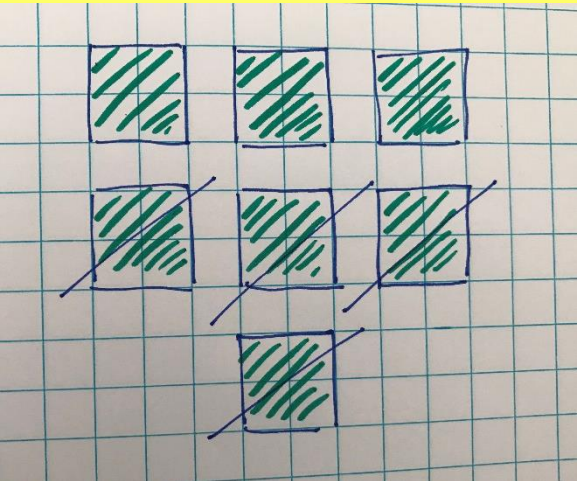
Numicon, Bead Strings, Dienes, Counters, Ten Frames, Part/Part/Whole Model, Bar Model

**Build it**



Physically taking concrete resources away to understand 'take away'

**Draw it**



Crossing out images to understand 'take away'

**Year R**

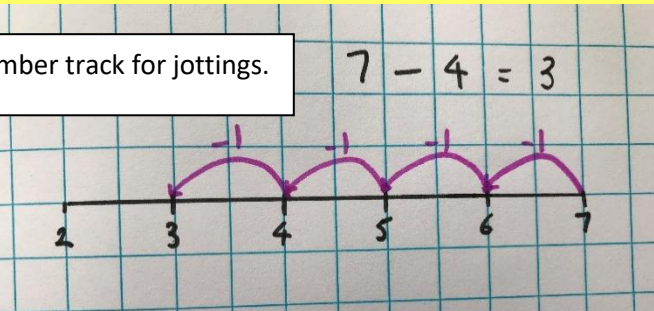
Using quantities and objects, subtract two single-digit numbers and count back to find the answer

**Write it**

I had 7 apples. I ate 4.  
How many do I have left over?  
 $7 - 4 = 3$

Any abstract form would most likely be jottings alongside a practical activity.

Using a number track for jottings.



Tips: Start at the larger number and count back in ones

**Discuss it**



*Subtraction is taking one amount away from another*

Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is\_?

**Statutory Requirements**

1. Read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs
2. Represent and use number bonds and related subtraction facts within 20
3. Subtract one-digit and two-digit numbers to 20, including zero
4. Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as  $9 = \square - 7$ .

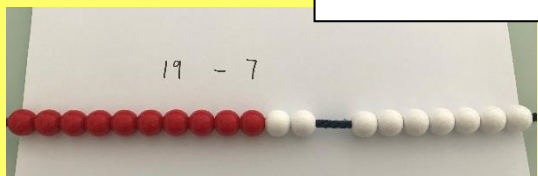
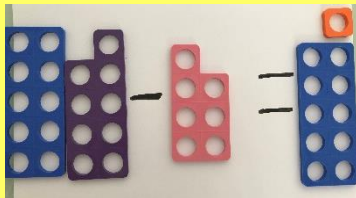
**What I need to know already**

- Order numbers to 20 accurately
- Count accurately from 0 to 21
- Count up to 20 objects accurately and attribute the correct numeral to label the set
- Subsidise small groups of objects
- Understand the 'cardinal' value of a set/ array. (Once it has been counted they understand that they don't need to count again.)

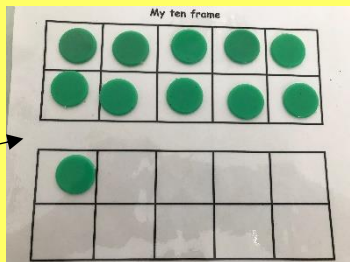
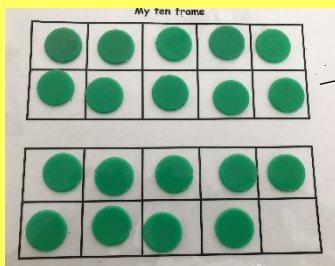
**Key Resources**

Numicon, Bead Strings, Dienes, Counters, Ten Frames, Part/Part/Whole Model, Bar Model

**Build it**

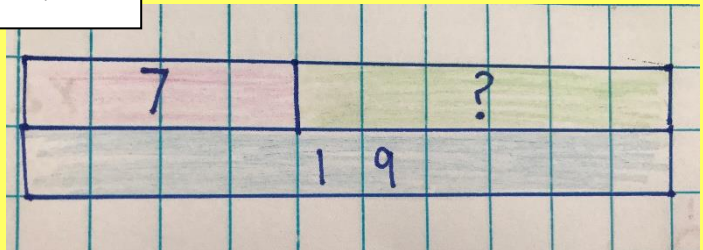


Physically taking concrete resources away to understand 'take away'

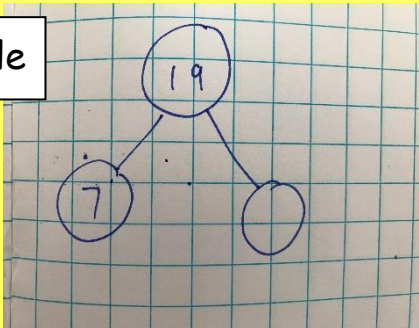


**Draw it**

Bar Model



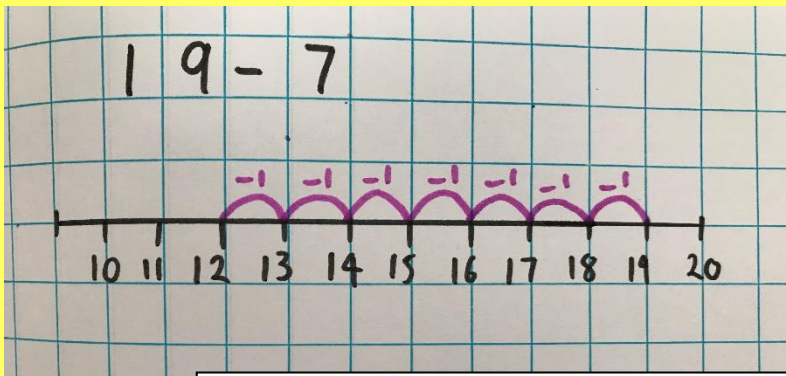
Part Part Whole



**Year 1**

Subtract one-digit and two-digit numbers to 20, including zero

**Write it**



Tips: Start at the larger number and count back in ones

**Discuss it**



*Subtraction is taking one amount away from another*

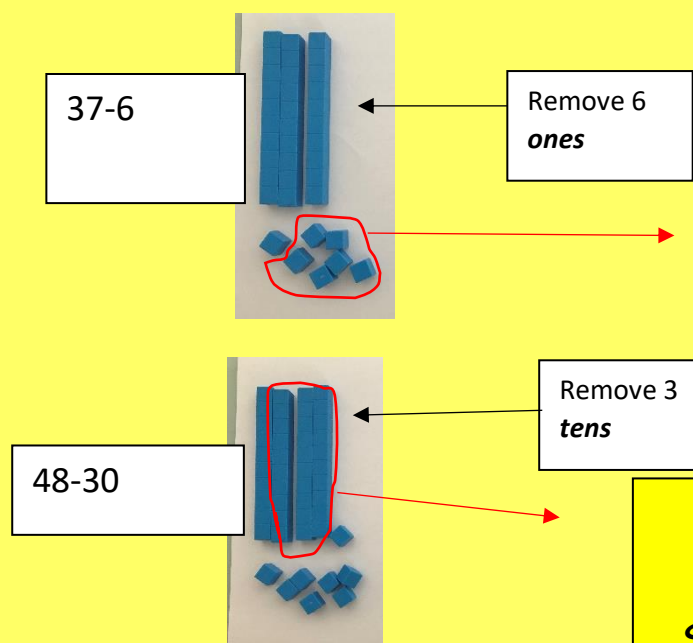
Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is\_?



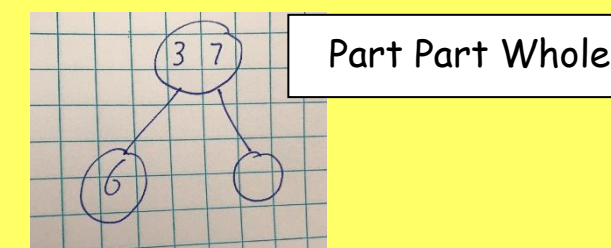
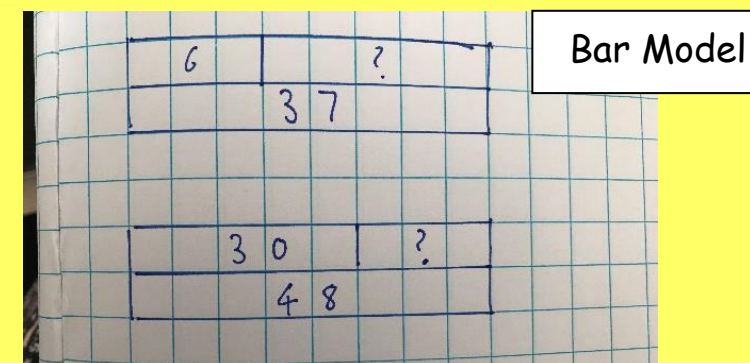
## Statutory Requirements

1. Solve problems with subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures
2. Applying their increasing knowledge of mental and written methods
3. Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100
4. 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
  - subtracting three one-digit numbers
5. Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
6. Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

