Berrycoombe Primary School Calculation Policy

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

This Policy will be reviewed on: February 2021
Reviewed: February 2021

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 Primary School.

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.

100,000	10,000	1,000	100	10	1	0.1	0.01

Year R

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

Statutory Requirements

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

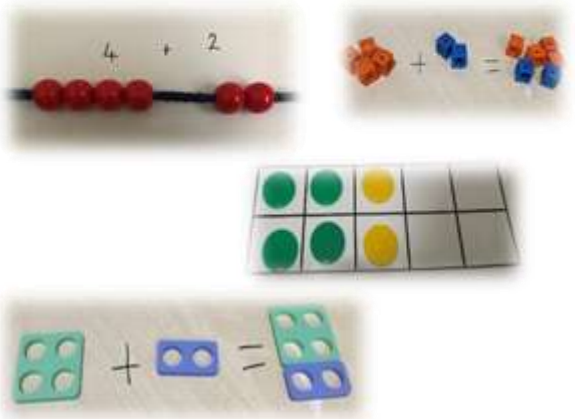
What I need to know already

- 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

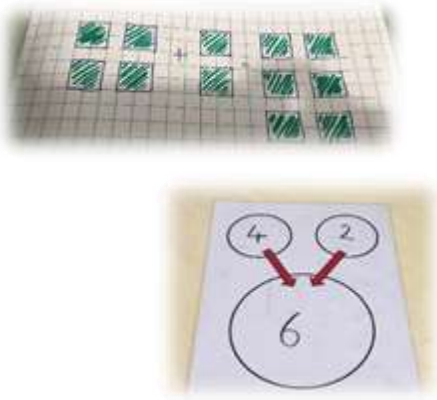
Key Resources

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

Build it



Draw it



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 to join two or more numbers together to make a total.

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

Year 1

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

Statutory Requirements

- ✓ Read, write and interpret mathematical statements involving + and =signs and relate this to balance sums and scales
- ✓ Represent and use number bonds and related subtraction facts within 20
- ✓ Add 1-digit and 2-digit numbers to 20, including zero
- ✓ Solve one -step problems that involve addition, using concrete objects and pictorial representations.

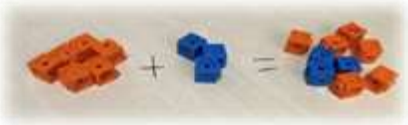
What I need to know already

- 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

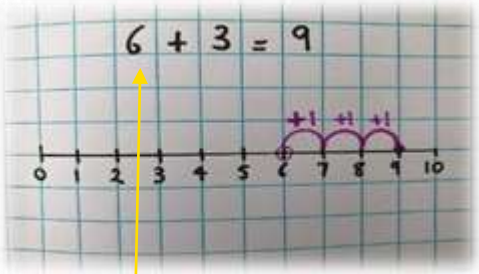
Numicon, Bead Strings, Dienes, Counters, Ten Frames, Part/Part/Whole Model, Bar Model

Build it



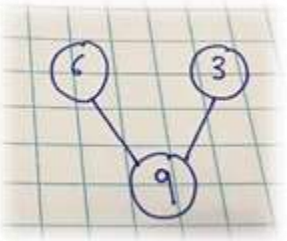
Using a range of concrete resources

Write it



Tips: Start with the larger number and count on

Draw it



Discuss it

Addition is to join two or more numbers together to make a total.

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

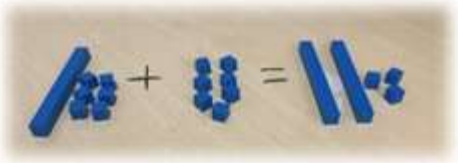
Year 2

- **Add a 2-digit number and ones**
- **Add a 2-digit number and tens**

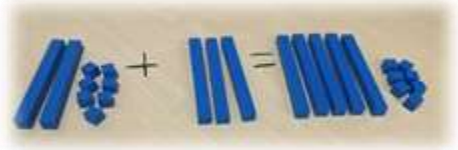
Statutory Requirements

- ✓ 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
- ✓ Recall and use addition facts to 20 fluently, and derive and use related facts up to 100
- ✓ 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
- ✓ Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- ✓ Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Build it

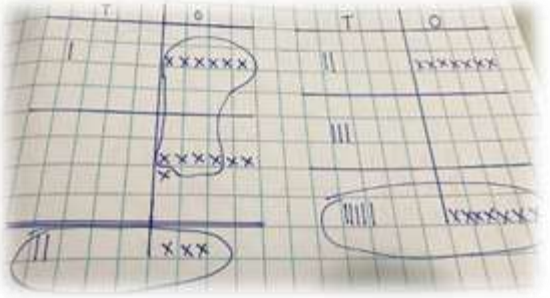


16
+ 7



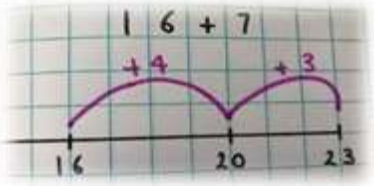
27
+ 30

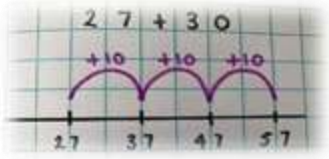
Draw it



Agreed visual maths symbols

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 to join two or more numbers together to make a total.

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

Year 2

- **Add two 2-digit numbers**
- **Add three 1-digit numbers**

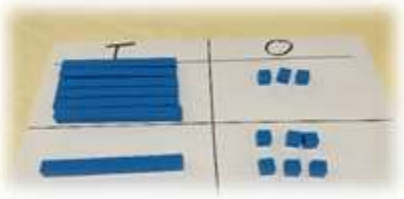
What I need to know already

- 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

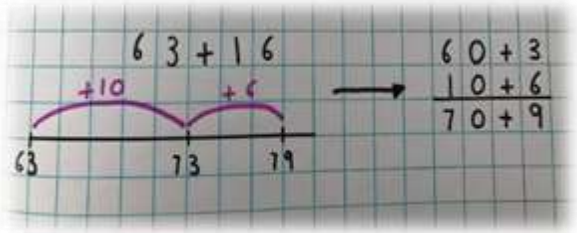
Build it



63
+ 16

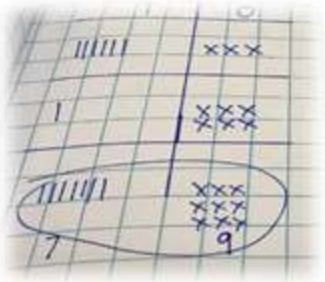
6+3+4

Write it

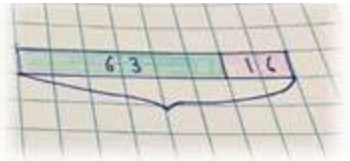


Tips: *Choose numbers that don't go over the tens barrier until secure*

Draw it



Agreed visual maths symbols



Discuss it

Addition is to join two or more numbers together to make a total.

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

+

Year 3

Add numbers with 3 digits
e.g 236+73

Statutory Requirements

✓ 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

✓ Add numbers with up to three digits, using formal written methods of columnar addition

✓ Estimate the answer to a calculation and use inverse operations to check answers

✓ Solve problems, including missing number problems, using number facts, place value, and more complex addition.

