



How we teach calculation...

Stanley Park Junior School

Calculation Policy

Contents



- 3. Introduction
- 4. Approaching Calculation

Stages

- 5. Addition Stage 1—Number line
- 6. Addition Stage 2—Partitioning
- 7. Addition Stage 3—Column
- 8. Subtraction Stage 1—Number line back
- 9. Subtraction Stage 1—Number line on
- 10. Subtraction Stage 2—Partitioning
- 11. Subtraction Stage 3—Column Subtraction
- 12. Multiplication Stage 1—Partitioning
- 13. Multiplication Stage 2—Expanded Short
- 14. Multiplication Stage 3—Short
- 15. Multiplication Stage 4—Long
- 16. Multiplication Stage 4—Long with Decimals
- 17. Division Stage 1—Number line
- 18. Division Stage 2—Partitioning
- 19. Division Stage 3—Short
- 20. Division Stage 4—Long



Ages

- 21. Year 3—Addition
- 21. Year 4—Addition
- 22. Year 5—Addition
- 23. Year 6—Addition
- 24. Year 3—Subtraction
- 25. Year 4—Subtraction
- 26. Year 5—Subtraction
- 27. Year 6—Subtraction
- 28. Year 3—Multiplication
- 29. Year 4—Multiplication
- 30. Year 5—Multiplication
- 31. Year 6—Multiplication
- 32. Year 3—Division
- 33. Year 4—Division
- 34. Year 5—Division
- 35. Year 6—Division



Introduction



About the policy...

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

This document is intended to help all members of the SPJS community understand the written methods taught to children in their learning, use and application the four operations in a variety of different contexts.



Stages and ages...



The policy is split into two sections. Firstly there are the different *stages* that children are expected to follow as they progress through their time at SPJS. Secondly there are the *age related expectations* which give a guide of where each child is expected to be according to the National Curriculum 2014.

Although these expectations are labelled, it is vital that pupils are taught according to the stage that they are currently working at.

Children will be moved onto the next level as soon as they are ready, or work at a lower stage until they are secure enough to move on.

In lessons...

At SPJS we always try to present the different types of calculation in a real life context or using problem solving approach to help build children's understanding of the purpose of calculation and to help them recognise when to use certain operations and methods when faced with problems. This is our priority within calculation lessons.



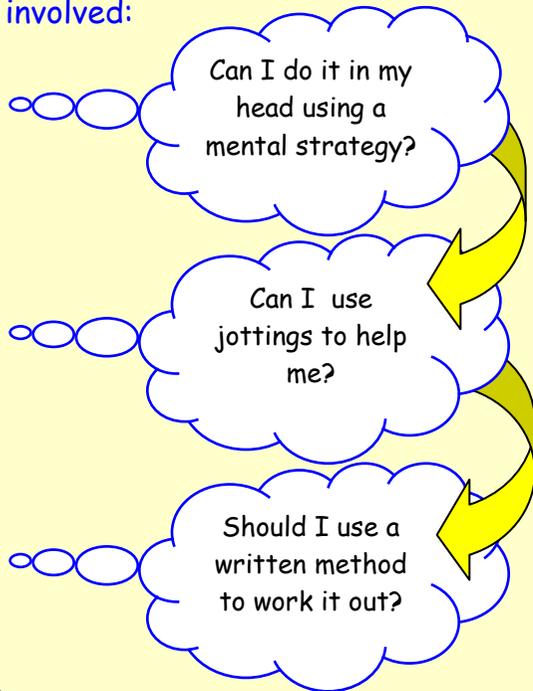
This policy not only shows the procedures used for the four operations, it also makes suggestions as to the models and manipulatives that we use to support the children's learning.

Approaching Calculation



Methods to use...

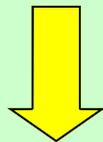
Children need to be taught and encouraged to use the following processes in deciding what approach they will take to a calculation, to ensure they select the most appropriate method for the numbers involved:



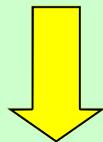
Before you begin...

Before any full calculations begin, an estimate must be made so that the children know if their answer is reasonable and they can check their calculations.

Estimate



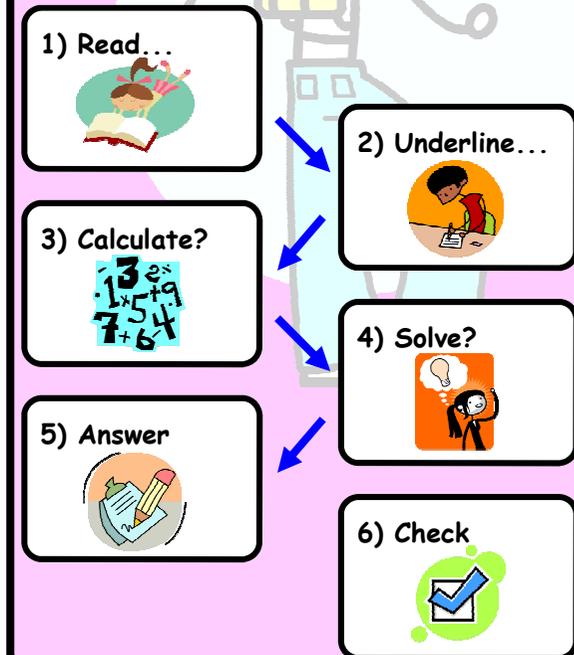
Calculate



Check

Problem Solving...

When faced with problem solving the children are taught to use RUCSAC as an efficient and thorough way of finding a solution.



Addition

Stage 1 - Number Line



Steps to Success

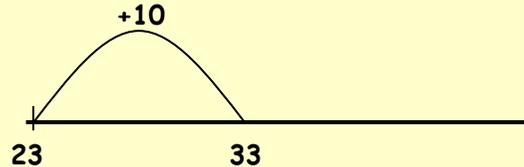
$$23 + 16 = 39$$



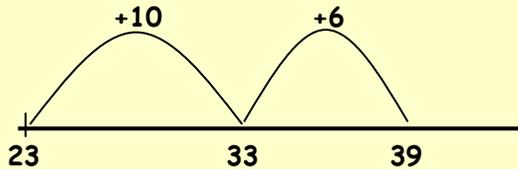
- Write the greatest number at the beginning of the number line.



- Partition the smallest number.
- Add on the tens first counting on in jumps.
- Draw a loop to show each jump and write the size of the jump above it.



- Then add on the ones.
- Write the number you are on after each jump under the line.
- Only add on the amount in the sum.



- Check your answer is reasonable.

Manipulative Use

Base Ten



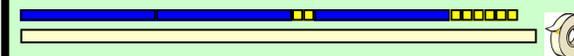
Use base ten to model the sum.



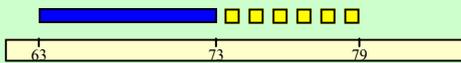
Line up the base ten horizontally as a number line.



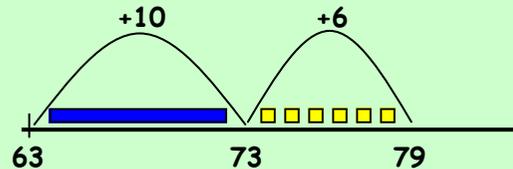
Use masking tape to create a number line on the table and match it to the line of base ten.



Label the masking tape in pencil to show the greatest number that you've started with.



Relate this to the number line as below.



Other Manipulatives

Addition

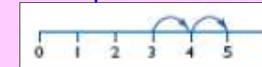
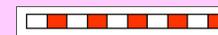
Number beads—Used to help children learn how to bridge tens.



Place Value Cards—Used to support children's understanding of place value and partitioning.



Number Line—Used as the first written method and the key model for children's understanding of the four operations.



Base Ten—Used to support children's understanding of place value and partitioning.



Place Value Counters—Used to support children's understanding of place value and partitioning.



Addition

Stage 2 - Partitioning



Steps to Success

$$232 + 89 = 321$$



- Partition the numbers into ones, tens and hundreds.

$$232 = 200 + 30 + 2$$

$$89 = 80 + 9$$

- Write the partitioned numbers into the correct columns and underline them twice for your answer line.

$$200 + 30 + 2$$

$$\underline{\quad 80 + 9}$$

- Start adding at the ones column first.

$$200 + 30 + 2$$

$$\underline{\quad 80 + 9}$$

$$200 + 110 + 11$$

- Add together the subtotals.

$$\underline{\quad 200 + 110 + 11 = 321}$$

- Check your answer is reasonable.