## Build it



## Draw it

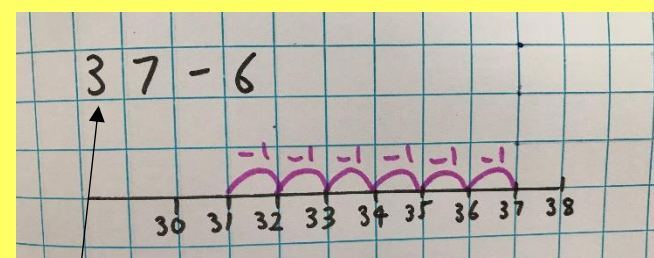


## Year 2

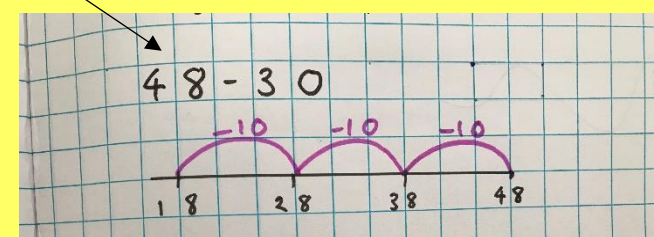
Subtract a two-digit number and ones

Subtract a two-digit number and tens

## Write it



Tips: Start at the larger number and count back in ones



## Discuss it



*Subtraction is taking one amount away from another*

Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is?, count on, strategy, partition, tens, ones



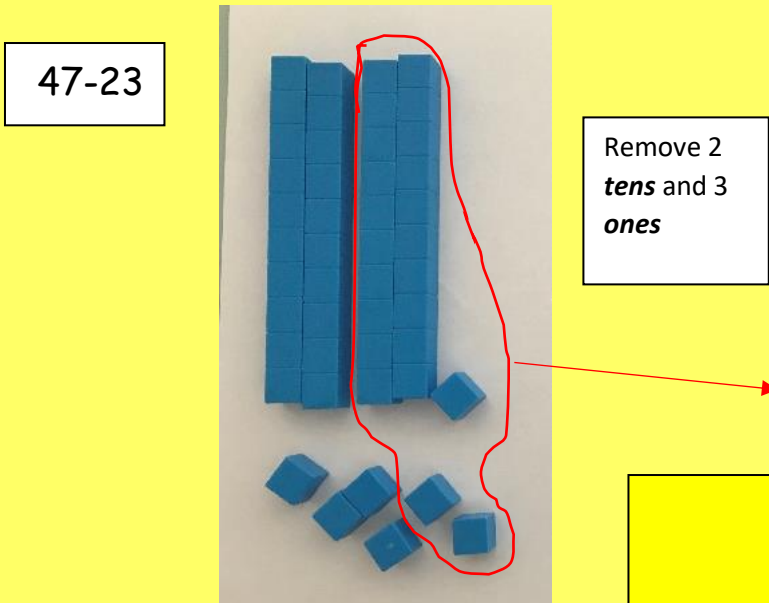
What I need to know already

- Understand the value of digits in two-digit numbers
- Interpret a mathematical statement involving the symbols + and = or - and =
- Subtract one- and two-digit numbers to 20, including 0

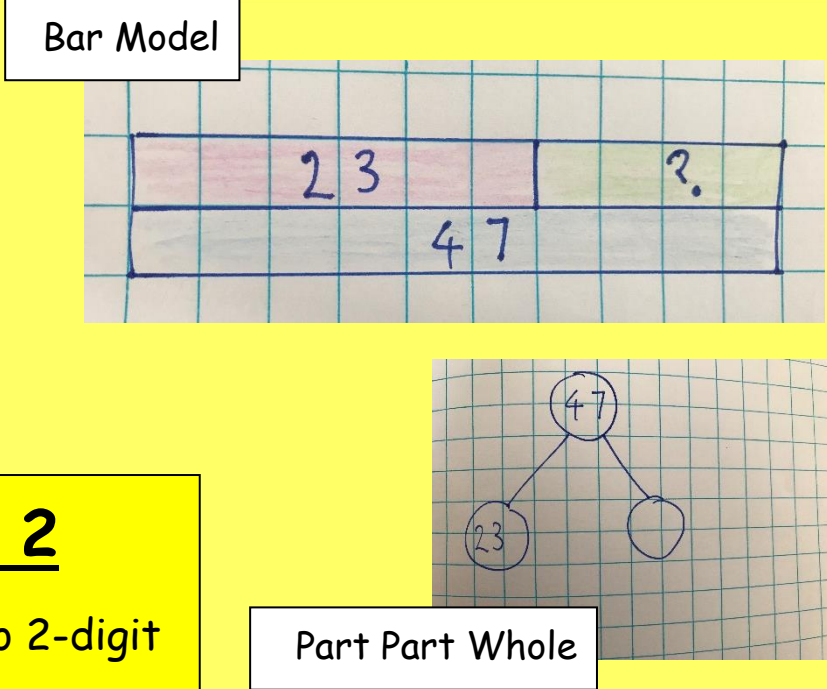
Key Resources

Numicon, Bead Strings, Dienes, Counters, Ten Frames, Part/Part/Whole Model, Bar Model

Build it



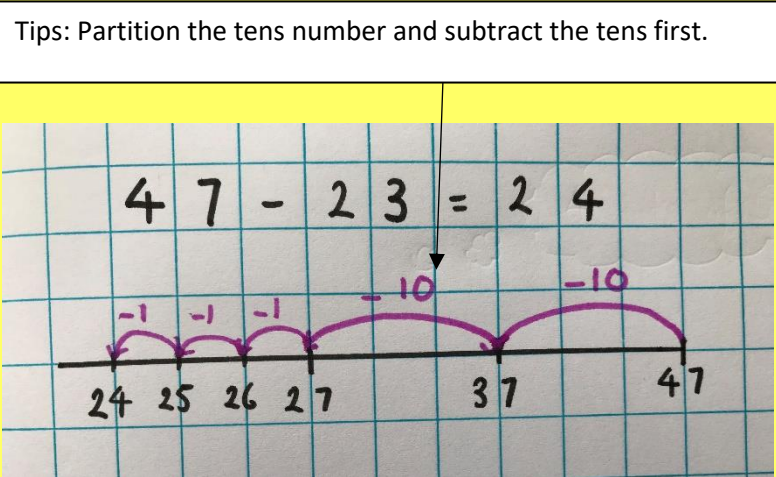
Draw it



Year 2

Subtract two 2-digit numbers

Write it



Discuss it



*Subtraction is taking one amount away from another*

Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is\_?, count on, strategy, partition, tens, ones

## Statutory Requirements

1. Subtract numbers mentally, including:
  - a three-digit number and ones
  - a three-digit number and tens
  - a three-digit number and hundreds
  - a three-digit number and thousands
2. Subtract numbers with up to three digits, using formal written methods of columnar subtraction
3. Estimate the answer to a calculation and use inverse operations to check answers
4. Solve problems, including missing number problems, using number facts, place value, and more complex subtraction.

## What I need to know already

- Know that addition and subtraction are inverse operations
- Recall subtraction facts to 20
- Derive subtraction facts to 100
- Subtract two-digit numbers and ones (or tens) mentally

## Key Resources

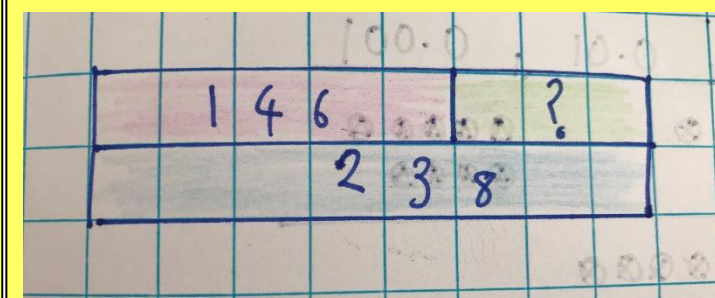
Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters

## Build it

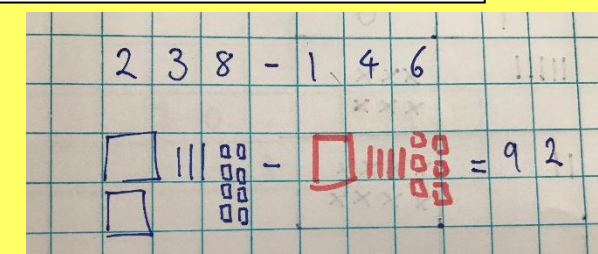
238 - 146

- 1) Set the Dienes up in correct columns.
- 2) Start with the **ones**
- 3) **Partition** the number you are subtracting  
100 + 40 + 6
- 4) Remove 6 **ones**
- 5) 3 **tens** subtract 4 **tens** - **exchange**
- 6) 1 **hundred** subtract 1 **hundred**