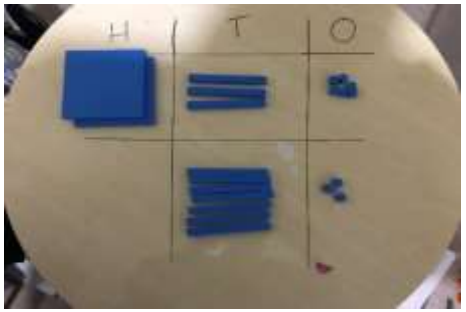
What I need to know already

- 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

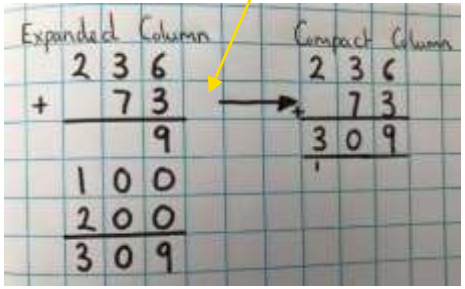


236
+73

1) Set the Dienes blocks up in the correct columns
2) Start with the ones

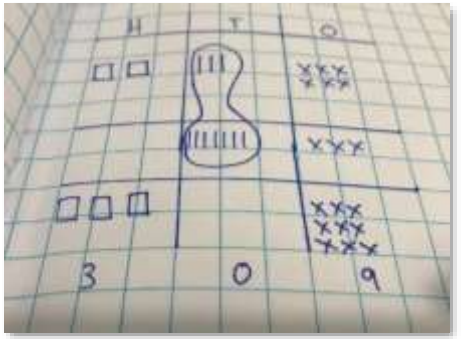
Write it

Tips: Focus on starting with the ones



Tips: Secure and confident children can move to this method

Draw it



Agreed visual maths symbols

Discuss it

Addition is to join two or more numbers together to make a total.

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

.

Year 4

Add numbers with 4 digits

Statutory Requirements

- ✓ Add numbers with up to 4 digits using the formal written methods of columnar addition
- ✓ Estimate and use inverse operations to check answers to a calculation.
- ✓ 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

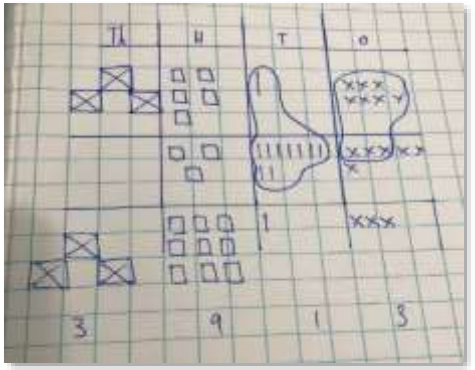
Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters

Build it

3517
+396

1) Set the PV counters up in the correct columns
2) Start with the ones

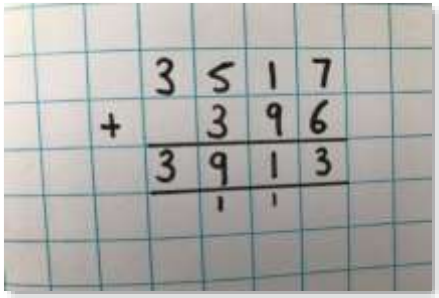
Draw it



Agreed visual maths symbols

Write it

Column Method



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

Discuss it

Addition is to join two or more numbers together to make a total.

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

.

Year 5

- **Add numbers with more than 4 digits.**
- **Add decimals with 2 decimal places, including money.**

Statutory Requirements

- ✓ add whole numbers with more than 4 digits, including using formal written methods (columnar addition)
- ✓ add numbers mentally with increasingly large numbers
- ✓ use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- ✓ 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

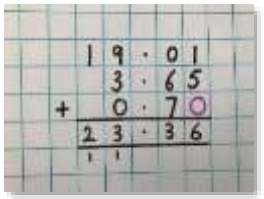
Build it

23481
+1362

23.59
+7.55

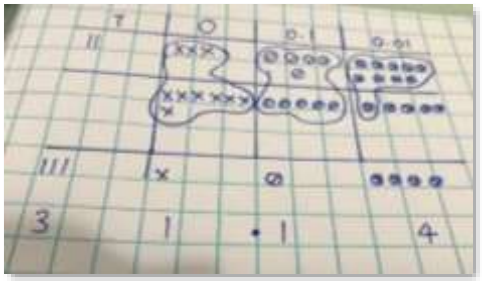
Write it

Column Method

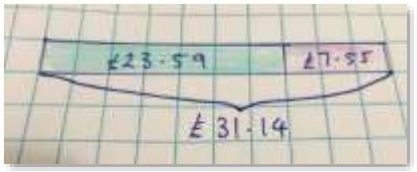


Tips: Zeros added to support place value. Line decimal point up

Draw it



Agreed visual maths symbols



Discuss it

Addition is to join two or more numbers together to make a total.

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

.

Year 6

Add several numbers of increasing complexity

Statutory Requirements

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

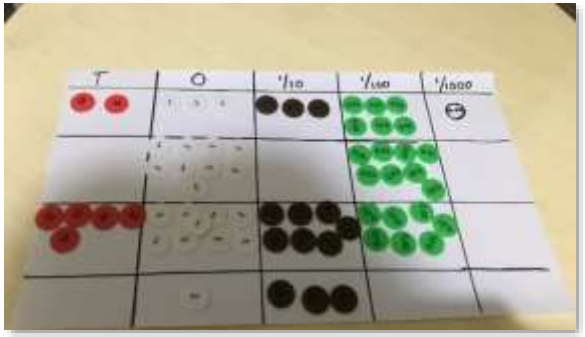
What I need to know already

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

Key Resources

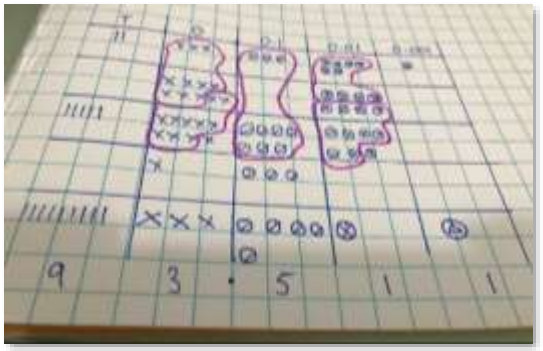
Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters

Build it



1) Set the PV counters up in the correct columns
2) Start with the thousandths

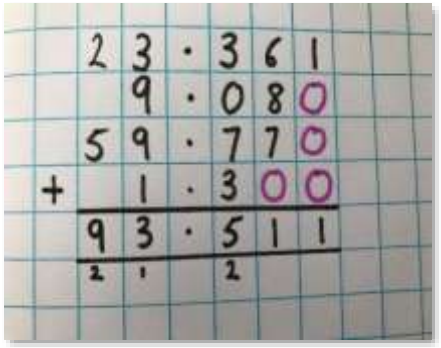
Draw it



Agreed visual maths symbols

Write it

Column Method



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

Discuss it

Addition is to join two or more numbers together to make a total.

Add, more, plus, and, make, altogether, total, equal to, count on, 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

.