Manipulative Use

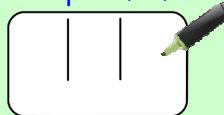
Place Value Cards



Model the sum using place value cards.

$$232 + 89$$

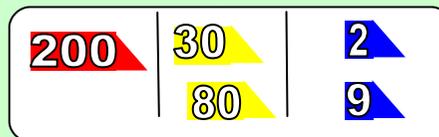
Use mini-whiteboards to draw out three columns on the top half of a whiteboard.



Partition the cards into hundreds, tens and ones.

$$200 + 30 + 80 + 2 + 9$$

Group the place value cards into the correct column on their whiteboards.



Overlap place value cards that represent the new subtotals.

$$200 + 110 + 11$$

Add together the subtotals for the final answer by counting the hundreds, tens and ones.

$$300 + 20 + 1 = 321$$

Other Manipulatives

Addition

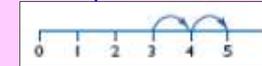
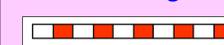
Number beads—Used to help children learn how to bridge tens.



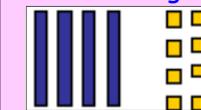
Place Value Cards—Used to support children's understanding of place value and partitioning.



Number Line—Used as the first written method and the key model for children's understanding of the four operations.



Base Ten—Used to support children's understanding of place value and partitioning.



Place Value Counters—Used to support children's understanding of place value and partitioning.



Addition

Stage 3 - Column Addition



Steps to Success

$$£30.59 + £402.56$$



£402.59



£402.59

£ 30.54

+



£402.59

£ 30.54

+

£ .



£402.59

£ 30.54

+

£ . 3



£402.59

£ 30.54

+

£433.13

+

- Write the greatest number first.
- Write any other numbers underneath in the correct column.
- Write the addition symbol.
- Underline twice with a ruler for your answer line.
- Write any decimal points and units in the correct place under the line.
- Start adding the smallest place value first.
- Carry into the next column underneath the bottom line if the sub total is ten or more.
- Continue adding the digits in each column until you have your total.
- Remember to add on carried digits.

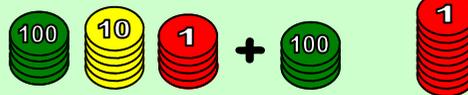
Manipulative Use

Place Value Counters

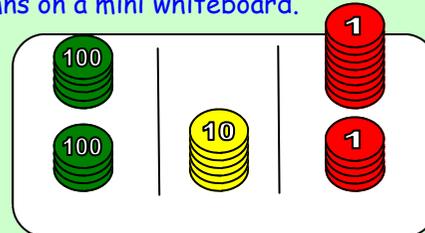


Model the sum using place value counters.

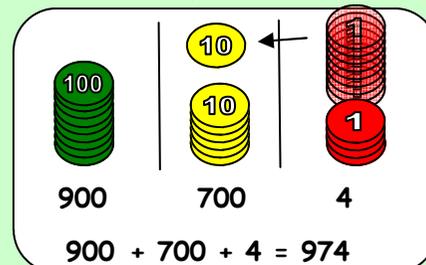
$$565 + 409$$



Arrange the numbers correctly into the columns on a mini whiteboard.



Begin adding each column. If ten or more counters are in one column then exchange them for a larger counter and carry them into the next column. Complete the sum.



Other Manipulatives

Addition

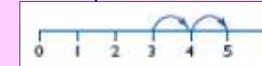
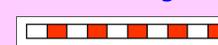
Number beads—Used to help children learn how to bridge tens.



Place Value Cards—Used to support children's understanding of place value and partitioning.



Number Line—Used as the first written method and the key model for children's understanding of the four operations.



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Subtraction

Stage 1 - Number Line - Counting Back

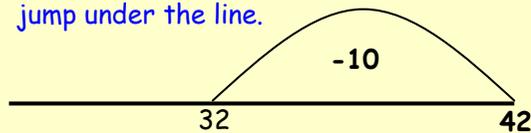


Steps to Success

$$42 - 13 = 29$$

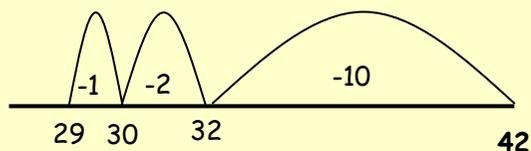


- Draw a number line and write the greatest number at the end.
- Count back in jumps partitioning the number you are subtracting as you go.
- Draw a loop to show each jump and write the size of the jump inside it.
- Write the number you are on after each jump under the line.



- When all your jumps add up to the number you are subtracting then stop.

$$10 + 2 + 1 = 13$$



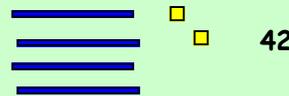
$$42 - 13 = 29$$

- Check your answer is reasonable.

Manipulative Use Base Ten



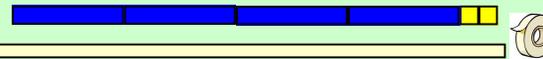
Use base ten to and collect 42.



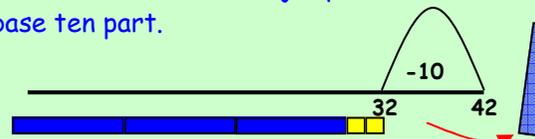
Line up the base ten horizontally as a number line.



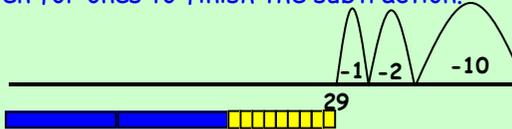
Use masking tape to create a number line on the table and match it to the line of base ten.



Label the masking tape in pencil to show the greater number that you've started with. Relate each backwards jump to removal of a base ten part.



If necessary, get the children to exchange a ten for ones to finish the subtraction.



Other Manipulatives Subtraction

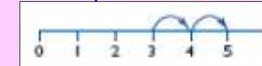
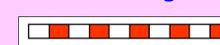
Number beads—Used to help children learn how to bridge tens and exchange.



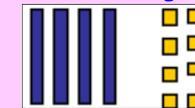
Place Value Cards—Used to support children's understanding of place value and partitioning.



Number Line—Used as the first written method and the key model for children's understanding of the four operations.



Base Ten—Used to support children's understanding of place value and partitioning.



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Subtraction

Stage 1 - Number Line - Counting On



Steps to Success

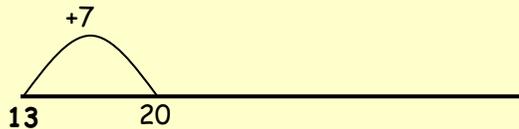
$$32 - 13$$



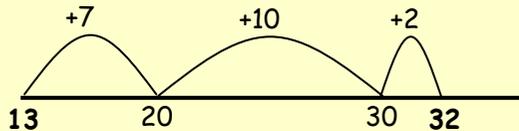
- Draw a number line and write the number you're subtracting at the start

13

- Count on to the nearest ten first.
- Draw a loop to show each jump and write the size of the jump inside it.
- Write the number you are on after each jump under the line.



- When all your jumps add up to the number you are subtracting then stop.
- Add together all the jumps counted on.



$$7 + 10 + 2 = 19$$

- Check your answer is reasonable

Manipulative Use

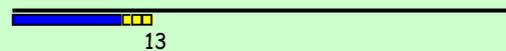
Base Ten



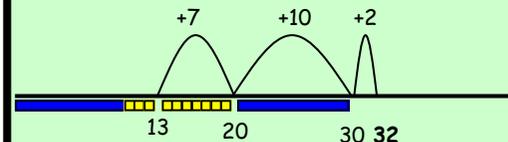
Use base ten to model counting on. Take 13.



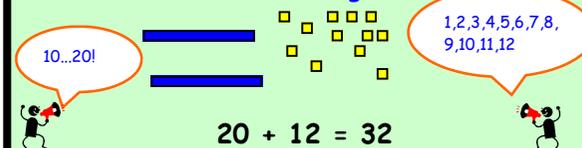
Line up the base ten horizontally as a number line.



Relate each step to a number line by using mini whiteboards or writing in books. Each time a number is counted on it can be added using base ten.