## Draw it



Bar modelling and pictorial representations of Dienes blocks

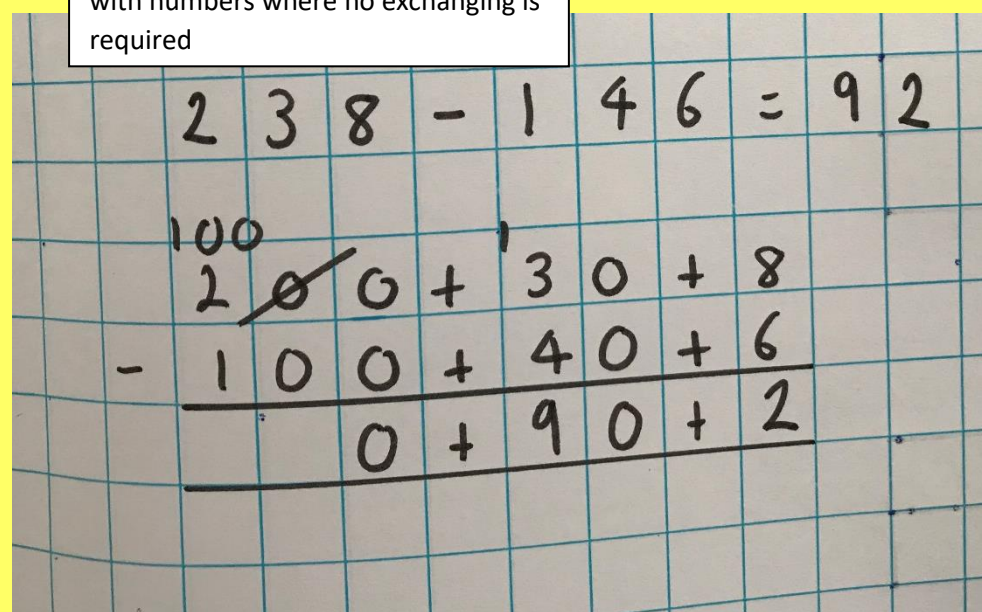


## Year 3

Subtract numbers with 3 digits

## Write it

Tips: Attempt this partitioning method when secure with a number line. Start with numbers where no exchanging is required



## Discuss it



*Subtraction is taking one amount away from another*

Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is\_?, count on, strategy, partition, tens, ones, exchange, decrease, hundreds, value, digit



Statutory Requirements

1. Subtract with up to 4 digits using the formal written methods of columnar subtraction where appropriate
2. Estimate and use inverse operations to check answers to a calculation
3. Solve subtraction two-step problems in contexts, deciding which operations and methods to use and why.

What I need to know already

- Find 100 less than a given number
- Use column subtraction for numbers up to three digits

Key Resources

Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters

Build it

2754  
-1562

1) Set the counters up in correct columns.

2) Start with the ones

3) 4 **ones** subtract 2 **ones**

4) 5 **tens** subtract 6 **tens** - **Exchange**

5) 6 **hundreds** subtract 5 **hundreds**

6) 2 **thousands** subtract 1 **thousand**

Draw it

2754 - 1562

Subtract 1 **thousand**

Subtract 5 **hundreds**

Subtract 6 **tens**

Subtract 2 **ones**

Year 4

Subtract numbers with 4 digits

Write it

2754 - 1562 = 1192

2000 + 700 + 50 + 4  
- 1000 + 500 + 60 + 2  
1000 + 100 + 90 + 2

2'7'5'4  
- 1'5'6'2  
1'1'9'2

Tips: Move from the partitioning method to the compact method when secure

Discuss it

Subtraction is taking one amount away from another

Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is\_?, count on, strategy, partition, tens, ones, exchange, decrease, hundreds, value, digit, inverse

**Statutory Requirements**

1. Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction)
2. Subtract numbers mentally with increasingly large numbers
3. Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
4. Solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

**What I need to know already**

- Subtract numbers mentally, including a three-digit number and ones, tens or hundreds
- Use column subtraction for numbers up to four digits
- Estimate the answer to a calculation

**Key Resources**

Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters

31056  
-2128

**Build it**

1) Set the counters up in correct columns.

2) Start with the **ones**.

3) 6 **ones** subtract 8 **ones** - **exchange**

4) 4 **tens** subtract 2 **tens**

5) 0 **hundreds** subtract 1 **hundred** - **exchange**

6) 0 **thousands** subtract 2 **thousands** - **exchange**

**Draw it**

31056 - 2128

Subtract 2 **thousands**

Subtract 1 **hundred**

Subtract 2 **tens**

Subtract 8 **ones**

**Year 5**  
Subtract numbers with more than 4 digits

**Write it**

Tips: Using 0's as place value holders

Tips: practice having to exchange multiple times

**Discuss it**

*Subtraction is taking one amount away from another*

Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is\_?, count on, strategy, partition, tens, ones, exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal place, decimal



**Statutory Requirements**

1. Solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

**What I need to know already**

- How to use column subtraction for numbers above 4-digits

**Key Resources**

Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters

**Build it**

150,699  
-89,949

1) Set the counters up in correct columns.

2) Start with the ones.

3) 9 ones subtract nine ones (remove them)

4) 9 tens subtract 4 tens

5) 6 hundreds subtract 9 hundreds - exchange

6) 9 thousands subtract 9 thousands

7) 4 ten thousands subtract 8 ten thousands - exchange

**Year 6**

Subtracting with increasingly large and more complex numbers and decimal values.

**Draw it**

150,699  
-89,949

**Write it**

Tips: Multiple times of exchanging and increasingly larger decimals.

60.750

**Discuss it**

*Subtraction is taking one amount away from another*

Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is\_?, count on, strategy, partition, tens, ones, exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal place, decimal

# Multiplication

Statutory Requirements

3. Solve problems, including doubling

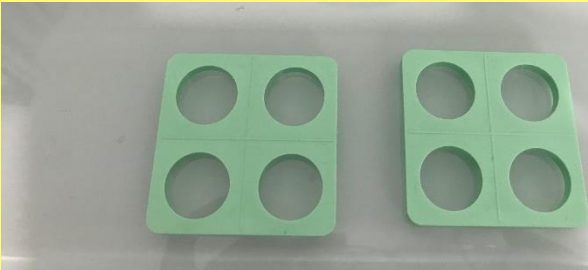
What I need to know already

- Order numbers to 20 accurately
- Count accurately from 0 to 21
- Count up to 20 objects accurately and attribute the correct numeral to label the set

Key Resources

Cubes, Numicon, Bead Strings, Dienes, Counters, Ten Frames, Part/Part/Whole Model, Bar Model

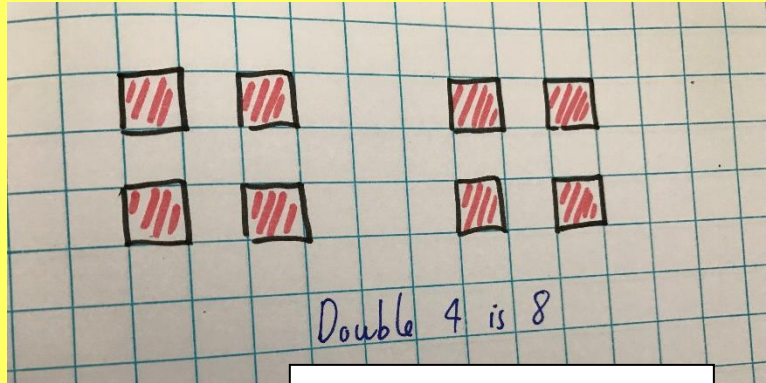
Build it



Demonstrate doubling with Numicon, cubes and a range of concrete objects



Draw it

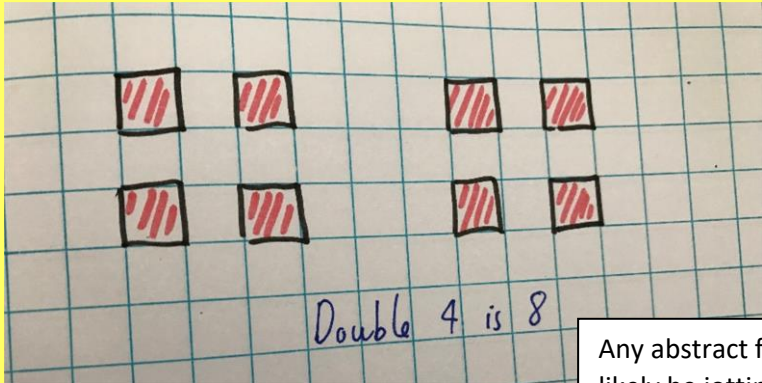


Draw pictures to show how to double

Year R

Solve problems, including doubling

Write it



Any abstract form would most likely be jottings alongside a practical activity.

$$4 + 4 = 8$$

Discuss it

Groups of, lots of, times, array, altogether, multiply, count, double



**Statutory Requirements**

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

**What I need to know already**

- Pupils need to be able to read, write and order numbers to at least 20
- Subitise small groups of objects (i.e. can say how many there are without needing to count each individual object.)