Year R

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

Statutory Requirements

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

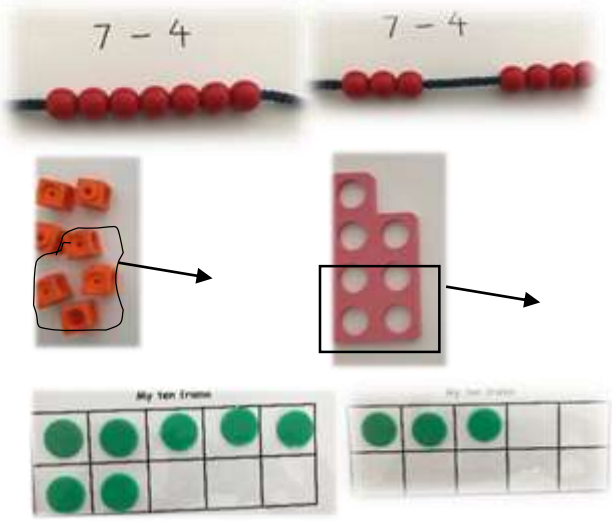
What I need to know already

- 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

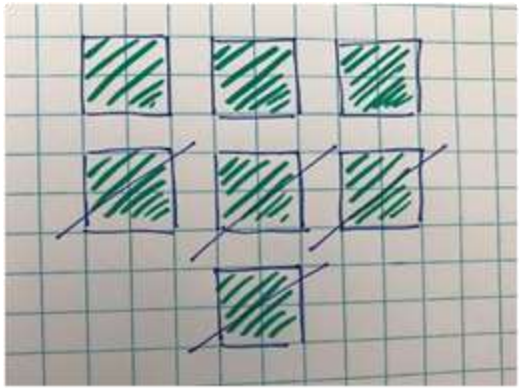
Key Resources

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

Build it



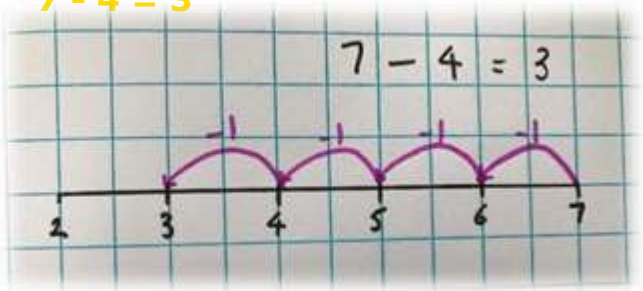
Draw it



Crossing out images to understand 'take away'

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.

Discuss it

Subtraction is taking one number 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_?

.

Year 1

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

Statutory Requirements

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

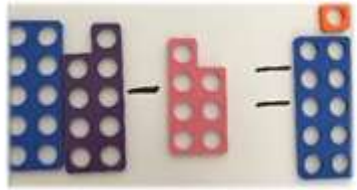
What I need to know already

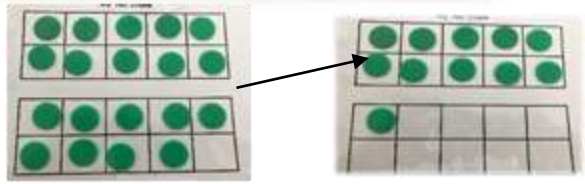
- Order numbers to 20 accurately
- Count accurately from 0 to 21
- Count up to 20 objects accurately and attribute the correct numeral to label the set
- Subsidise small groups of objects
- Understand the 'cardinal' value of a set/ array.

Key Resources

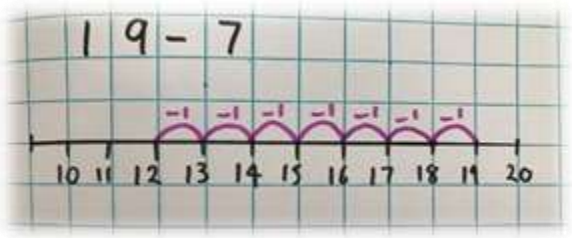
Numicon, Bead Strings, Dienes, Counters, Ten Frames, Part/Part/Whole Model, Bar Model

Build it





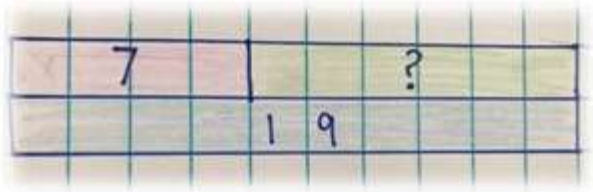
Write it



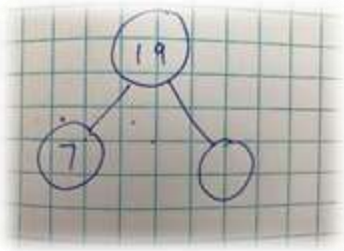
Tips: Start at the larger number and count back in ones

Draw it

Bar Model



Part Part Whole



Discuss it

Subtraction is taking one number 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_?

.

Year 2

Subtract a two-digit number and ones
Subtract a two-digit number and tens

Statutory Requirements

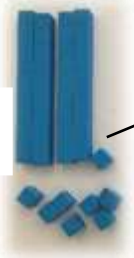
- ✓ Solve problems with subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- ✓ Applying their increasing knowledge of mental and written methods
- ✓ Recall and use subtraction facts to 20 fluently, and derive and use related facts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

Build it

37-6

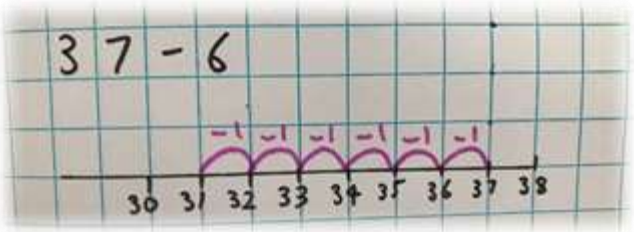
Remove 6 ***ones***

48-30

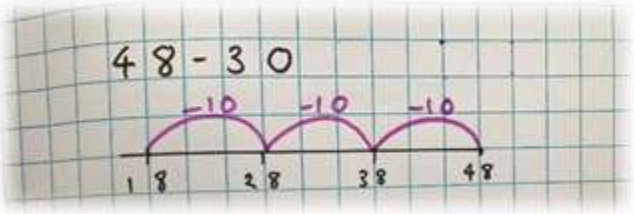


Remove 3 ***tens***

Write it



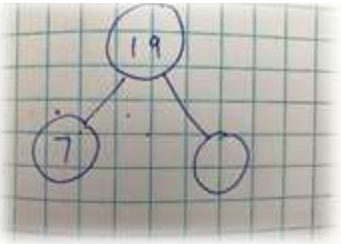
Tips: Start at the larger number and count back in ones



Draw it

Bar Model

Part Part Whole



Discuss it

Subtraction is taking one number 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

.

Year 2

Subtract two 2-digit numbers

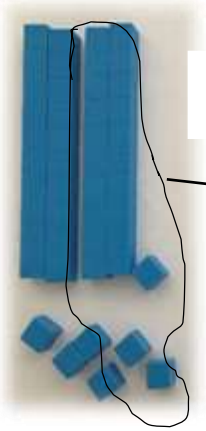
What I need to know already

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

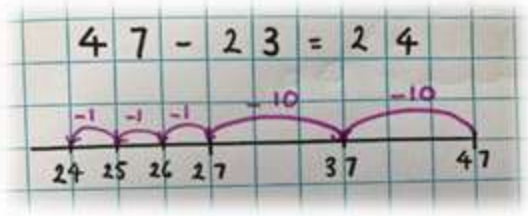
Build it



47-23

Remove 2 ***tens*** and 3 ***ones***

Write it

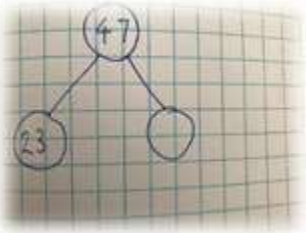


Tips: Start at the larger number and count back in ones

Draw it

Bar Model

Part Part Whole



Discuss it

Subtraction is taking one number 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

.