When the number being subtracted from is reached then group and together all the base ten, count and add them together!



$$20 + 12 = 32$$

If necessary, get the children to exchange ones for a ten before counting.

Other Manipulatives

Subtraction

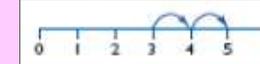
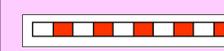
Number beads—Used to help children learn how to bridge tens and exchange.



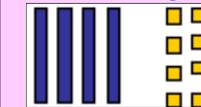
Place Value Cards—Used to support children's understanding of place value and partitioning.



Number Line—Used as the first written method and the key model for children's understanding of the four operations.



Base Ten—Used to support children's understanding of place value and partitioning.



Place Value Counters—Used to support children's understanding of place value and partitioning.



Subtraction

Stage 2 - Partitioning



Steps to Success

$$345 - 226 = 119$$



- Partition the numbers
- Write the partitioned numbers into the correct columns with addition symbols.

$$\begin{array}{r} 300 + 40 + 5 \\ 200 + 20 + 6 \end{array}$$

- Underline twice with a ruler for your answer line.

$$\begin{array}{r} 300 + 40 + 5 \\ 200 + 20 + 6 \\ \hline \hline \end{array}$$

- Start subtracting the ones column first.
- If the difference goes below zero then exchange from the next column.

$$\begin{array}{r} 300 + \overset{30}{\cancel{40}} + 15 \\ 200 + 20 + 6 \\ \hline 100 + 10 + 9 \end{array}$$

- Add up the columns.

$$\begin{array}{r} 300 + \overset{30}{\cancel{40}} + 15 \\ 200 + 20 + 6 \\ \hline 100 + 10 + 9 = 119 \end{array}$$

- Check that your answer is reasonable.

Manipulative Use

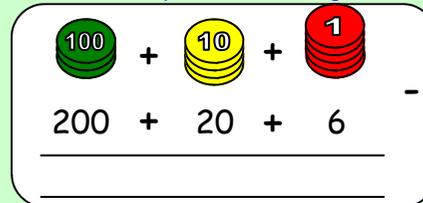
Place Value Counters



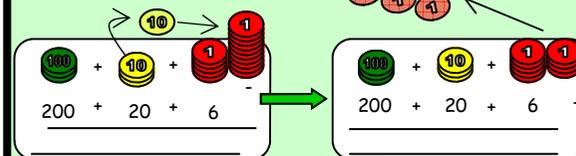
Model the number you're subtracting from with the counters.



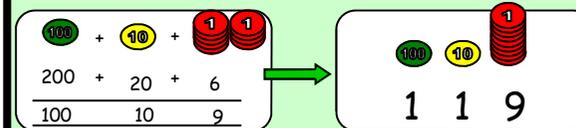
Arrange the counters on a whiteboard in the correct way and write the number you're subtracting below.



Use the counters to model subtraction by counting them away and exchanging if needed.



Continue this writing in the difference from each column until all the columns are complete then collect the counters to add up the differences at the end by counting.



Check the answer makes sense.

Other Manipulatives Subtraction

Number beads—Used to help children learn how to bridge tens and exchange.



Place Value Cards—Used to support children's understanding of place value and partitioning.



Number Line—Used as the first written method and the key model for children's understanding of the four operations.



Base Ten—Used to support children's understanding of place value and partitioning.



Place Value Counters—Used to support children's understanding of place value and partitioning.



Subtraction

Stage 3 - Column Subtraction



Steps to Success

$$\pounds 2504 - \pounds 1289$$

$$\pounds 2504$$

$$\pounds 1289$$


$$\pounds 2504$$

$$\pounds 1289 -$$


$$\pounds 2504$$

$$\pounds 1289 -$$

$$\pounds \quad \quad 5$$


$$\pounds 2504$$

$$\pounds 1289 -$$

$$\pounds 1215$$


$$\pounds 2504 - \pounds 1289$$

$$= \pounds 1215$$



- Write the greatest number on top and the number you're subtracting below.
- Make sure the digits are in the correct column.
- Write the subtraction symbol
- Underline twice with a ruler for your answer line.
- Start with the ones and subtract the bottom from the top.
- If the subtraction goes into negative numbers then exchange from the next column
- If you can't exchange from the next column then work along until you can.
- Check that the answer is reasonable by comparing with your estimate and write it down.



Other Manipulatives Subtraction

Number beads—Used to help children learn how to bridge tens and exchange.



Place Value Cards—Used to support children's understanding of place value and partitioning.



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Place Value Counters—Used to support children's understanding of place value and partitioning.



Multiplication

Stage 1 - Partitioning



Steps to Success

$$52 \times 6 = 312$$

- Partition the greatest factor into tens and units starting with the tens.

$$50 \longrightarrow 50 + 2$$

- Multiply the partitioned tens and ones by the smallest factor separately.

$$50 \times 6 = 300$$

$$2 \times 6 = 12$$

- Add together the partial products using columns addition (double ruler for your answer line).

$$50 \times 6 = 300$$

$$2 \times 6 = \underline{12} +$$

$$\underline{312}$$

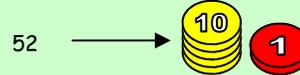
- Check that the answer is reasonable.



Manipulative Use

Place Value Counters

Model the partitioning of the largest factor.



Arrange the counters on a whiteboard in the correct place.

$\begin{array}{c} \text{10} \\ \text{10} \\ \text{10} \\ \text{10} \\ \text{10} \end{array} \times 6 =$
 $\begin{array}{c} \text{1} \\ \text{1} \end{array} \times 6 =$

Collect six lots of each pile of counters.

$\begin{array}{c} \text{10} \\ \text{10} \\ \text{10} \\ \text{10} \\ \text{10} \end{array} \times 6 = \begin{array}{c} \text{10} \text{ 10} \text{ 10} \text{ 10} \\ \text{10} \text{ 10} \end{array}$
 $\begin{array}{c} \text{1} \\ \text{1} \end{array} \times 6 = \begin{array}{c} \text{1} \text{ 1} \text{ 1} \\ \text{1} \text{ 1} \text{ 1} \end{array}$

Count up the total exchanging for hundred counters or tens counters where necessary. Check it makes sense.

$$= 312$$

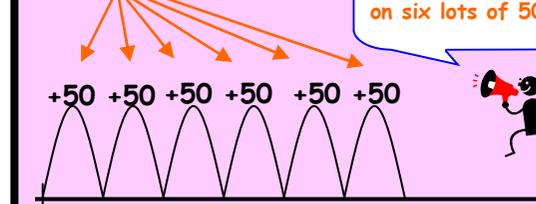

Multiplication Model

Number Line

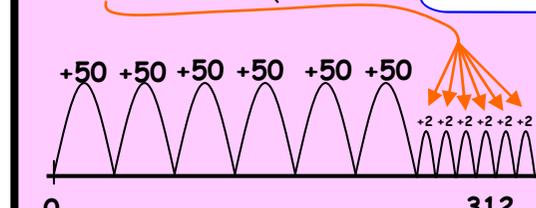
Use the number line to reinforce the concept of multiplication being repeated addition.

$$50 \longrightarrow 50 + 2$$

$$50 \times 6 = 300$$



$$2 \times 6 = 12$$



$$\begin{array}{r} 300 \\ \underline{12} + \\ \hline 312 \end{array}$$

Multiplication



Stage 2 - Expanded Short Multiplication

Steps to Success

Expanded Short

$$47 \times 4 = 188$$

- Write the greatest factor on top.
- Make sure the digits are in the correct column.
- Write the multiplication symbol.
- Underline with a ruler.
- Multiply the ones first and write this partial product under the ruler line.
- Jot down the factors used in the multiplication for your first partial product next to it in brackets.
- Then multiply the tens and write the partial product underneath the previous.
- Underline twice with a ruler for your answer line.
- Add together the two partial products using column addition.
- Check your answer against your estimate!

$$\begin{array}{r}
 47 \\
 \underline{4} \times \\
 28 \\
 \underline{160} \\
 \hline
 188
 \end{array}$$

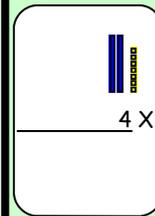
$$\begin{array}{r}
 47 \\
 \underline{4} \times \\
 28 \quad (4 \times 7) \\
 \underline{160} \quad (4 \times 40) \\
 \hline
 188
 \end{array}$$

Manipulative Use

Base Ten

Use base ten to model the largest factor.

$$47 \longrightarrow \begin{array}{c} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{array} \begin{array}{c} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{array}$$



Arrange the base ten onto a whiteboard into columns and write the single digit factor underneath ready to start the multiplication.