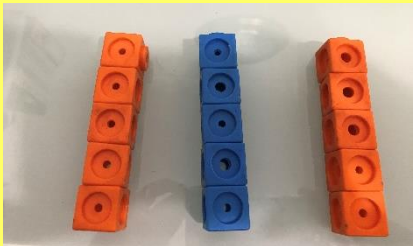
**Key Resources**

Cubes, Numicon, Bead Strings, Dienes, Counters, Part/Part/Whole Model, Bar Model

**Build it**



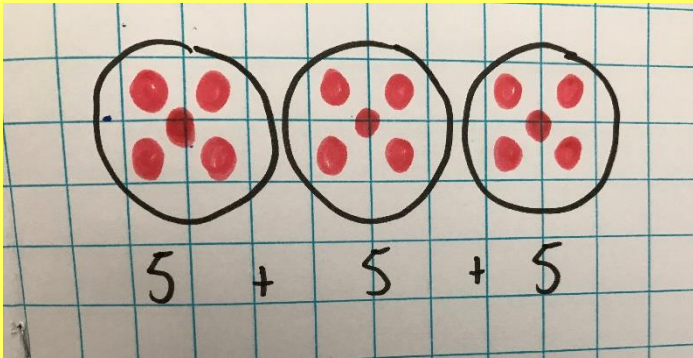
*Tips: Practise making equal groups first*



*Tips: Use a range of concrete materials*



**Draw it**



Draw the concrete method

**Year 1**

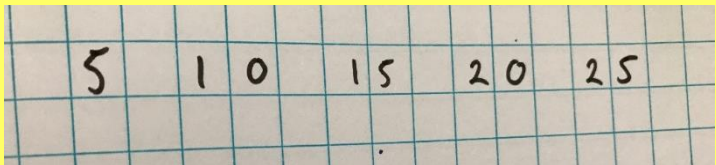
Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays

**Write it**



$5 + 5 + 5 = 15$   
 $5 \times 3 = 15$

*Tips: Record multiplication alongside repeated addition*



**Discuss it**

Groups of, lots of, times, array, altogether, multiply, count



**Statutory Requirements**

- 6. Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- 7. Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs
- 8. Show that multiplication of two numbers can be done in any order
- 9. Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication

**What I need to know already**

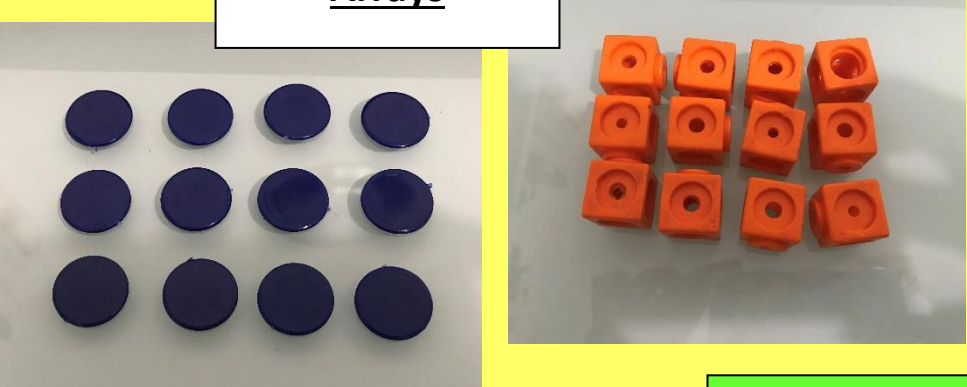
- Count from zero in 2s, 5s and 10s
- Use concrete objects to solve problems involving multiplication
- Use pictorial representations to solve problems involving multiplication
- Use arrays to solve problems involving multiplication.

**Key Resources**

Cubes, Numicon, Bead Strings, Dienes, Counters, Part/Part/Whole Model, Bar Model

**Build it**

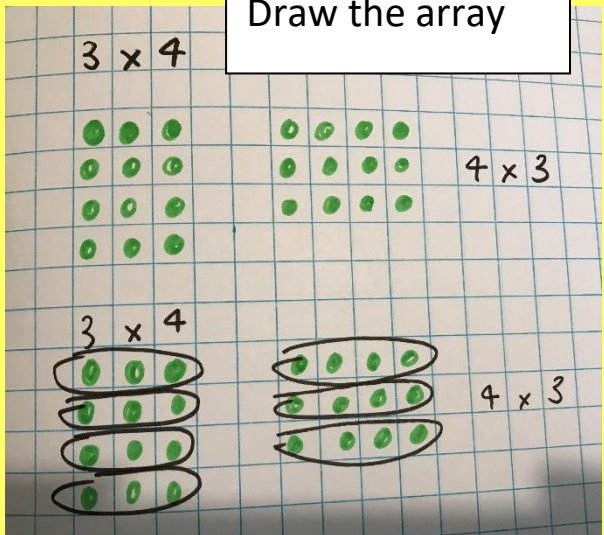
**Arrays**



*Tips: Use counters or cubes to arrange in groups of rows and columns*

**Draw it**

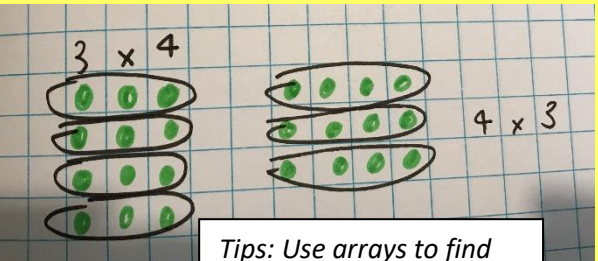
Draw the array



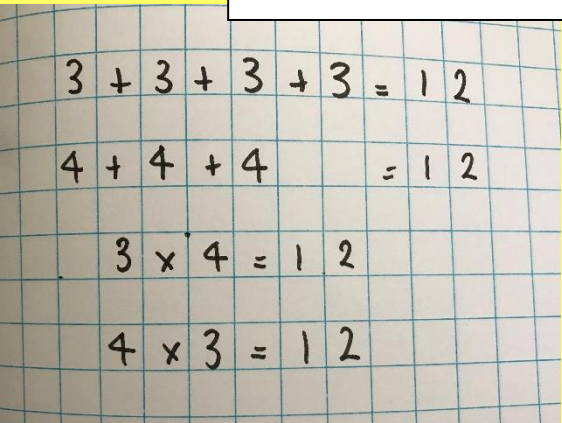
**Year 2**

Calculate mathematical statements and solve problems for multiplication within the multiplication tables (2, 5 & 10)

**Write it**



*Tips: Use arrays to find multiple information*



*Tips: Understand that multiplication is commutative*

**Discuss it**

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times

### Statutory Requirements

- Recall and use multiplication facts for the 3, 4 and 8 multiplication tables
- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- Solve problems involving missing number problems involving multiplication including positive number scaling problems and correspondence problems where  $n$  objects are connected to  $m$  objects

### What I need to know already

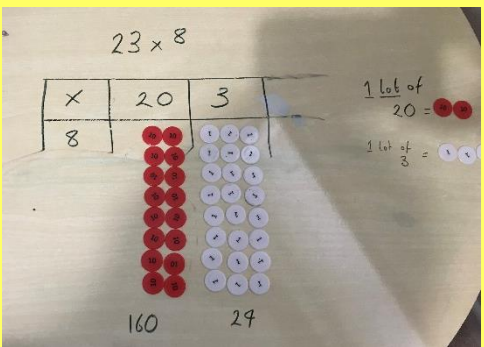
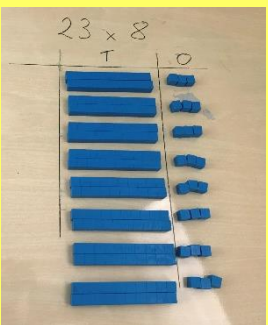
- Recall multiplication facts for 2, 5 and 10 multiplication tables
- Understand that multiplication and division are inverse operations
- Understand that multiplication is commutative

### Key Resources

Cubes, Dienes, Bar Model, Numicon, Visual Maths Symbols, Place Value Chart, Place Value Counters

## Build it

Tip: Show links with arrays to introduce grid method

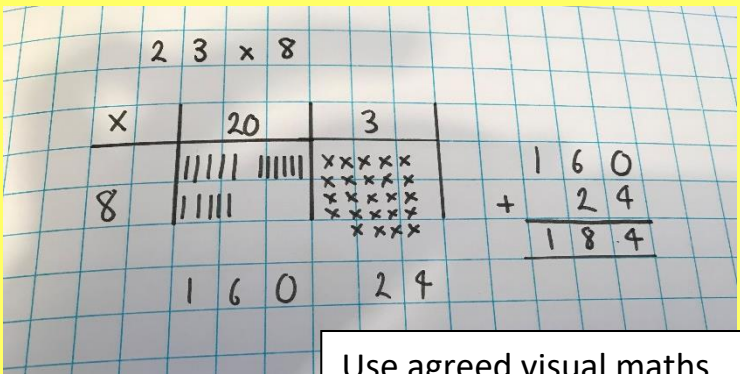


Build array with counters

Build with Dienes

Build with PV counters

## Draw it

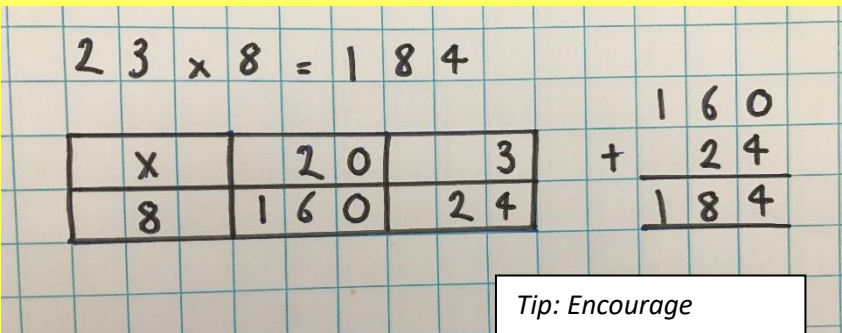


Use agreed visual maths symbols to represent grid method

### Year 3

Multiply 2-digits by a single digit number

## Write it



Tip: Encourage column addition to add accurately

## Discuss it

commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, tens, ones, value



**Statutory Requirements**

- 4. Recall and use multiplication facts for multiplication tables up to 12 x 12
- 5. Use place value, known and derived facts to multiply mentally, including: x0 x1 and multiplying together three numbers
- 6. Recognise and use factor pairs and commutativity in mental calculations
- 7. Multiply two -digit and three -digit numbers by a one -digit number using formal written layout
- 8. Solve problems involving multiplying, including the distributive law to multiply two - digit numbers by one digit including positive number scaling problems and correspondence problems where n objects are connected to m objects.