Year 3

Subtract numbers with 3 digits

Statutory Requirements

- ✓ 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
- ✓ Subtract numbers with up to three digits, using formal written methods of columnar subtraction
- ✓ Estimate the answer to a calculation and use inverse operations to check answers
- ✓ 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

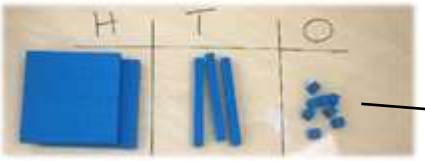
Key Resources

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

Build it

238-146

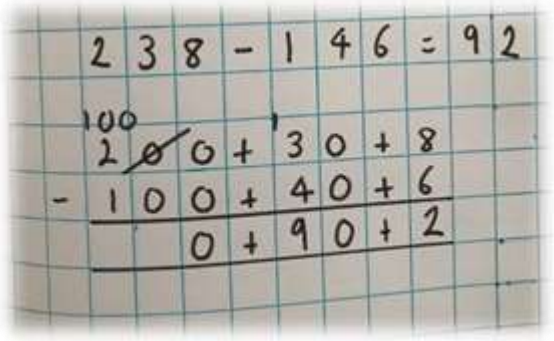
1)Set the Dienes up in correct columns.



2) Remove 6 ones

3) Subtract 4 ***tens*** - **exchange**

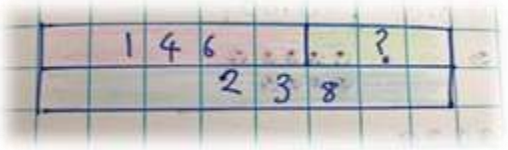
Write it



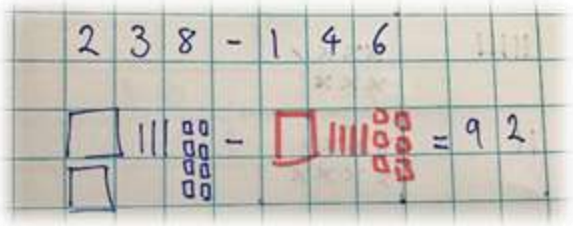
Tips: Attempt this partitioning method when secure with a number line. Start with numbers where no exchanging is required

Draw it

Bar Model



Pictorial representation



Discuss it

Subtraction is taking one number 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

.

Year 4

Subtract numbers with 4 digits

Statutory Requirements

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

What I need to know already

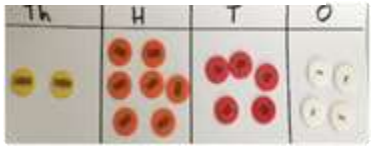
- Find 100 less than a given number
- Use column subtraction for numbers up to three digits

Key Resources

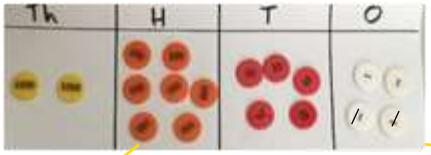
Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters

Build it

2754 - 1562



1)Set the PV counters up in correct columns.



3) Exchange where necessary

2) Start by removing the ones

Draw it

2754 - 1562

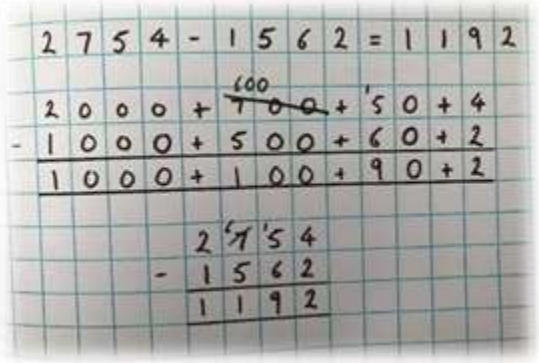
Subtract 1 thousand

Subtract 5 hundreds

Subtract 6 tens

Subtract 2 ones

Write it



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

Discuss it

Subtraction is taking one number 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

.

Year 5

Subtract numbers with more than 4 digits

Statutory Requirements

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

What I need to know already

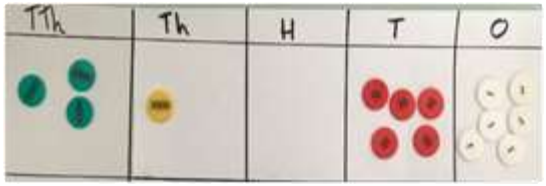
- Subtract numbers mentally, including a three-digit number and ones, tens or hundreds
- Use column subtraction for numbers up to four digits
- Estimate the answer to a calculation

Key Resources

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

Build it

31056 -2128

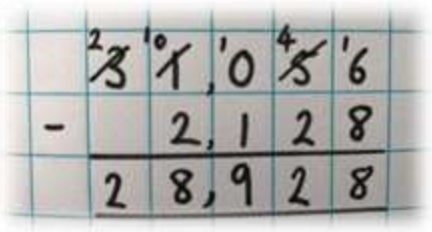


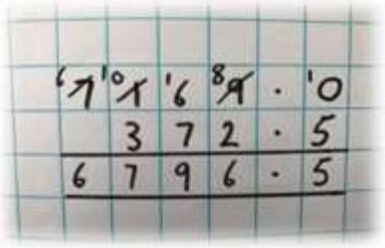
1) Set the PV counters up in correct columns.

2) Start by removing the ones

3) Exchange where necessary

Write it





Tips: Using 0's as place value holders
Practice exchanging multiple times

Draw it

31056 -2128

Subtract 2 thousands

Subtract 1 hundred

Subtract 2 tens

Subtract 8 ones

Discuss it

Subtraction is taking one number 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.

Year 6

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

Statutory Requirements

- ✓ 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

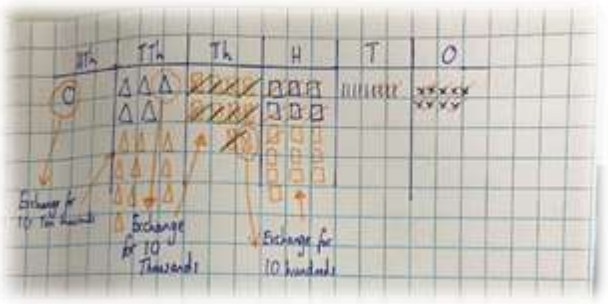
31056 -2128

1) Set the PV counters up in correct columns.

2) Start by removing the ones

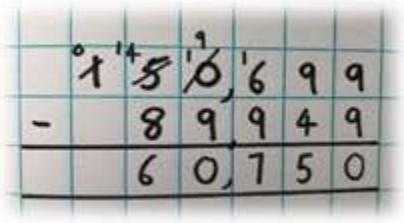
3) Exchange where necessary

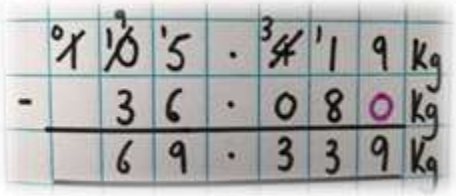
Draw it



150,699
- *89,949*

Write it





Tips: Multiple times of exchanging and increasingly larger decimals.