Starting with the ones, multiply the base ten by the smallest factor exchanging when necessary.

Ten ones make a ten!
Ten tens make a hundred!

Gather together the two partial products in the correct place on the whiteboard and count them up and add them together...
Check that the answer is reasonable

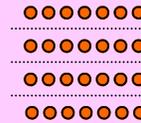
$$\begin{array}{r}
 100 + 80 + 8 \\
 = 188
 \end{array}$$

Multiplication Model

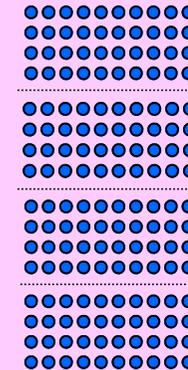
Arrays

Use the array to give a visualisation of the multiplication.

This shows 4 lots of 7...
There are seven in each row and 28 altogether!



$$\begin{array}{r}
 47 \\
 \underline{4} \times \\
 28 \\
 \underline{160} \\
 188
 \end{array}$$



This is four lots of 40. Each group represents 40...

$$\begin{array}{c}
 \text{160} \\
 + \\
 \text{28} \\
 \hline
 \text{188}
 \end{array}$$

Now we can join the two partial products together and count up to add!

Multiplication

Stage 3 - Short Multiplication



Steps to Success

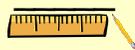
Short

$$473 \times 4 = 1892$$

- Write the greatest factor on top.
- Make sure the digits are in the correct column.
- Write the multiplication symbol.
- Underline twice with a ruler for your answer line.
- Multiply the ones first and write the partial product under the ruler line in the ones column.
- Carry any digits if the partial product is ten or more.
- Multiply the tens column and write the partial product under the ruler line adding any carried digits.
- Continue multiplying each column until you have a product.
- Check that the answer is reasonable.



$$\begin{array}{r} 473 \\ \underline{4} \times \end{array}$$



$$\begin{array}{r} 473 \\ \underline{4} \times \\ \underline{2} \end{array}$$

$$\begin{array}{r} 473 \\ \underline{4} \times \\ \underline{2} \\ 1 \end{array}$$

$$\begin{array}{r} 473 \\ \underline{4} \times \\ \underline{2} \\ 1 \end{array}$$

$$\begin{array}{r} 473 \\ \underline{4} \times \\ \underline{2} \\ 1 \end{array}$$

$$\begin{array}{r} 473 \\ \underline{4} \times \\ \underline{2} \\ 1 \end{array}$$

$$\begin{array}{r} 473 \\ \underline{4} \times \\ \underline{2} \\ 1 \\ \underline{1892} \end{array}$$



Manipulative Use

Base Ten

Use base ten to model the largest factor.

$$473 \rightarrow$$

At each stage, write on the whiteboard and model using the base ten.

Whiteboard: $\begin{array}{r} 473 \\ \underline{4} \times \\ \underline{2} \\ 1 \end{array}$

Model: $4 \times$ [3 ones] = [12 ones] → [1 ten, 2 ones]

Callout: "Anything you exchange you need to carry!"

Hand: "Carry!"

Whiteboard: $\begin{array}{r} 473 \\ \underline{4} \times \\ \underline{92} \\ 1 \end{array}$

Model: $4 \times$ [7 tens] = [28 tens] → [2 hundreds, 8 tens]

Callout: "Another exchange and carry needed!"

Hand: "Carry!"

Whiteboard: $\begin{array}{r} 473 \\ \underline{4} \times \\ \underline{1892} \\ 1 \end{array}$

Model: $4 \times$ [4 hundreds] = [16 hundreds] → [1 thousand, 6 hundreds]

Callout: "Add together the partial products at the end!"

$$1000 + 800 + 90 + 2 = 1892$$



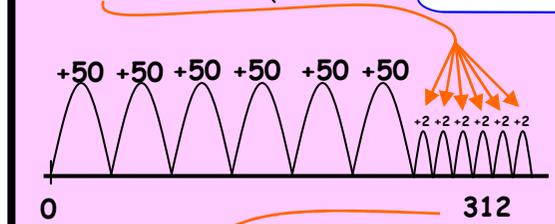
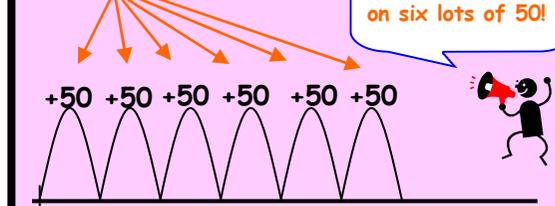
Multiplication Model

Number Line

Use the number line to reinforce the concept of multiplication being repeated addition.

$$50 \rightarrow 50 + 2$$

$$50 \times 6 = 300$$



$$\begin{array}{r} 300 \\ \underline{12} + \\ \underline{312} \end{array}$$

Multiplication

Stage 4 - Long Multiplication



Steps to Success

$$£473 \times 46 = £21758$$

- Write the greatest factor on top.
- Make sure the digits are in the correct column.
- Write the multiplication symbol.
- Underline with a ruler.
- Multiply the ones of the smallest factor first writing this partial product under the line in the ones.
- Carry any digits if necessary.
- Continue with each column until your first partial product is complete.
- Jot down the factors used in the multiplication for your first partial product next to it in brackets.
- Write a zero underneath the first partial product in the ones column.
- Multiply the tens of the smallest factor writing in the tens column first to make the second partial product.
- Jot down the factors used in the multiplication for your second partial product next to it in brackets.
- Underline twice with a ruler for your answer line.
- Add together the two partial products using column addition to give you your product.
- **Check that the answer is reasonable.**



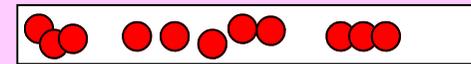
$$\begin{array}{r}
 £ 473 \\
 \underline{46} \times \\
 \hline
 2838 \quad (6 \times 473) \\
 \downarrow \\
 £ 473 \\
 \underline{46} \times \\
 \hline
 18920 \quad (40 \times 473) \\
 \downarrow \\
 £ 473 \\
 \underline{46} \times \\
 \hline
 2838 \quad (6 \times 473) \\
 18920 \quad (40 \times 473) \\
 \hline
 21758
 \end{array}$$



Other Manipulatives

Multiplication

Counters—Used to help children learn how to bridge tens and exchange.



Place Value Cards—Used to support children's understanding of place value and partitioning.



Number Line—Used as the first written method and the key model for children's understanding of the four operations.



Base Ten—Used to support children's understanding of place value and partitioning.



Place Value Counters—Used to support children's understanding of place value and partitioning.



Multiplication

Stage 4 - Long Multiplication Decimals



Steps to Success

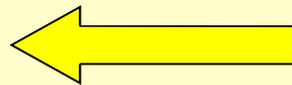
$$3.5 \times 43.7 = 152.95$$

- Jot down the number of decimal places for each factor added together.
- Change the place value of both factors to make them integers e.g. 34×42 and write this down horizontally.
- Write the greatest factor on top.
- Make sure the digits are in the correct column.
- Write the multiplication symbol.
- Underline with a ruler.
- Calculate the first partial product remembering to jot down the factors in brackets in the correct place.
- Calculate the second partial product in the same way.
- Underline twice with a ruler for your answer line.
- Add together the two partial products.
- Amend the place value referring to your original jotting and write next to the product.
- **Check the answer is reasonable.**

$$35 \times 437 = 15295$$

3.5 and 43.7 → 2dp

$$3.5 \times 43.7 = 152.95$$



3.5 and 43.7 → 2dp

3.5 → 35

43.7 → 437

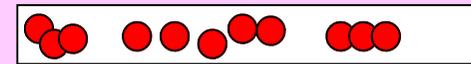
$$\begin{array}{r}
 437 \\
 \underline{35} \times \\
 2185 \\
 \underline{13110} \\
 15295
 \end{array}$$

2185 (5 × 437)
 13110 (30 × 437)
 15295 (40 × 437)

Other Manipulatives

Multiplication

Counters—Used to help children learn how to bridge tens and exchange.



Place Value Cards—Used to support children's understanding of place value and partitioning.