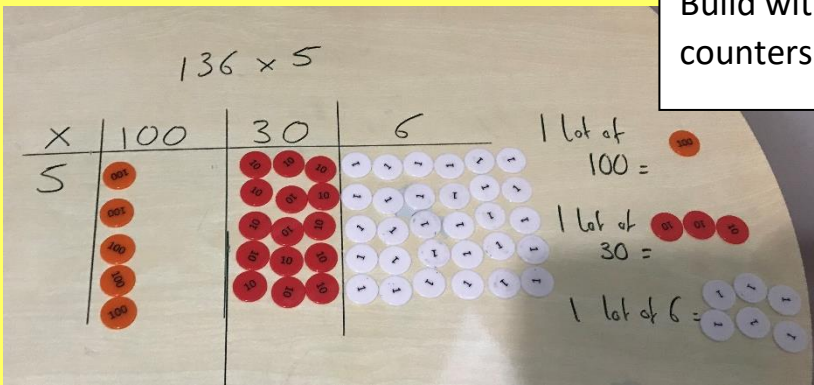
**What I need to know already**

- Recall multiplication facts for 2, 3, 4, 5, 8 and 10 multiplication tables
- Understand that multiplication and division are inverse operations

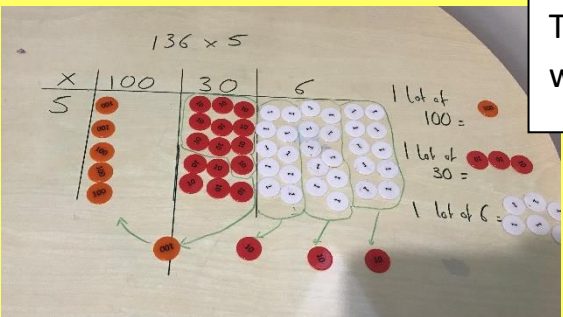
**Key Resources**

Cubes, Dienes, Bar Model, Visual Maths Symbols, Numicon, Place Value Chart, Place Value Counters

**Build it**

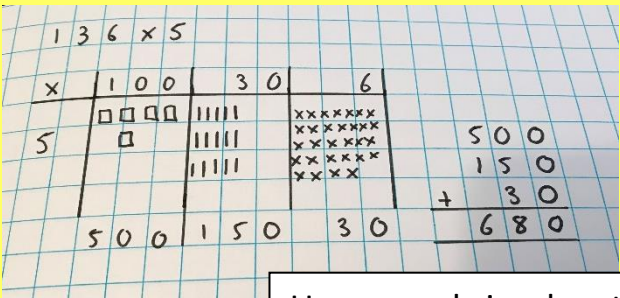


Build with PV counters



Tips: Make exchanges where necessary

**Draw it**

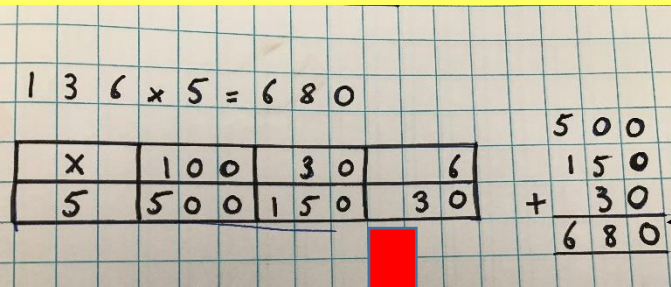


Use agreed visual maths symbols to represent grid method

**Year 4**

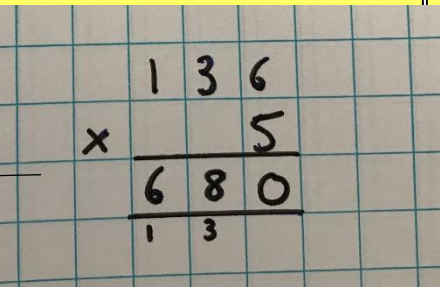
Multiply 2 and 3-digit numbers by a single digit, using all multiplication tables up to 12x12

**Write it**



Tip: Encourage column addition to add accurately

Tip: Move on to short multiplication when child is confident and accurate



**Discuss it**

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, tens, ones, value, inverse



**Statutory Requirements**

- 5. Identify multiples and factors: all factor pairs of a number, common factors of two numbers, establish whether a number up to 100 is prime and recall prime numbers up to 19.
- 6. Multiply numbers up to four digits by a one or two -digit number using a formal written method.
- 7. Multiply whole numbers and those involving decimals by 10, 100 and 1000.

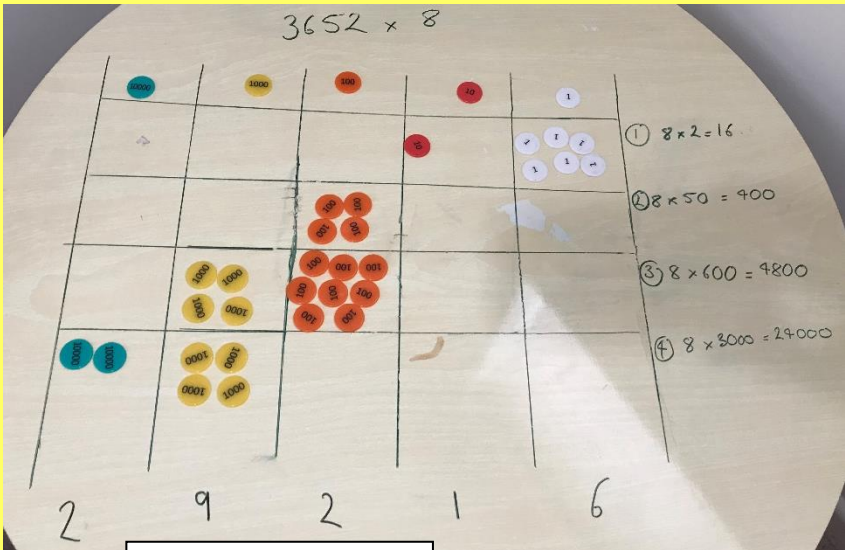
**What I need to know already**

- Recall multiplication facts for multiplication tables up to  $12 \times 12$
- Find factor pairs of a given number
- Understand the commutativity of multiplication
- Multiply a two-digit number by 10, 100
- Multiply a three-digit number by a one-digit number using short multiplication

**Key Resources**

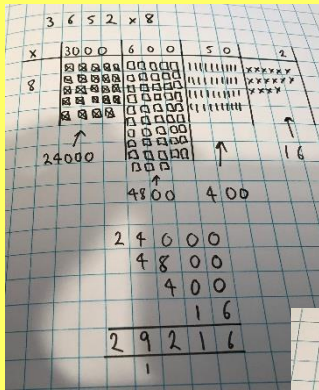
Cubes, Dienes, Bar Model, Visual Maths Symbols, Numicon, Place Value Chart, Place Value Counters

**Build it**

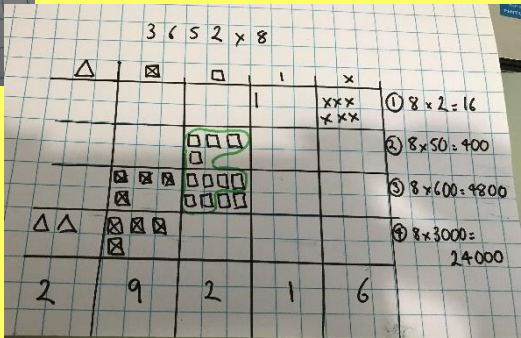


Represent column multiplication with PV counters

**Draw it**



Use agreed visual maths symbols to represent column multiplication

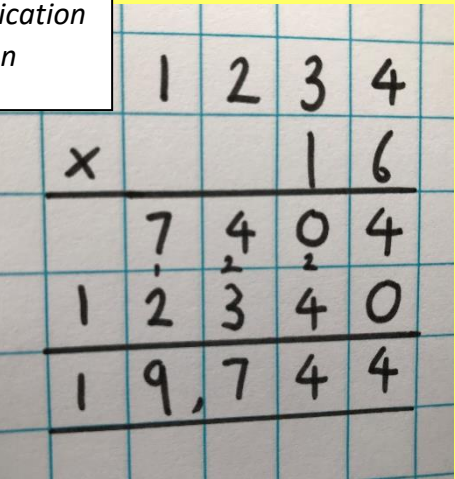
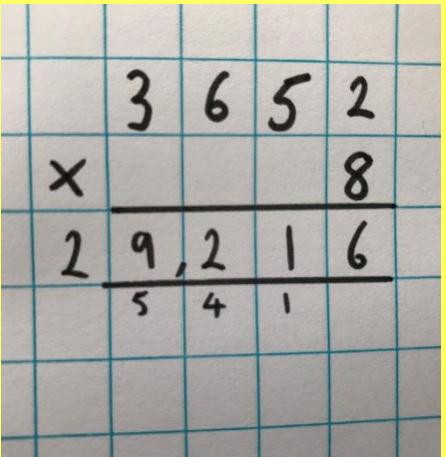


**Year 5**

Multiply numbers up to / more than 4 digits

**Write it**

Tip: Become skilled at short multiplication before moving to long multiplication



**Discuss it**

Commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, tens, ones, value, inverse, square, factor, integer, decimal, short/long multiplication, carry

**Statutory Requirements**

- 1. Identify multi-digit numbers up to 4 digits by a two-digit number using formal, long multiplication.
- 2. Identify common factors, common multiples and common prime numbers.
- 3. Use their knowledge of the order of operations to carry out calculations involving the four operations.