Discuss it

Subtraction is taking one number 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.

Year R

Solve problems, including doubling

Statutory Requirements

✓ Solve problems, including doubling

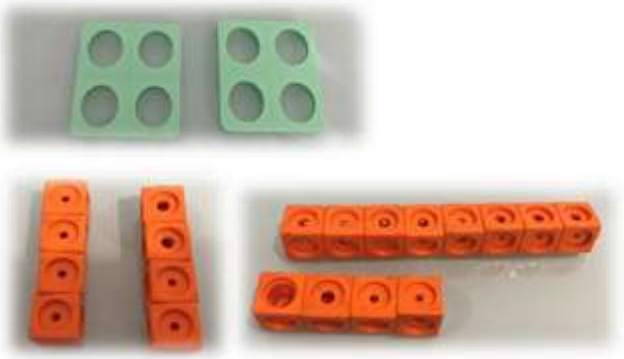
What I need to know already

- 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

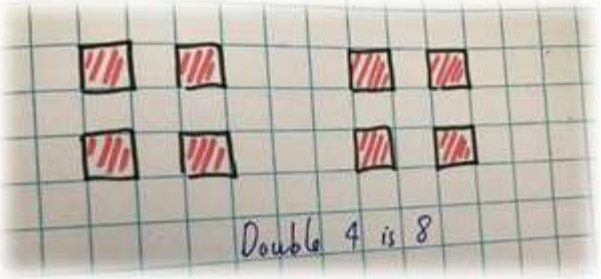
Cubes, Numicon, Bead Strings, Dienes, Counters, Ten Frames, Part/Part/Whole Model, Bar Model

Build it



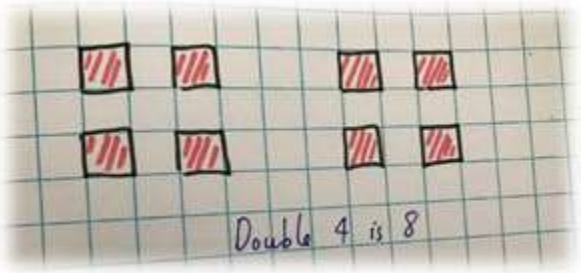
Demonstrate doubling with Numicon, cubes and a range of concrete objects

Draw it



Draw pictures to show how to double

Write it



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

Discuss it

Multiplication is repeatedly adding something together

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

Year 1

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

Statutory Requirements

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

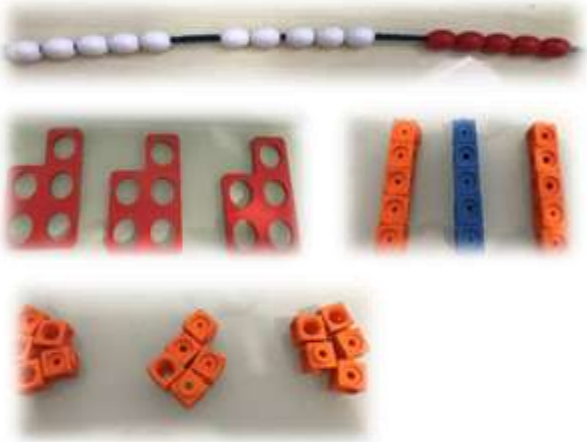
What I need to know already

- 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

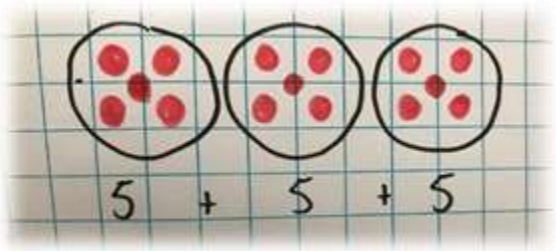
Cubes, Numicon, Bead Strings, Dienes, Counters, Ten Frames, Part/Part/Whole Model, Bar Model

Build it



Tips: Practise making equal groups first

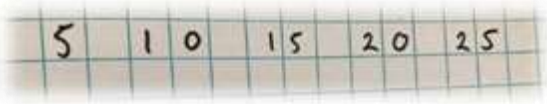
Draw it



Draw the concrete method

Write it

5 + 5 + 5 = 15
5 x 3 = 15



Tips: Record multiplication alongside repeated addition

Discuss it

Multiplication is repeatedly adding something together

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

Year 2

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

Statutory Requirements

- ✓ Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- ✓ Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs
- ✓ Show that multiplication of two numbers can be done in any order
- ✓ 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

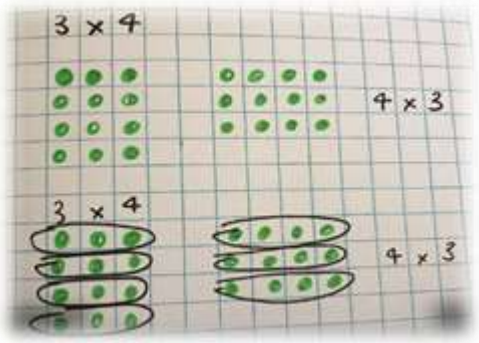
Cubes, Numicon, Bead Strings, Dienes, Counters, Ten Frames, Part/Part/Whole Model, Bar Model

Build it

Arrays

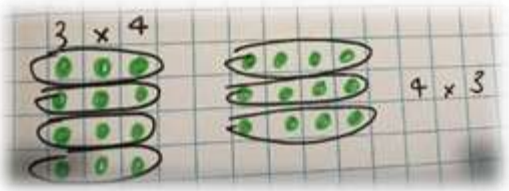
Tips: Use counters or cubes to arrange in groups of rows and columns