Number Line—Used as the first written method and the key model for children's understanding of the four operations.



Base Ten—Used to support children's understanding of place value and partitioning.



Place Value Counters—Used to support children's understanding of place value and partitioning.



Division

Stage 1 - Number Line

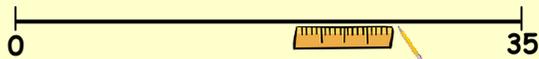


Steps to Success

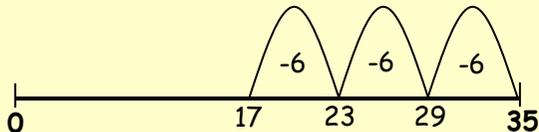
$$35 \div 6 = 5 \text{ r}5$$



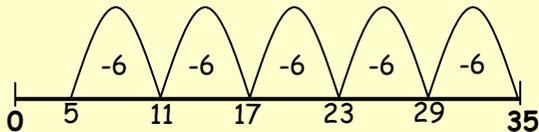
- Draw the line and write 0 at the start and the number your dividing at the end.



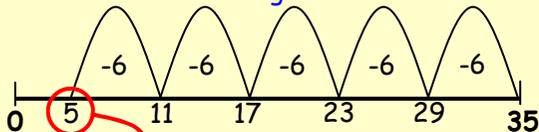
- Start to count backwards in jumps of the number you're dividing by.



- Continue until you run out of jumps the size of the number your dividing by.



- The number remaining is the remainder.



$$35 \div 6 = 5 \text{ r}5$$

- Check the answer is reasonable.

Manipulative Use

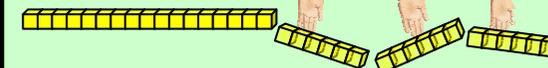
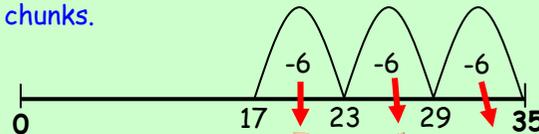
Multilink Cubes



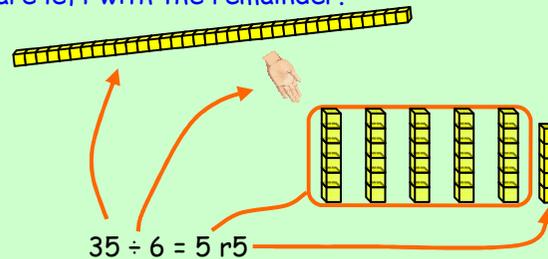
Model the number line by connecting together multilink cubes.



Relate each step to a number line by using mini whiteboards or writing in books. Each time you count backwards remove multilink chunks.



When the number of multilink cubes is less than the number you're dividing by then you are left with the remainder.



Check that it's correct by putting the cubes back together to make the original number.

Division Models

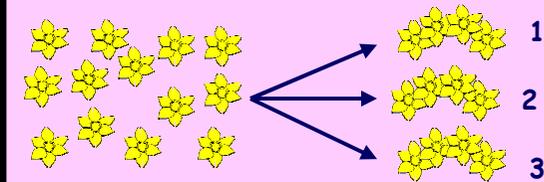
Grouping and Sharing

Take the number of objects—here are 12 daffodils:



Grouping— $12 \div 4$

How many bunches can I make with 4 daffodils in each? Children should count out the groups like the number line method.

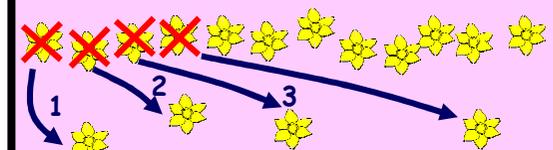


There are 3 bunches of 4 daffodils.

Sharing— $12 \div 4$

If I want 4 bunches, how many daffodils will there be in each bunch?

Children should share each daffodil out one at a time...



Continue until the daffodils are gone.



There are 3 daffodils in each bunch

Division

Stage 3 - Short Division



Steps to Success

Bus Stop

$$912 \div 8 = 114$$

- Draw out the bus stop.

- Write the number you're dividing inside the bus stop and the other number outside.

$$8 \overline{) 912}$$

- Use multiplication facts to find out a how many multiples of the number you're dividing go into each digit and write it above the bus stop.

- Carry any remainders to the next digit.

How many times does 8 go into 9? Once! So there's 1 left over!

$$\begin{array}{r} 1 \\ 8 \overline{) 912} \end{array}$$

How many times does 8 go into 11? Once! Remainder of 3...

$$\begin{array}{r} 11 \\ 8 \overline{) 9132} \end{array}$$

- Continue until there are no digits left.

How many times does 8 go into 32? 4 times! With no remainder...

$$\begin{array}{r} 114 \\ 8 \overline{) 9132} \end{array}$$

- Check the answer is reasonable.

Steps to Success

Bus Stop Remainder

$$916 \div 8 = 114 \text{ r } 4$$

- The method is the same but the remainder is noted at the end.

- Draw out the bus stop.

- Write the number you're dividing inside the bus stop and the other number outside.

$$8 \overline{) 916}$$

- Use multiplication facts to find out a how many multiples of the number you're dividing go into each digit and write it above the bus stop.

- Carry any remainders to the next digit.

- Continue until there are no digits left.

$$\begin{array}{r} 1 \\ 8 \overline{) 916} \end{array} \longrightarrow \begin{array}{r} 11 \\ 8 \overline{) 9136} \end{array}$$

- If there is anything left over after the last digit write it as the remainder labelling it r.

$$\begin{array}{r} 114 \text{ r } 4 \\ 8 \overline{) 9136} \end{array}$$

How many times does 8 go into 36? 4 times! With an overall remainder of 4...

- Check the answer is reasonable.

Steps to Success

Bus Stop Decimals

$$916 \div 8 = 114.5$$

- More advanced use this time!

- Draw out the bus stop.

- Write the number you're dividing inside the bus stop and the other number outside.

- Use multiplication facts to find out a how many multiples of the number you're dividing by go into each digit.

- Write each result above the bus stop.

- Carry any remainders to the next digit.

- When a final remainder has been reached continue the number you're dividing with a decimal point and 0 tenths.

- Place a decimal point above the bus stop in the answer.

$$\begin{array}{r} 114 \text{ r } 4 \\ 8 \overline{) 9136} \end{array} \longrightarrow \begin{array}{r} 114. \\ 8 \overline{) 9136.0} \end{array}$$

- Continue the carrying process into the decimal columns using zeros until there is no remainder.

$$\begin{array}{r} 114.5 \\ 8 \overline{) 9136.40} \end{array}$$

How many eights in 40? There are 5!

- Check the answer is reasonable.

Division

Stage 4 - Long Division



Steps to Success

$$£380 \div 16 = £23.75$$

- Draw out the bus stop.
- Write the number you're dividing inside the bus stop and the other number outside.
- Use multiplication facts and jottings to find out how many multiples of the number you're dividing by go into each digit.
- Write each result above the bus stop.
- Carry any remainders to the next digit.
- When a final remainder has been reached continue the number you're dividing with a decimal point and 0 tenths.
- Place a decimal above the bus stop in the answer.
- Continue the carrying process into the decimal columns using zeros until there is no remainder.
- If a decimal pattern occurs then write in recurring dot/dots accurately.
- Check your answer.



$$16 \overline{)380}$$

- $16 \times 10 = 160$
- $16 \times 5 = 80$
- $16 \times 2 = 32$
- $16 \times 4 = 64$
- $16 \times 8 = 128$

These jottings will help to divide each digit by the two digit number outside the box



$$16 \overline{)380} \begin{array}{r} 2 \\ \hline \end{array}$$

16 doesn't go into 2 so I carry the 2. How many 16s in 38? I can see from my jottings that it's 2 with a remainder of 6.



$$16 \overline{)380} \begin{array}{r} 23 \\ \hline \end{array}$$

Looking at my jottings I can see that there are 3 16s in 60 with a remainder of 12. This means I will need to go into decimals!

$$16 \overline{)380.0} \begin{array}{r} 23. \\ \hline \end{array}$$

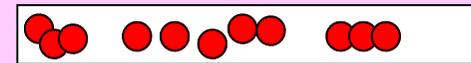


$$16 \overline{)380.00} \begin{array}{r} 23.75 \\ \hline \end{array}$$

$$£380 \div 16 = £23.75$$

Other Manipulatives Division

Counters—Used to help children learn how to bridge tens and exchange.