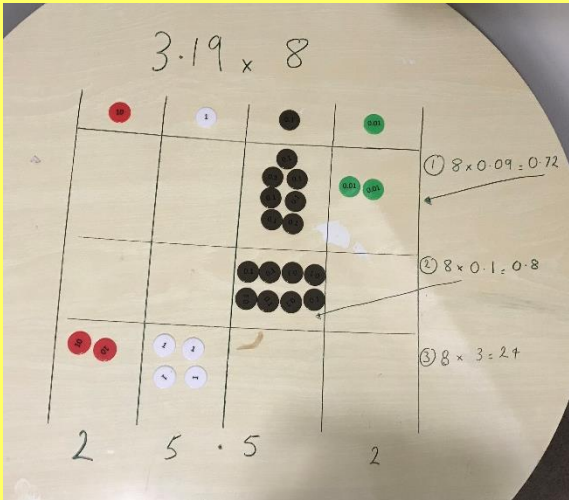
**What I need to know already**

- Recall multiplication facts for multiplication tables up to  $12 \times 12$
- Understand the commutativity of multiplication and addition
- Multiply a three-digit number by a two-digit number using long multiplication

**Key Resources**

Cubes, Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters, Numicon

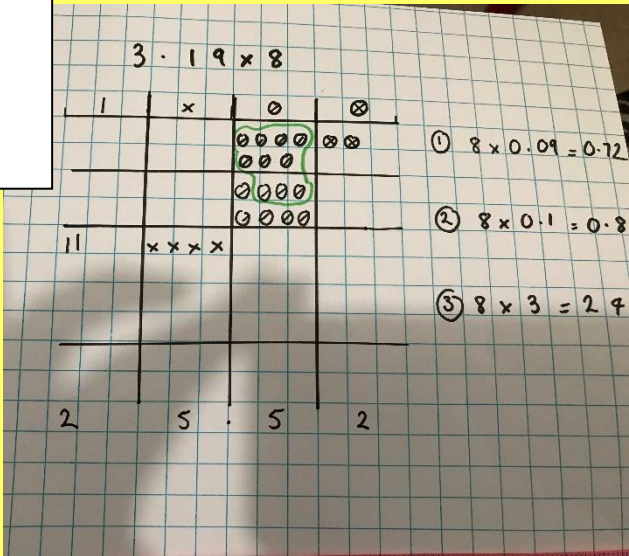
**Build it**



Represent column multiplication with PV counters

**Draw it**

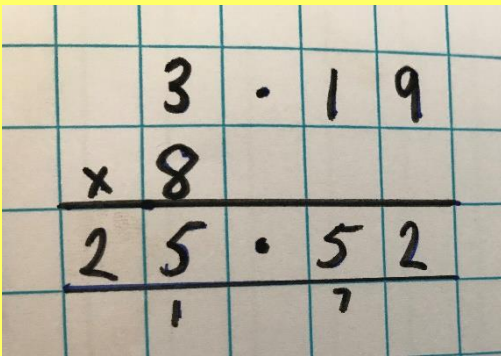
Use agreed visual maths symbols to represent column multiplication



**Year 6**

Multiply numbers with more than 4 digits with decimals

**Write it**



Tips: Ensure decimal point is in line with carefully written values either side

**Discuss it**

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, tens, ones, value, inverse, square, factor, integer, decimal, short/long multiplication, carry, tenths, hundredths, decimals

# Division



**Statutory Requirements**

1. Solve problems, including halving and sharing

**What I need to know already**

- Order numbers to 20 accurately
- Count accurately from 0 to 21
- Count up to 20 objects accurately and attribute the correct numeral to label the set

**Key Resources**

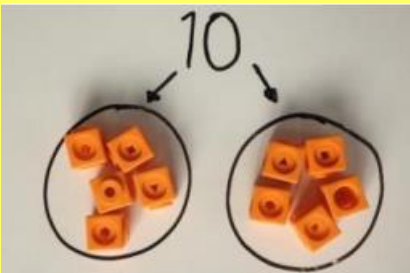
Cubes, Numicon, Bead Strings, Dienes, Counters, Ten Frames, Part/Part/Whole Model, Bar Model

**Build it**

Start by practically halving objects with both halves being exactly the same.



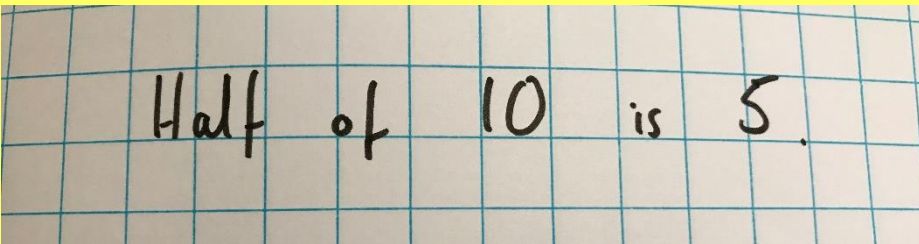
Move to practical objects



Tip: Focus on making number stories

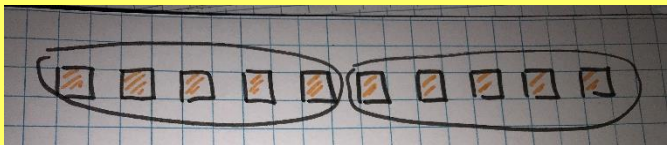
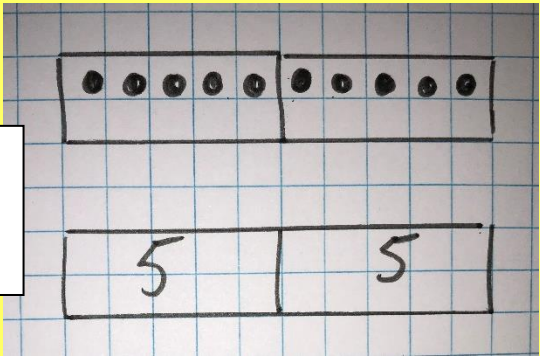
**Write it**

Any abstract form would most likely be jottings alongside a practical activity.



**Draw it**

Pictorial representation with a range of pictures



**Year R**

Solve problems, including halving and sharing

**Discuss it**

Halving is smaller / Doubling is larger, 2 Equal parts, Share, share equally

**Statutory Requirements**

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

**What I need to know already**

- Pupils need to be able to read, write and order numbers to at least 20
- Subitise small groups of objects (i.e. can say how many there are without needing to count each individual object).

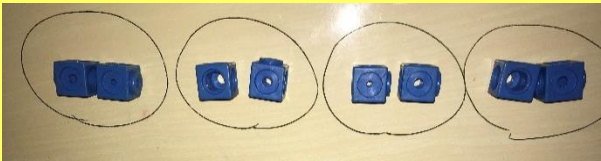
**Key Resources**

Cubes, Numicon, Bead Strings, Dienes, Counters, Part/Part/Whole Model, Bar Model

**Build it**

**Sharing**

Sharing a range of practical objects into equal groups

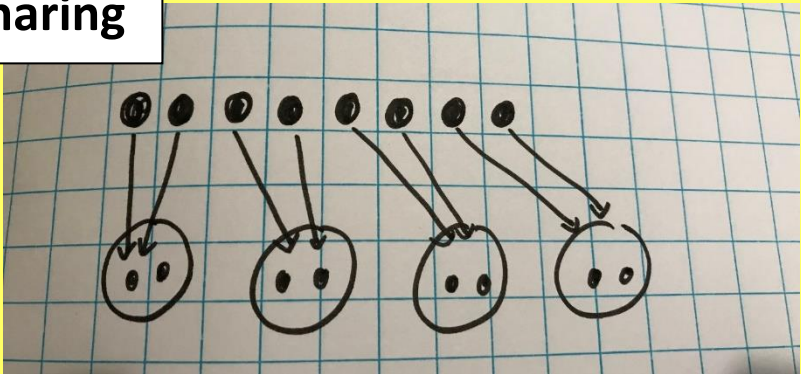


Sharing multilink into equal groups and arrange them in rows (beginning of arrays)



**Draw it**

**Sharing**



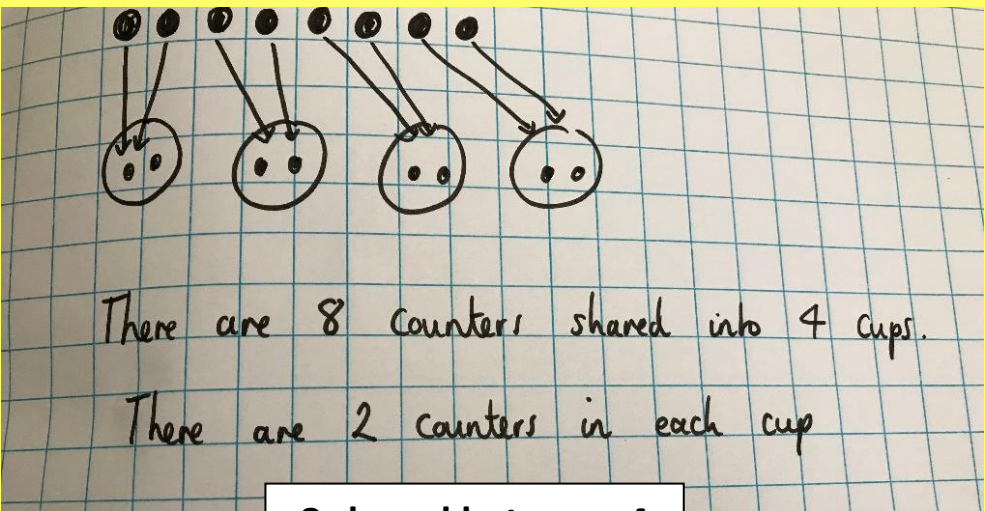
Pictorial representation with a range of pictures

**Year 1**

Solve one-step problems involving division by calculating the answer using concrete objects, pictorial representations and arrays

**Write it**

**Sharing**



8 shared between 4

**Discuss it**

Share, share equally, one each, two each..., group, groups of, lots of, array



**Statutory Requirements**

1. Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables
2. Recognising odd and even numbers
3. Calculate mathematical statements for division within the multiplication tables and write them using the signs  $\div$  and  $=$
4. Show that multiplication of two numbers is commutative but division is not
5. Solve problems involving division using materials, arrays, repeated addition, mental methods and division facts, including problems in contexts.