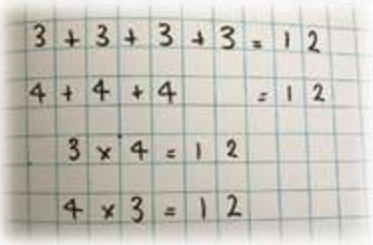
Draw it



Draw the array

Write it





Tips: Understand that multiplication is commutative

Discuss it

Multiplication is repeatedly adding something together

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

Year 3

Multiply 2-digits by a single digit number

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

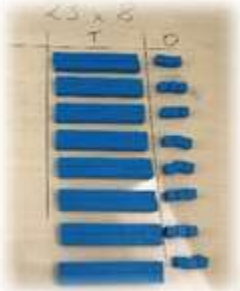
What I need to know already

- 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



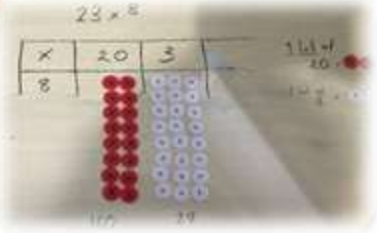
Build array with counters

↓

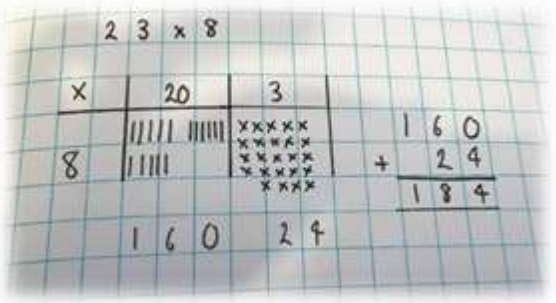
Build with dienes

↓

Build with PV Counters

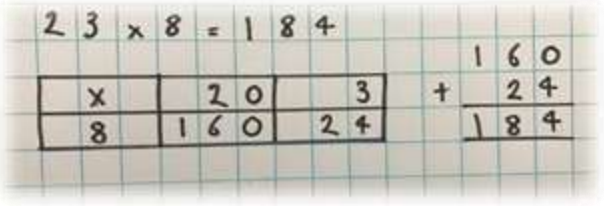


Draw it



Agreed visual maths symbols

Write it



Tip: Encourage column addition to add accurately

Discuss it

Multiplication is repeatedly adding something together

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

Year 4

Multiply 2 and 3-digit numbers by a single digit

Statutory Requirements

- ✓ Recall and use multiplication facts for multiplication tables up to 12 x 12
- ✓ Use place value, known and derived facts to multiply mentally, including: x0 x1 and multiplying together three numbers
- ✓ Recognise and use factor pairs and commutativity in mental calculations
- ✓ Multiply two -digit and three -digit numbers by a one -digit number using formal written layout
- ✓ 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.

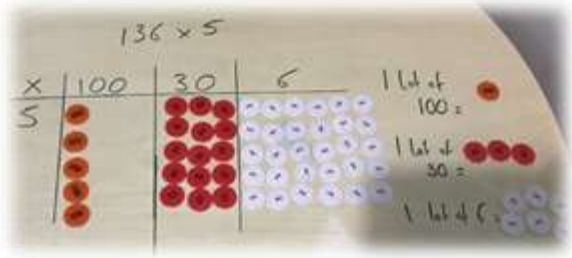
What I need to know already

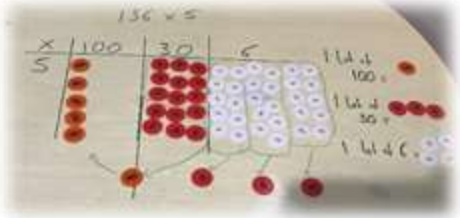
- Recall multiplication facts for 2, 3, 4, 5, 8 and 10 multiplication tables
- Understand that multiplication and division are inverse operations

Key Resources

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

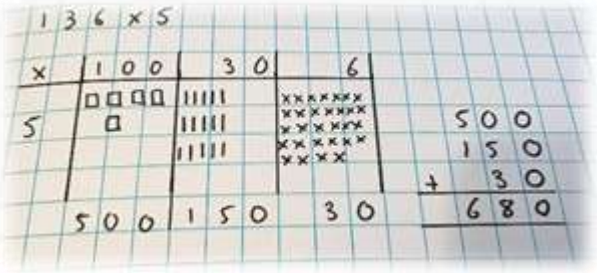
Build it





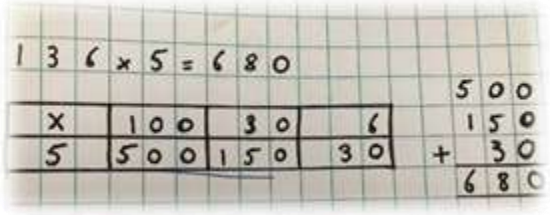
Build with PV counters

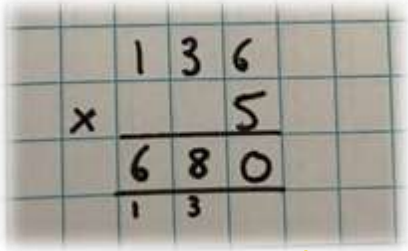
Draw it



Agreed visual maths symbols

Write it





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

Discuss it

Multiplication is repeatedly adding something together

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

Year 5

Multiply numbers up to / more than 4 digits

Statutory Requirements

- ✓ 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.
- ✓ Multiply numbers up to four digits by a one or two -digit number using a formal written method.
- ✓ Multiply whole numbers and those involving decimals by 10, 100 and 1000.

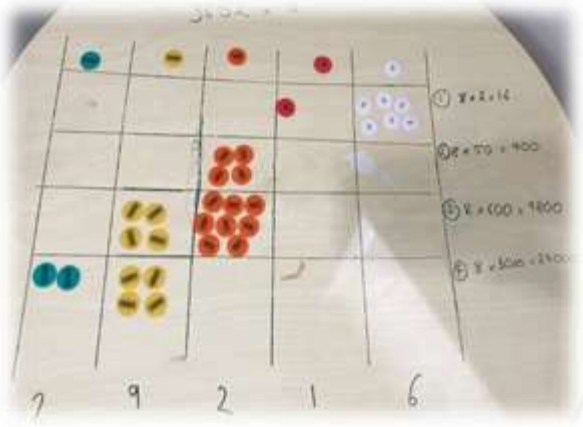
What I need to know already

- Recall multiplication facts for multiplication tables up to 12 × 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

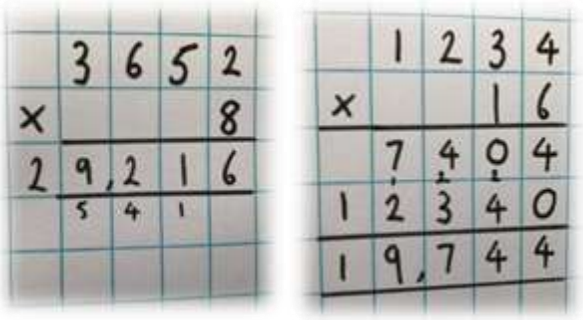
Cubes, Dienes, Bar Model, Numicon, Visual Maths Symbols, Place Value Chart, Place Value Counters

Build it



Represent column multiplication with PV counters

Write it



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

Draw it

Agreed visual maths symbols

Discuss it

Multiplication is repeatedly adding something together

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

Year 6

Multiply numbers with more than 4 digits with decimals

Statutory Requirements

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

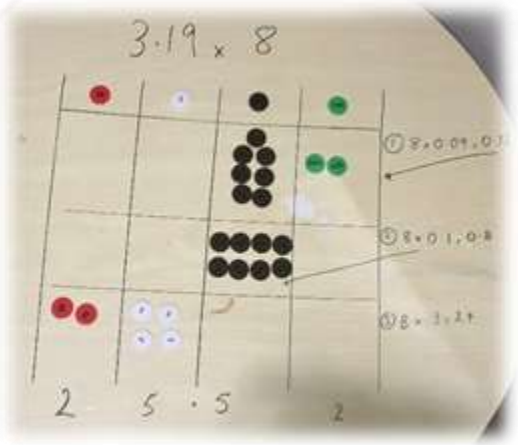
What I need to know already

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

Key Resources

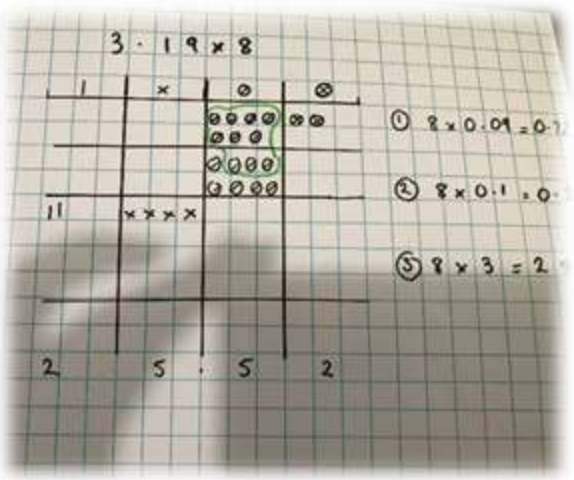
Cubes, Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters, Numicon