Place Value Cards—Used to support children's understanding of place value and partitioning.



Number Line—Used as the first written method and the key model for children's understanding of the four operations.



Base Ten—Used to support children's understanding of place value and partitioning.



Place Value Counters—Used to support children's understanding of place value and partitioning.



Addition

YEAR 3



Add numbers with up to 3 digits



Key skills for addition at Y3:

- Read and write numbers to 1000 in numerals and words.
- Add 2-digit numbers mentally, incl. those exceeding 100.
- Add a three-digit number and ones mentally. (175 + 8)
- Add a three-digit number and tens mentally. (249 + 50)
- Add a three-digit number and hundreds mentally. (381 + 400)
- Estimate answers to calculations, using inverse to check answers.
- Solve problems, including missing number problems, using number facts, place value, and more complex addition.
- Recognise place value of each digit in 3-digit numbers (hundreds, tens, ones).
- Continue to practise a wide range of mental addition strategies, ie. number bonds, adding the nearest multiple of 10, 100, 100 and adjusting, using near doubles, partitioning and recombining.

Stage 1 Number Line	Stage 2 Partitioning	Stage 3 Column Method
$63 + 16$ 63 73 79	$50 + 8$ $40 + 3$ $90 + 11$ $= 101$	236 $+ 73$ $\hline 309$ 1
<i>Children begin with the number line using 2 digit numbers and their knowledge of place value to build fluency.</i>	<i>Children move on to a more formal method of partitioning into columns and creating subtotals.</i>	<i>Children will then move on to using the written method of column addition to add larger integers up to 3 digits.</i>

Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, vertical, 'carry', expanded, compact, addend, subtotal.

Addition

YEAR 4



Add numbers with up to four digits



Key skills for addition at Y4:

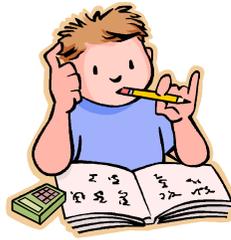
- Select most appropriate method: mental, jottings or written and explain why.
- Recognise the place value of each digit in a four-digit number.
- Round any number to the nearest 10, 100 or 1000.
- Estimate and use inverse operations to check answers .
- Solve 2-step problems in context, deciding which operations and methods to use and why.
- Find 1000 more or less than a given number.
- Continue to practise a wide range of mental addition strategies, ie. number bonds, add the nearest multiple of 10, 100, 1000 and adjust, use near doubles, partitioning and recombining.
- Add numbers with up to 4 digits using the formal written method of column addition.
- Solve 2-step problems in contexts, deciding which operations and methods to use and why.
- Estimate and use inverse operations to check answers to a calculation.

Stage 2 Partitioning	Stage 3 Column Method
$\begin{array}{r} 600 + 70 + 5 \\ 200 + 50 + 2 \\ 800 + 120 + 7 \\ \hline =927 \end{array}$	$\begin{array}{r} 6536 \\ + \quad 573 \\ \hline 7109 \\ \small{\text{+ +}} \end{array}$
<i>Children can continue to use the partitioning method with larger numbers.</i>	<i>When ready, children will move on to using the written method of column addition to add with up to 4 digit numbers.</i>

Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse, addend, subtotal.

Addition

YEAR 5



Add numbers with more than four digits



Key skills for addition at Y5:

- Add numbers mentally with increasingly large numbers, using and practising a range of mental strategies ie. add the nearest multiple of 10, 100, 100 and adjust; use near doubles, inverse, partitioning and re-combining; using number bonds.
- Use rounding to check answers and accuracy.
- Solve multi-step problems in contexts, deciding which operations and methods to use and why.
- Read, write, order and compare numbers to at least 1 million and determine the value of each digit.
- Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000.
- Add numbers with more than 4 digits using formal written method of columnar addition.

Stage 3

Column Method—advanced use



The table shows single train prices to different European destinations. What is the total cost of a return journey to Berlin for one child and one adult?

	ADULT RETURN	CHILD RETURN
Paris	£184.34	£123.96
Berlin	£287.92	£238.53
Rome	£351.66	£306.35

Working

$$\begin{array}{r} £238.53 \\ + £287.92 \\ \hline £526.45 \\ \text{+++} \end{array}$$

Children will begin to use column addition to calculate sums involving numbers with five digits—decimals, money and measurements.

Children will use the column method as part of their toolkit for solving a wide variety of problems using RUCSAC.

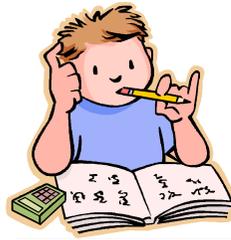
Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, carry, expanded, compact, vertical, thousands, hundreds, digits, inverse & decimal places, decimal point, tenths, hundredths, thousandths, addend, subtotal.

Addition

YEAR 6

Key skills for addition at Y6:

- Perform mental calculations, including with mixed operations and large numbers, using and practising a range of mental strategies.
- Solve multi-step problems in context, deciding which operations and methods to use and why.
- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.
- Read, write, order and compare numbers up to 10 million and determine the value of each digit.
- Round any whole number to a required degree of accuracy.
- Pupils understand how to add mentally with larger numbers and calculations of increasing complexity.



Add several numbers with increasing complexity...



Stage 3

Column Method—advanced use

The table shows how many ice creams were sold on Bognor Regis seafront in the year 2008.

January—March	3,688
April—June	20,551
July—September	81,059
October—December	15,301



How many ice creams were sold over the whole year?

Working

$$\begin{array}{r} 81059 \\ 20551 \\ 15301 \\ + 3668 \\ \hline 120579 \\ \hline \end{array}$$

Children solve a range of sums featuring many numbers. Numbers are multi-digit and include decimals, measures, quantities and money.

At this stage, children will be using addition in conjunction with other operations to solve multi-step problems using RUCSAC.

Key vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, carry, expanded, compact, vertical, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths, addend.

Subtraction

YEAR 3



Subtract numbers with up to 3 digits



Key skills for subtraction at Y3:

- Subtract mentally: 3-digit number and ones, 3-digit number and tens, 3-digit number and hundreds.
- Estimate answers and use inverse operations to check.
- Solve problems, including missing number problems.
- Find 10 or 100 more or less than a given number.
- Recognise the place value of each digit in a 3-digit number.
- Counting up differences as a mental strategy when numbers are close together or near multiples of 10 (see examples above).
- Read and write numbers up to 1000 in numerals and words.
- Practise mental subtraction strategies, such as subtracting near multiples of 10 and adjusting (e.g. subtracting 19 or 21), and select most appropriate methods to subtract, explaining why.

Stage 1 Number Line (counting on)	Stage 2 Partitioning	Stage 3 Column Method
$74 - 27 =$ $3 + 40 + 4 = 47$	$238 - 146 = 92$	$\begin{array}{r} 5\cancel{0}36 \\ + 573 \\ \hline 63 \end{array}$
<p><i>Children begin by counting back or counting on to find the difference using a number line and jottings. This will help to reinforce the concept of subtraction and improve their fluency.</i></p>	<p><i>By learning to exchange, children can move on to a more formal method of partitioning into columns and creating subtotals.</i></p>	<p><i>When children are ready and fully understood how to exchange they move onto the compact method of column subtraction which is more efficient.</i></p>

Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_? difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, minuend, subtrahend.

Subtraction

YEAR 4



Subtract numbers with up to 4 digits



Key skills for subtraction at Y4:

- Subtract by counting on where numbers are close together or they are near to multiples of 10, 100 etc.
- Children select the most appropriate and efficient methods for given subtraction calculations.
- Estimate and use inverse operations to check answers.
- Solve addition and subtraction 2-step problems, choosing which operations and methods to use and why.
- Solve simple measure and money problems involving fractions and decimals to two decimal places.
- Find 1000 more or less than a given number.
- Count backwards through zero, including negative numbers.
- Recognise place value of each digit in a 4-digit number
- Round any number to the nearest 10, 100 or 1000
- Solve number and practical problems that involve the above, with increasingly large positive numbers.