**What I need to know already**

- Count from zero in 2s, 5s and 10s
- Use concrete objects to solve problems involving division
- Use pictorial representations to solve problems involving division
- Use arrays to solve problems involving division

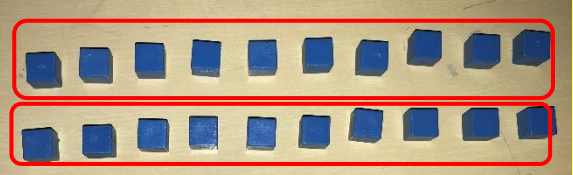
**Key Resources**

Cubes, Numicon, Bead Strings, Dienes, Counters, Part/Part/Whole Model, Bar Model

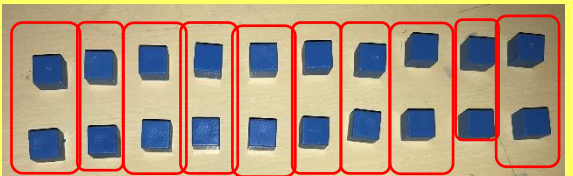
**Build it**

Know and understand **sharing AND grouping**

**Sharing**



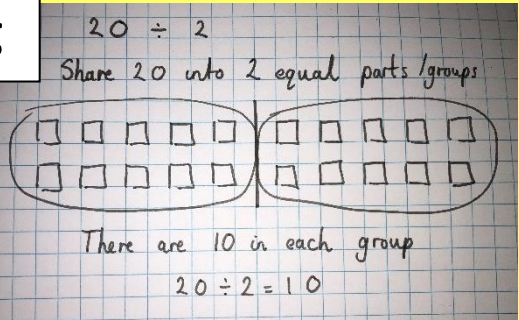
**Grouping**



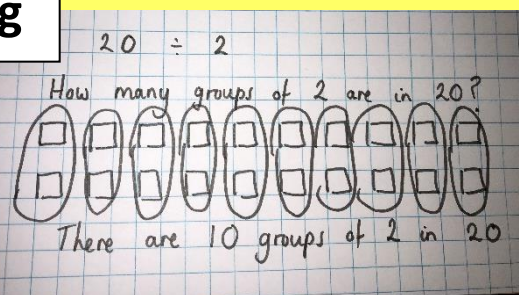
*Tip: Link division to multiplication by creating an array. Create all number sentences*

**Draw it**

**Sharing**



**Grouping**



**Year 2**

Calculate mathematical statements and solve problems for division within the multiplication tables (2, 5 & 10)

**Write it**

There are 10 in each group

$$20 \div 2 = 10$$

**Sharing**

There are 10 groups of 2 in 20

**Grouping**

$$20 \div 2 = 10$$

**Discuss it**

Share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over



**Statutory Requirements**

1. Recall and use multiplication and division facts for the 3, 4 and 8 x tables.
2. Write and calculate mathematical statements for division using the multiplication tables they know, including 2-digit divided by 1-digit using mental and progressing to formal written methods
3. Solve problems, involving missing number problems, division, including positive number scaling problems and correspondence problems where n objects are connected to m objects.

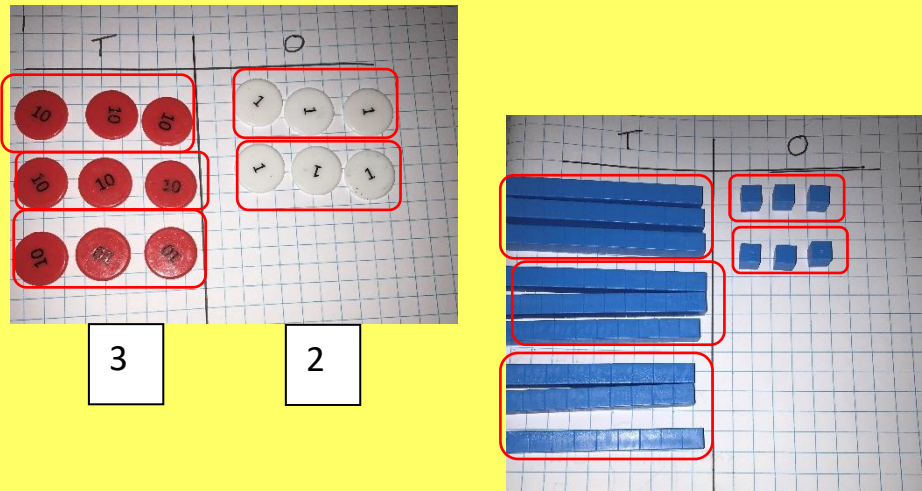
**What I need to know already**

- Recall division facts for 2, 5 and 10 multiplication tables
- Understand that multiplication and division are inverse operations

**Key Resources**

Cubes, Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters, Numicon

**Build it**

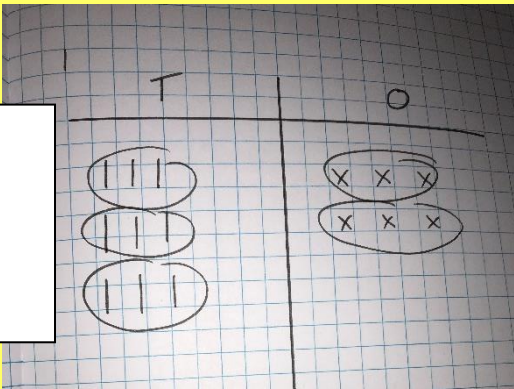


We want to make groups of 3 starting with the tens

**Year 3**

Divide 2-digit numbers by a single digit (where there is no remainder in the final answer)

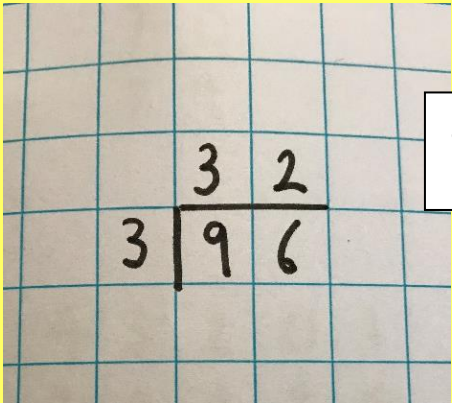
**Draw it**



Agreed visual maths symbol to represent bus stop method

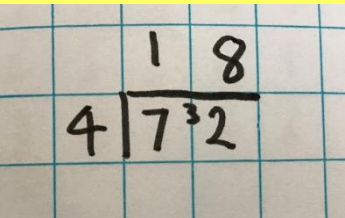
We want to make groups of 3 starting with the tens

**Write it**



Short Division Bus Stop Method

Move to a calculation that involves remainders within it.



**Discuss it**

Share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple

**Statutory Requirements**

- 1. Recall multiplication and division facts up to  $12 \times 12$ .
- 2. Use place value, known and derived facts to divide mentally, including dividing by 1.
- 3. Solve problems involving dividing a three-digit number by one-digit and number using a formal layout

**What I need to know already**

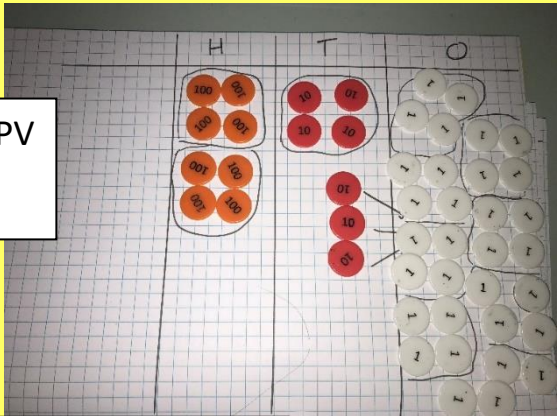
- Recall division facts for 2, 3, 4, 5, 8 and 10 multiplication tables
- Understand that multiplication and division are inverse operations