Build it



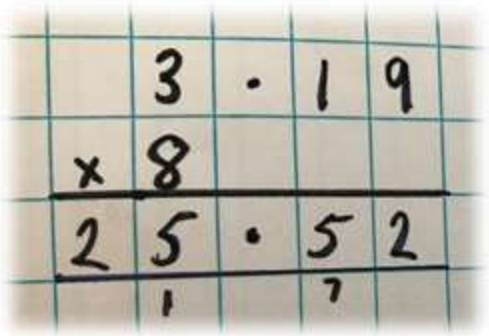
Represent column multiplication with PV counters

Draw it



Agreed visual maths symbols

Write it



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

Discuss it

Multiplication is repeatedly adding something together

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

Year R

Solve problems, including halving and sharing

Statutory Requirements

✓ 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

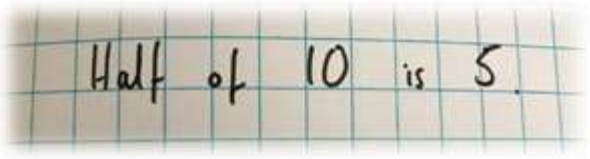
Build it

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

Move to practical objects

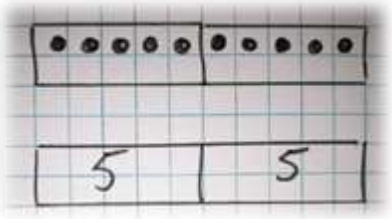
Tip: Focus on making number stories

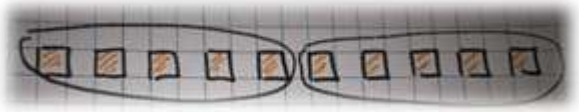
Write it



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

Draw it





Pictorial representation with a range of pictures

Discuss it

Division is sharing or grouping a number into equal parts.

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

Year 1

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

Statutory Requirements

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

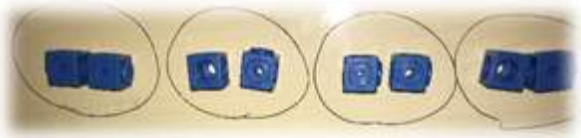
What I need to know already

- 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, Ten Frames, Part/Part/Whole Model, Bar Model

Build it

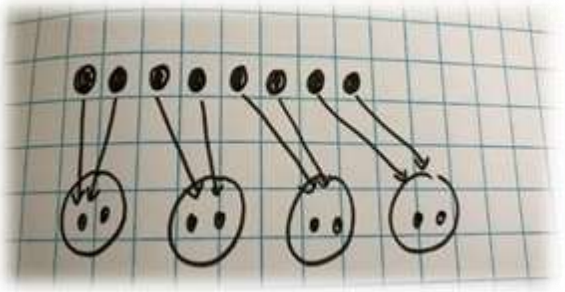


Sharing

Sharing a range of practical objects into equal groups

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

Draw it

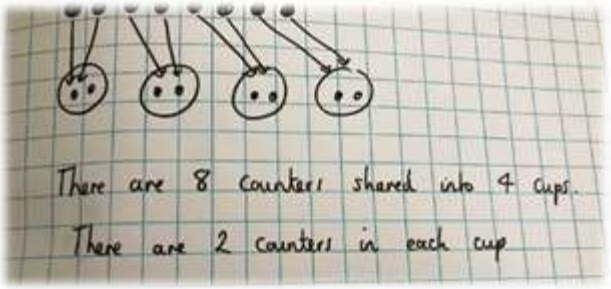


Sharing

Pictorial representation with a range of pictures

Write it

Sharing



8 shared between 4

Discuss it

Division is sharing or grouping a number into equal parts.

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

÷

Year 2

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

Statutory Requirements

- ✓ Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables
- ✓ Recognising odd and even numbers
- ✓ Calculate mathematical statements for division within the multiplication tables and write them using the signs ÷ and =
- ✓ Show that multiplication of two numbers is commutative but division is not
- ✓ 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, Ten Frames, 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

Write it

Sharing

There are 10 in each group

20 ÷ 2 = 10

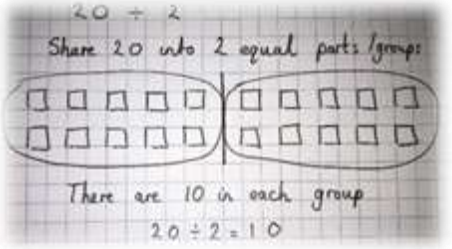
Grouping

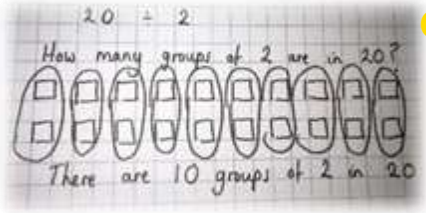
There are 10 groups of 2 in 20

20 ÷ 2 = 10

Draw it

Sharing





Grouping

Discuss it

Division is sharing or grouping a number into equal parts.

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

Year 3

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

Statutory Requirements

- ✓ Recall and use multiplication and division facts for the 3, 4 and 8 x tables.
- ✓ 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
- ✓ Solve problems, involving missing number problems, division, including positive number scaling problems and correspondence problems where n objects are connected to m objects.

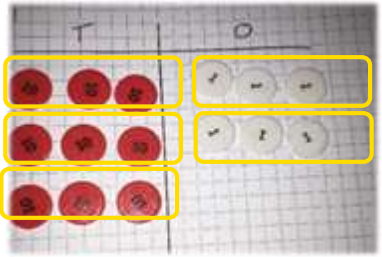
What I need to know already

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

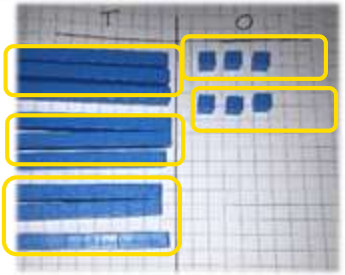
Key Resources

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

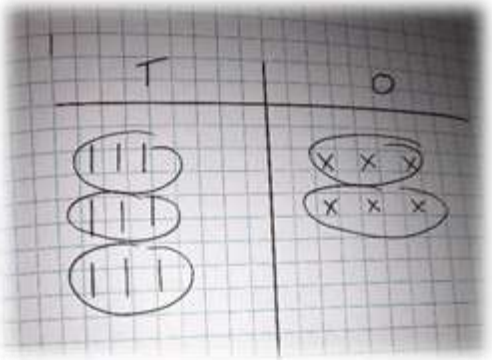
Build it



We want to make groups of 3 starting with the tens



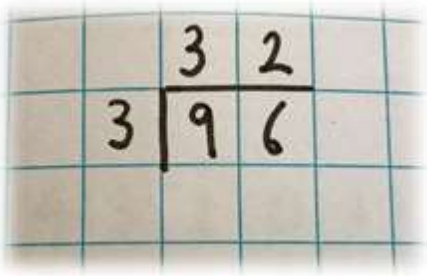
Draw it



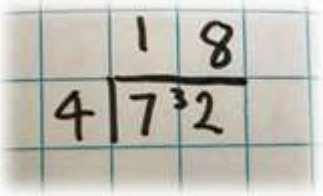
Agreed visual maths symbols

Write it

Short Division Bus Stop Method



Move to a calculation that involves remainders within it.