Stage 2 Partitioning	Stage 3 Column Method
$2754 - 1562 = 1192$ $2000 + \cancel{700} + 50 + 4$ $- 1000 + 500 + 60 + 2$ $1000 + 100 + 90 + 2$	$\begin{array}{r} 2754 \\ - 1562 \\ \hline 1192 \end{array}$
<p><i>Children can continue to use the partitioning method of columns to reinforce the concept of exchanging with larger numbers.</i></p> <p><i>The partitioning method is less efficient but can be used for numbers up to 4 digits.</i></p>	<p><i>When the children are using the column method regularly they will be able to extend to four digit numbers.</i></p>

Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_? difference, count on, strategy, partition, tens, units exchange, decrease, hundreds, value, digit, inverse, minuend, subtrahend.

Subtraction

YEAR 5



Subtraction with numbers made of more than 4 digits



Key skills for subtraction at Y5:

- Subtract numbers mentally with increasingly large numbers .
- Use rounding and estimation to check answers to calculations and determine, in a range of contexts, levels of accuracy .
- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why.
- Read, write, order and compare numbers to at least 1 million and determine the value of each digit.
- Count forwards or backwards in steps of powers of 10 for any given number up to 1 million.
- Interpret negative numbers in context, counting forwards and backwards with positive and negative integers through 0.
- Round any number up to 1 million to the nearest 10, 100, 1000, 10 000 and 100 000.

Stage 3

Column Method—advanced use

Larger Integers

	² 3	¹ 0	⁰ 8	⁶
-		2	1	28
<hr/>				
	2	8	9	28

Decimal Numbers

	⁶ 7	¹ 0	⁶	⁸ 9	.	⁰
-			3	7	2	5
<hr/>						
	6	7	9	6	.	5

Children will begin to use column subtraction to calculate differences involving numbers with five digits—decimals, money and measurements.

Children will use the column method as part of their toolkit for solving a wide variety of problems using RUCSAC.

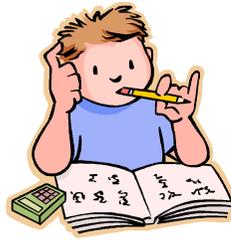
Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back , how many left, how much less is_? difference, count on, strategy, partition, tens, units exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point, decimal , minuend, subtrahend.

Subtraction

YEAR 6

Key skills for subtraction at Y6:

- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why.
- Read, write, order and compare numbers up to 10 million and determine the value of each digit
- Round any whole number to a required degree of accuracy
- Use negative numbers in context, and calculate intervals
- across zero.
- Children need to utilise and consider a range of mental subtraction strategies, jottings and written methods before choosing how to calculate.



Subtract several numbers with increasing complexity...



Stage 3

Column Method—advanced use



A bakery measures 105.19 kg of flour at the start of the week. By the end of the week 38.08 kg are left. How much flour did the bakery use throughout the week?



Working

	1	0	5	.	1	1	9	kg
-		3	6	.	0	8	0	kg
<hr/>								
	6	9	.	3	3	9	kg	

Children find a range of differences featuring numbers to subtract. Numbers are multi-digit and include decimals, measures, quantities and money.

At this stage, children will be using addition in conjunction with other operation to solve multi-step problems with RUCSAC.

Key vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_? difference, count on, strategy, partition, tens, units exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point, decimal, minuend, subtrahend.

Multiplication

YEAR 3



Multiply a 2 digit integer by a 1 digit integer



Key skills for multiplication at Y3:

- Recall and use multiplication facts for the 2, 3, 4, 5, 8 and 10 multiplication tables, and multiply multiples of 10.
- Write and calculate number statements using the multiplication tables they know, including 2-digit \times single-digit, drawing upon mental methods, and progressing to reliable written methods.
- Solve multiplication problems, including missing number problems.
- Develop mental strategies using commutativity (e.g. $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$)
- Solve simple problems in contexts, deciding which operations and methods to use.
- Develop efficient mental methods to solve a range of problems e.g using commutativity ($4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and for missing number problems
 - $? \times 5 = 20$
 - $3 \times ? = 18$
 - $? \times ? = 32$

Stage 1 Partitioning and Jottings	Stage 2 Expanded Short Multiplication
$43 \times 6 = 258$ $40 \times 6 = 240$ $3 \times 6 = \underline{18} +$ $\underline{258}$	 <p>Ben buys boxes of orange juice for his shop. Each box contains seven bottles. He buys 38 boxes in total. How many bottles of orange juice has he bought?</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p>Working</p> $\begin{array}{r} 38 \\ \times 7 \\ \hline 56 \quad (7 \times 8) \\ \underline{210} \quad (7 \times 30) \\ 266 \end{array}$ </div>
<p><i>Children use partitioning, supported by the use of manipulatives and arrays, so that they gain a greater understanding and fluency in multiplication.</i></p>	<p><i>Children work towards using the expanded short multiplication method with the support of manipulatives.</i></p> <p><i>Children do not yet need to carry when adding the partial products but must be able to use an efficient method of written addition.</i></p>

Key vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, _times as big as, once, twice, three times... partition, multiple, product, partial product tens, units, value.

Multiplication

YEAR 4

Key skills for multiplication at Y4:

- Count in multiples of 6, 7, 9, 25 and 1000
- Recall multiplication facts for all multiplication tables up to 12×12 .
- Recognise place value of digits in up to 4-digit numbers.
- Use place value, known facts and derived facts to multiply mentally, e.g. multiply by 1, 10, 100, by 0, or to multiply 3 numbers.
- Use commutativity and other strategies mentally $3 \times 6 = 6 \times 3$, $2 \times 6 \times 5 = 10 \times 6$, $39 \times 7 = 30 \times 7 + 9 \times 7$
- Solve problems with increasingly complex multiplication in a range of contexts.
- Count in multiples of 6, 7, 9, 25 and 1000
- Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones).



Multiply 2 and 3 digit integers by a 1 digit integer



Stage 2 Expanded Short Multiplication	Stage 3 Short Multiplication
 <p>It costs £382 pounds per person to fly to the Bahamas. How much would it cost for seven people to go?</p> <p>Working</p> $\begin{array}{r} \text{£}382 \\ \times \quad 7 \\ \hline 2674 \\ \text{£}2674 \end{array}$	<p>It costs £382 pounds per person to fly to the Bahamas. How much would it cost for seven people to go?</p> <p>Working</p> $\begin{array}{r} \text{£}382 \\ \times \quad 7 \\ \hline \text{£}2674 \end{array}$
<p><i>Children continue to use this method with larger integers of three digits until they are ready to move onto more efficient methods of short multiplication.</i></p>	<p><i>When confident with carrying, children move to the more efficient method of short multiplication. They now carry digits in the addition of partial products.</i></p>

Key vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, array, column, row, commutative, groups of, sets of, lots of, equal groups, times, multiply, times as big as, once, twice, three times... partition, total, multiple, product, sets of, inverse, partial product.

Multiplication

YEAR 5

Key skills for multiplication at Y5:

- Identify multiples and factors, using knowledge of multiplication tables to 12x12.
- Solve problems where larger numbers are decomposed into their factors.
- Multiply and divide integers and decimals by 10, 100 and 1000.
- Recognise and use square and cube numbers and their notation.
- Solve problems involving combinations of operations, choosing and using calculations and methods appropriately.



Multiply 4 digit numbers by 1 or 2 digit numbers

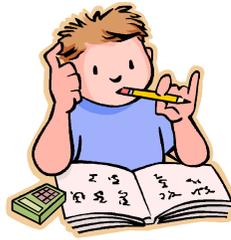


Stage 3 Short Multiplication	Stage 4 Long Multiplication
 <p>To watch a Bognor Regis FC match costs £7 per person. The attendance at the last match was 5382. How much money was collected at the ticket gate that day?</p> <p>Working</p> $\begin{array}{r} 5382 \\ \times \quad \underline{\text{£}7} \\ \hline \text{£}37674 \\ \quad \underline{281} \end{array}$	<p>Calculate 1234 multiplied by 16.</p> <p>Working</p> $\begin{array}{r} 1234 \\ \times \quad \underline{16} \\ \hline 7404 \quad (6 \times 1234) \\ 12340 \quad (10 \times 1234) \\ \hline 19744 \end{array}$
<p><i>Children extend their use of short multiplication to multiply 1 digit integers by larger integers up to 4 digits.</i></p>	<p><i>Children will begin to learn long multiplication by partitioning the smaller factor into short multiplications to create partial products that can be added.</i></p>

Key vocabulary: 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, total, multiple, product, inverse, square, factor, integer, decimal, short/long multiplication, carry, partial product.