**Key Resources**

Cubes, Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters, Numicon

**Build it**

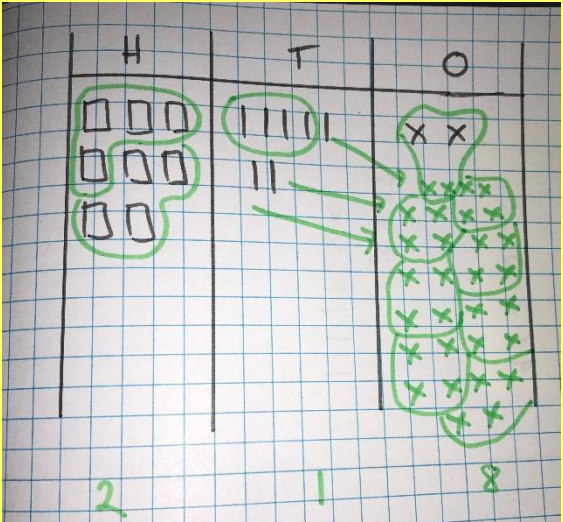
Build with PV counters



Tips: Make exchanges where necessary

**Draw it**

Use agreed visual maths symbols to represent bus stop method

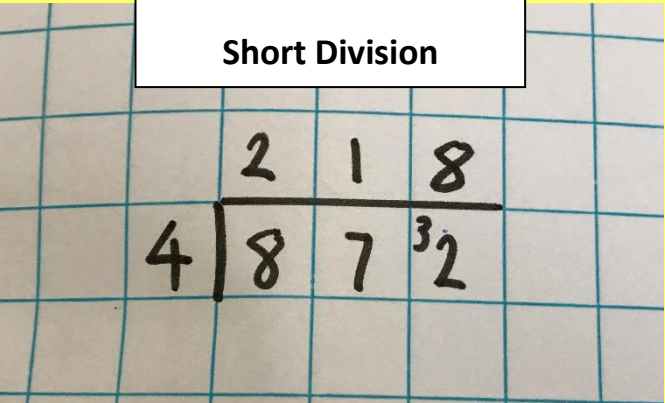


**Year 4**

Divide up to 3-digit numbers by a single digit

**Write it**

Bus Stop Method  
Short Division



**Discuss it**

Share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor



**Statutory Requirements**

1. Identify multiples and factors, including:
  - finding all factor pairs of a number
  - common factors of two numbers - know and use the vocabulary of prime numbers and establish whether a number up to 100 is prime
2. Multiply and divide numbers mentally drawing on known facts
3. Divide numbers up to 4 digits by a one-digit number using a written method and interpret remainders appropriately for the context Divide whole numbers and those involving decimals by 10, 100 and 1000

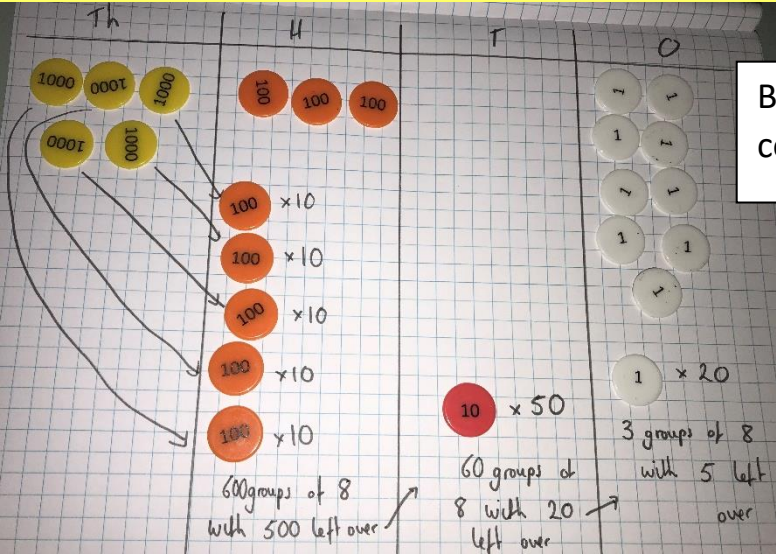
**What I need to know already**

- Recall division facts for multiplication tables up to  $12 \times 12$
- Divide a two-digit number by 10, 100

**Key Resources**

Cubes, Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters, Numicon

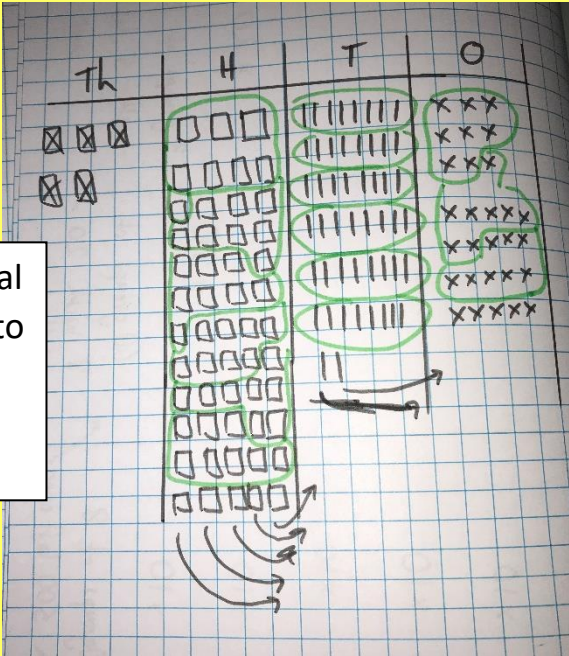
**Build it**



Build with PV counters

Tips: Make exchanges where necessary

**Draw it**



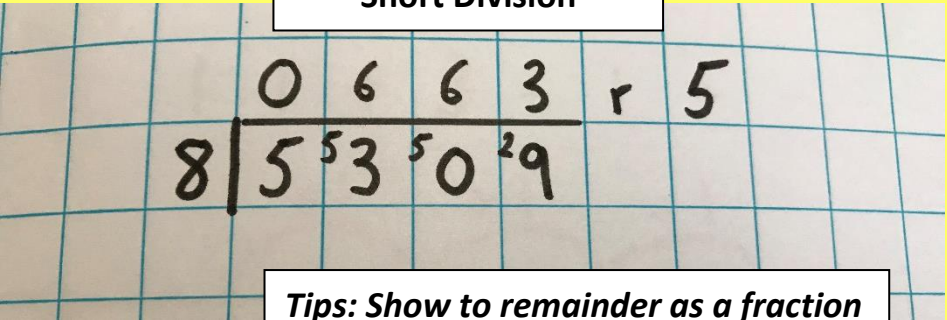
Use agreed visual maths symbols to represent bus stop method

**Year 5**

Divide at least 4 digits by single-digit numbers

**Write it**

Bus Stop Method  
Short Division



Tips: Show to remainder as a fraction  $663 \frac{5}{8}$  or rounded as appropriate to the problem involved

**Discuss it**

Share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, quotient, prime number, prime factors, composite number (non-prime)



**Statutory Requirements**

- 1. Divide numbers up to 4 digits by a two -digit number using the formal written method of long division
- 2. Interpret remainders as whole number remainders, fractions, or by rounding as appropriate for the context.
- 3. Divide numbers up to 4 digits by a two -digit number using the formal written method of short division as appropriate.

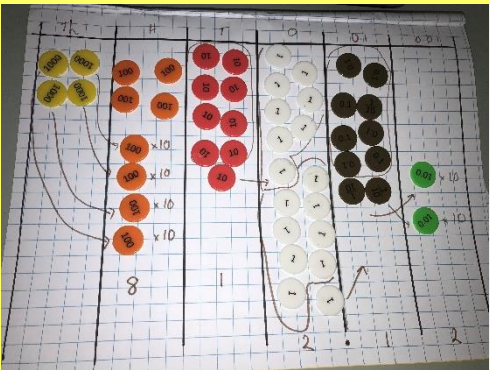
**What I need to know already**

- Recall division facts for multiplication tables up to  $12 \times 12$
- Use knowledge of multiplication tables when dividing
- Know how to use short division

**Key Resources**

Cubes, Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters, Numicon

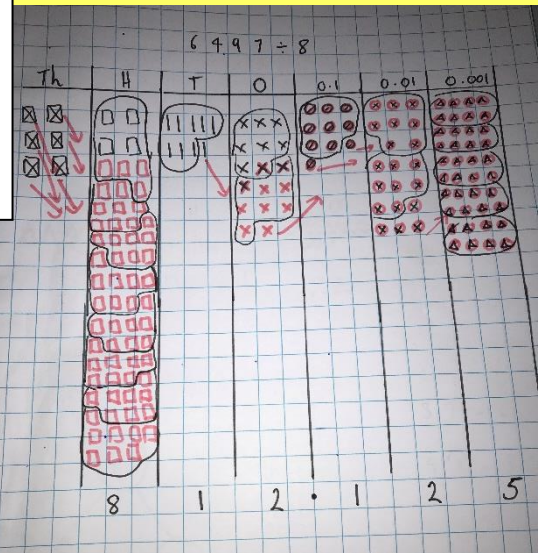
**Build it**



Build with PV counters

Tips: Make exchanges where necessary

**Draw it**

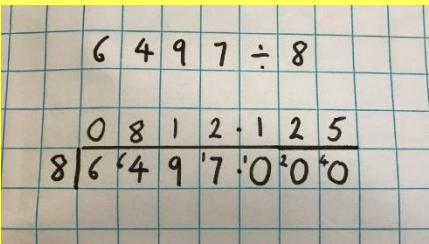


Use agreed visual maths symbols to represent bus stop method

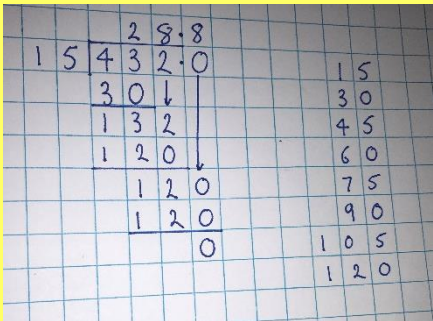
**Year 6**

Divide at least 4 digits by single-digit numbers and 2-digit numbers

**Write it**



Understand how to express remainders as fractions or decimals or rounding where appropriate to the problem



Long Division

Tip: Write the multiples next to the sum

**Discuss it**

Share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, quotient, prime number, prime factors, composite number (non-prime), common factor

## **Berrycoombe School Maths Calculation Policy 2018**