Discuss it

Division is sharing or grouping a number into equal parts.

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

Year 4

Divide up to 3-digit numbers by a single digit

Statutory Requirements

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

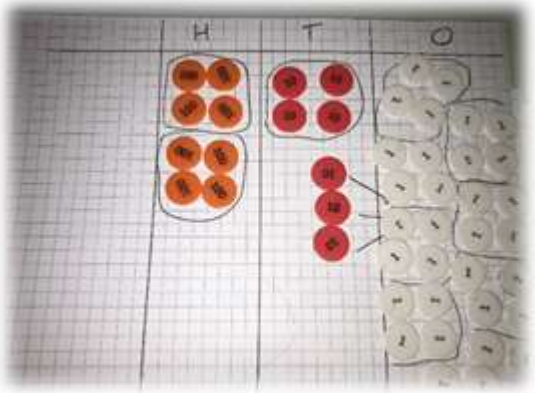
What I need to know already

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

Key Resources

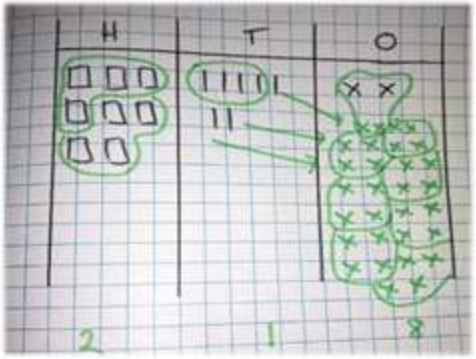
Cubes, Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters, Numicon

Build it



Tips: Make exchanges where necessary

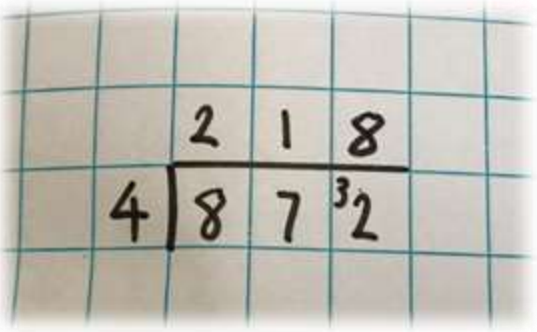
Draw it



Agreed visual maths symbols

Write it

Short Division Bus Stop Method



Discuss it

Division is sharing or grouping a number into equal parts.

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

Year 5

Divide at least 4 digits by single-digit numbers

Statutory Requirements

- ✓ 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
- ✓ Multiply and divide numbers mentally drawing on known facts
- ✓ 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

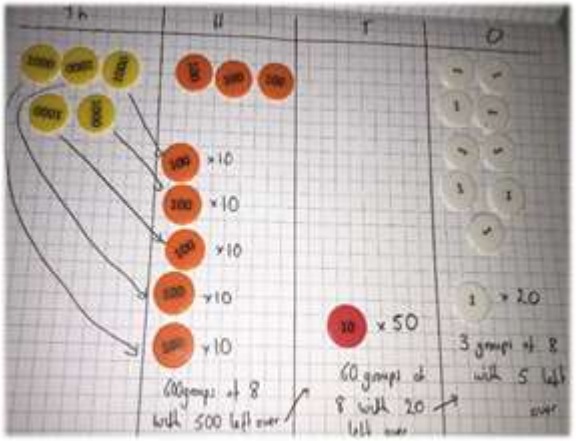
What I need to know already

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

Key Resources

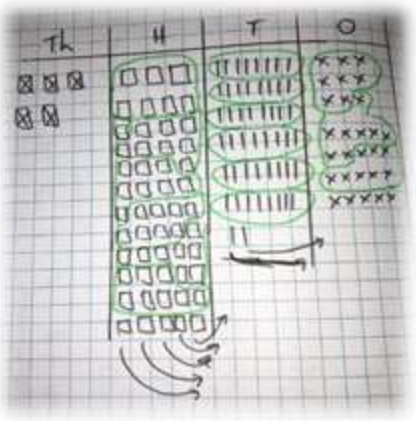
Cubes, Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters, Numicon

Build it



Tips: Make exchanges where necessary

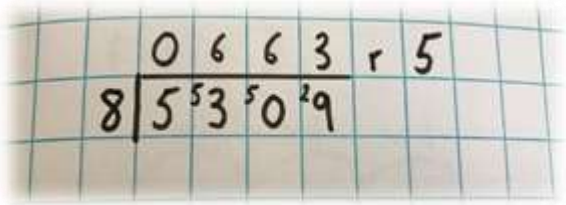
Draw it



Agreed visual maths symbols

Write it

Short Division Bus Stop Method



Tips: Show to remainder as a fraction 663 5/8 or rounded as appropriate to the problem involved

Discuss it

Division is sharing or grouping a number into equal parts.

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)

Year 6

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

Statutory Requirements

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

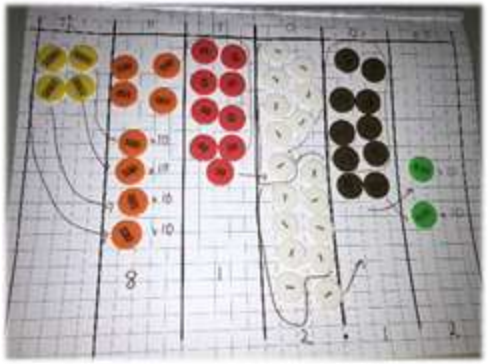
What I need to know already

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

Key Resources

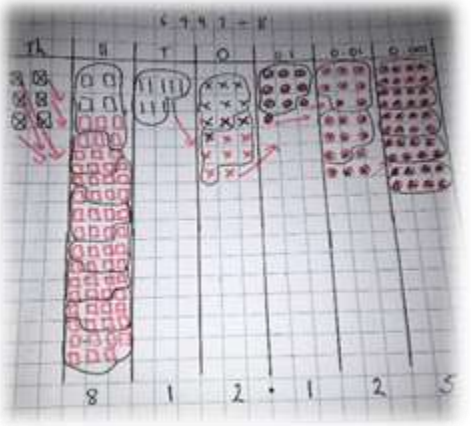
Cubes, Dienes, Bar Model, Visual Maths Symbols, Place Value Chart, Place Value Counters, Numicon

Build it



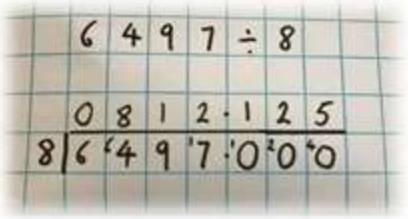
Tips: Make exchanges where necessary

Draw it



Agreed visual maths symbols

Write it



Short Division Bus Stop Method

Long Division Tip: Write the multiples next to the sum

Discuss it

Division is sharing or grouping a number into equal parts.

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)