Multiplication

YEAR 6



Multiply multi-digit numbers including decimals with up to 2 d.p.



Key skills for multiplication in Y6:

- Recall multiplication facts for all times tables up to 12×12 (as Y4 and Y5).
- Multiply multi-digit numbers, up to 4-digit \times 2-digit using long multiplication.
- Perform mental calculations with mixed operations and large numbers.
- Solve multi-step problems in a range of contexts, choosing appropriate combinations of operations and methods.
- Estimate answers using round and approximation and determine levels of accuracy.
- Round any integer to a required degree of accuracy.

Stage 3 Decimal Number Short	Stage 4 Decimal Number Long
<p>Calculate 3.82 multiplied by 7.</p> <p>Working</p> $\begin{array}{r} 3.82 \times 7 \\ 2 \text{ d.p.} \\ 3.82 \rightarrow 382 \\ \times \quad 7 \\ \hline 2674 \\ \hline 3.82 \times 7 = 26.74 \end{array}$	<p>Calculate 5.6×2.7.</p> <p>Working</p> $\begin{array}{r} 5.6 \times 2.7 \\ 2 \text{ d.p. in total} \\ 5.6 \rightarrow 56 \\ 2.7 \rightarrow 27 \\ \times \quad 27 \\ \hline 392 \quad (7 \times 56) \\ 1120 \quad (20 \times 56) \\ \hline 1512 \\ \hline 5.6 \times 2.7 = 15.12 \end{array}$
<p><i>Children extend their use of short multiplication to 1 digit integers multiplied by decimal numbers to 2 decimal places using their knowledge of place value.</i></p>	<p><i>Children will also begin to calculate decimal factors using their understanding of place value to change the multiplication to integers before amending the final product.</i></p>

Key vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, array, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times... partition, grid method, total, multiple, product, inverse, square, factor, integer, decimal, short / long multiplication, carry, tenths, hundredths, decimal, partial product.

Division

YEAR 3



Divide 2 digit integers by a 1 digit integer (no remainder)



Key skills for division at Y3:

- Recall and use multiplication and division facts for the 2, 3, 4, 5, 8 and 10 multiplication tables (through doubling, connect the 2, 4 and 8s).
- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.
- Solve problems, in contexts, and including missing number problems, involving multiplication and division.
- Pupils develop efficient mental methods, for example, using multiplication and division facts (e.g. using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts ($30 \times 2 = 60$, so $60 \div 3 = 20$ and $20 = 60 \div 3$).
- Pupils develop reliable written methods for division, starting with calculations of 2-digit numbers by 1-digit numbers and progressing to the formal written method of short division.

Stage 1 Number Line	Stage 2 Partitioning	Stage 3 Short Division
	$28 \div 4 = 7$ $20 \div 4 = 5$ $8 \div 4 = 2$ +	
<p><i>Children group using a number line. They count on in jumps of the divisor until they reach the dividend. It's important at this stage that children are still given opportunities to experiment with grouping and sharing through the use of arrays and manipulatives.</i></p>	<p><i>Children use their known multiplication facts to chunk the dividend into multiples of the divisor.</i></p>	<p><i>When confident, children use the bus stop method to divide numbers without a remainder.</i></p>

Key vocabulary: share, share equally, one each, two each..., group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, dividend, divisor

Division

YEAR 4

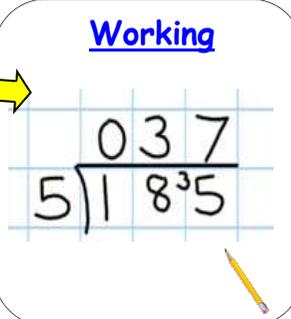


Divide 3 digit integers by a 1 digit integer



Key skills for division at Y4:

- Recall multiplication and division facts for all numbers up to 12×12 .
- Use place value, known and derived facts to multiply and divide mentally, including: multiplying and dividing by 10 and 100 and 1.
- Pupils practise to become fluent in the formal written method of short division with exact answers when dividing by a one-digit number.
- Pupils practise mental methods and extend this to three-digit numbers to derive facts, for example: $200 \times 3 = 600$ so $600 \div 3 = 200$
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as three cakes shared equally between 10 children.

Stage 2 Partitioning	Stage 3 Short Division
 <p>Arina wins 428 sweets in a <i>guess the sweets in the jar</i> competition. She shares them with four friends. How many sweets does each friend get?</p> <p>Working</p> $428 \div 4 = 107$ $400 \div 4 = 100$ $20 \div 4 = 5$ $8 \div 4 = \underline{2} +$ 107	 <p>Libby wins a <i>guess the cookies in the jar</i> competition. She shares them between herself, her mum and her three brothers. How many cookies does each family member get?</p> <p>Working</p> 
<p><i>Children who are still at stage 2 can use partitioning as a written method to answer word problems.</i></p> <p><i>They will need to be able to add efficiently 2 or sometimes more numbers at the same time.</i></p>	<p><i>Children will start to carry remainders to the next digit and place zero above the line where a digit is less than the number they're dividing by..</i></p> <p><i>Children will also encounter final remainders and mark them with an r.</i></p>

Key vocabulary: share, share equally, one each, two each..., group, equal 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, dividend, divisor.

Division

YEAR 5



Divide 4 digit numbers by 1 digit numbers



Key skills for division at Y5:

- Recall multiplication and division facts for all numbers up to 12×12 (as in Y4).
- Multiply and divide numbers mentally, drawing upon known facts.
- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two number.
- Solve problems involving multiplication and division where larger numbers are decomposed into their factors.
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
- Use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.
- Work out whether a number up to 100 is prime, and recall prime numbers to 19.
- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- Use multiplication and division as inverses.
- Interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (e.g. $98 \div 4 = 24 \text{ r } 2 = 24\frac{1}{2} = 24.5 \approx 25$).

Stage 3

Short Division—advanced use



At London Zoo the zookeepers need to separate 5309 ladybird beetles into 8 containers for a new exhibition. How many beetles should be in each container?

Working

	0	6	6	3	r	5
8)	5	3	0	9	

Children will begin to use short division to calculate quotients involving dividends of four digits or more—decimals, money and measurements.

Children will use this as part of their toolkit for solving a wide variety of problems using RUCSAC.

Key vocabulary: share, share equally, one each, two each..., group, equal 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, inverse, quotient, prime number, prime factors, composite number (non-prime), dividend, divisor.

Division

YEAR 6

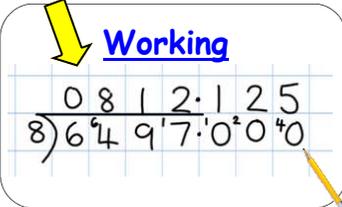
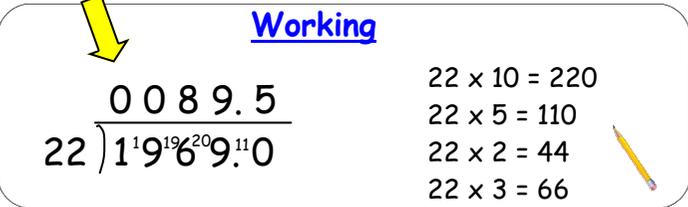
Key skills for division in Y6:

- Recall and use multiplication and division facts for all numbers to 12×12 for more complex calculations
- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. Use short division where appropriate.
- Perform mental calculations, including with mixed operations and large numbers.
- Identify common factors, common multiples and prime numbers.
- Solve problems involving all 4 operations.
- Use estimation to check answers to calculations and determine accuracy, in the context of a problem.
- Use written division methods in cases where the answer has up to two decimal places.
- Solve problems which require answers to be rounded to specified degrees of accuracy.



Divide 4 digit numbers by 1 or 2 digit numbers



Stage 3 Short Division	Stage 4 Long Division
Calculate 6497 divided by 8. 	Calculate 1969 divided by 22. 
<i>Children learn how to remove any final remainders using their understanding of decimal place value.</i>	<i>Children maintain their use of the bus stop method to divide by 2 digit numbers but they are assisted with the use of jottings—doubles, triples and other derived facts using their understanding of multiples of 10,</i>

Key vocabulary: share, share equally, one each, two each..., group, equal 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, inverse, quotient, prime number, prime factors, composite number (non-prime), common factor, dividend, divisor.