



Maths – how we teach it at Murrow and Gorefield

M₁ + A₁ = 2H
Makes YOUR
Life ADD UP!



Aims

The national curriculum for mathematics aims to ensure that all pupils:

- Become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **Reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- Can **solve problems** by applying their mathematics to a variety of routine non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

**FLUENCY / REASONING / APPLICATION
AND MASTERY**



Maths from Reception – Year 6

- Core principles
 - Seeing links - stages
 - Make it practical
 - Assessment before we start each unit
 - Understand the reasons behind
 - Confidence with tables and number bonds
 - Key vocabulary
 - Application
 - Reasoning



Review Calculation policy

- Comments?



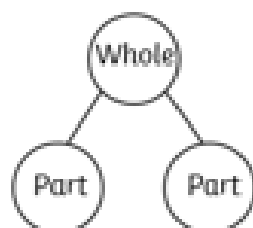
Whole School Initiatives

- Timestables
- Maths sentence stems in classrooms – “I know this because.....”
- Maths Talk
- White Rose Scheme – whole school calculation policy
- Formal methods



Sentence Stems

Addition



A whole can be broken into a number of parts.

The sum of the parts is equal to the whole.

We can add the parts in any order.

We can only add things with the same noun.

If you change the order of the addends, the sum remains the same.

In addition, we can add to one set to make it bigger. The total is the sum.

In addition, we can combine one or more sets. The total is the sum.



Formal Methods – by Year 6

- Addition
- Subtraction
- Multiplication
- Division

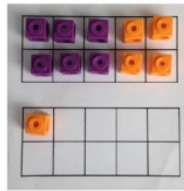


Addition

Regrouping to make 10.



$$6 + 5 = 11$$

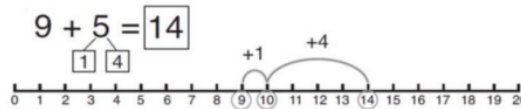


Start with the bigger number and use the smaller number to make 10.



$$3 + 9 =$$

Use pictures or a number line. Regroup or partition the smaller number to make 10.

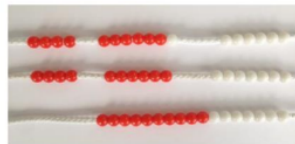


$$7 + 4 = 11$$

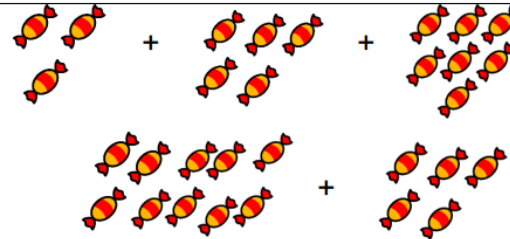
If I am at seven, how many more do I need to make 10. How many more do I add on now?

Adding three single digits

$4 + 7 + 6 = 17$
Put 4 and 6 together to make 10. Add on 7.



Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.



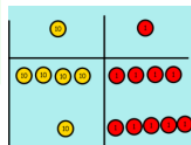
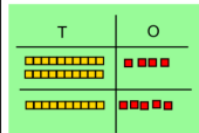
Add together three groups of objects. Draw a picture to recombine the groups to make 10.

$$\begin{array}{r} 4 + 7 + 6 = 10 + 7 \\ \quad \quad \quad 10 \\ = 17 \end{array}$$

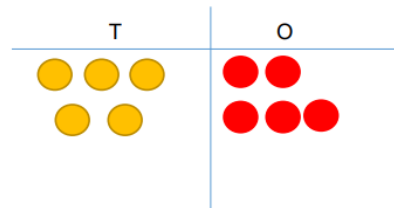
Combine the two numbers that make 10 and then add on the remainder.

Column method- no regrouping

$24 + 15 =$
Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters.



After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.



Calculations

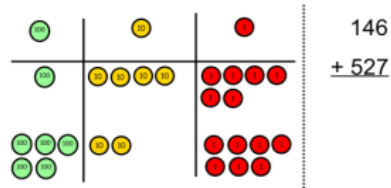
$$21 + 42 =$$

$$\begin{array}{r} 21 \\ + 42 \\ \hline \end{array}$$

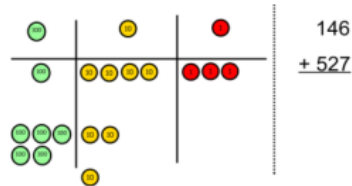
Addition

Column method-regrouping

Make both numbers on a place value grid.



Add up the units and exchange 10 ones for one 10.

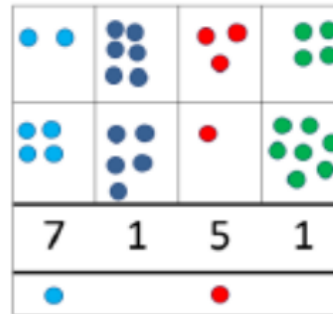


Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added.

This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100.

As children move on to decimals, money and decimal place value counters can be used to support learning.

Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.



Start by partitioning the numbers before moving on to clearly show the exchange below the addition.

$$\begin{array}{r} 20 + 5 \\ 40 + 8 \\ 60 + 13 = 73 \end{array}$$

$$\begin{array}{r} 536 \\ + 85 \\ \hline 621 \end{array}$$

As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here.

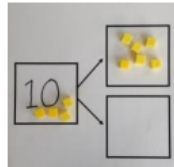
$$\begin{array}{r} 72.8 \\ + 54.6 \\ \hline 127.4 \end{array}$$

$$\begin{array}{r} £ 23.59 \\ + £ 7.55 \\ \hline £ 31.14 \end{array}$$

$$\begin{array}{r} 23.361 \\ 9.080 \\ 59.770 \\ + 1.300 \\ \hline 93.511 \\ 212 \end{array}$$

Subtractions

Part Part Whole Model



If 10 is the whole and 6 is one of the parts. What is the other part?

$$10 - 6 =$$

Link to addition- use the part whole model to help explain the inverse between addition and subtraction.

Use a pictorial representation of objects to show the part part whole model.

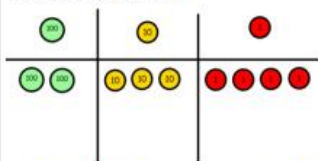


Move to using numbers within the part whole model.

Column method with regrouping

Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges.

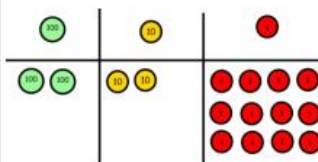
Make the larger number with the place value counters



Calculations

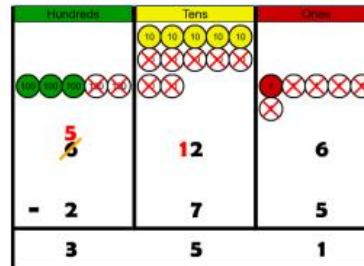
$$\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$$

Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.



Calculations

$$\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$$



Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.



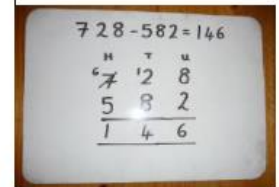
and knows when to exchange/regroup.

When confident, children can find their own way to record the exchange/regrouping.

Just writing the numbers as shown here shows that the child understands the method



Children can start their formal written method by partitioning the number into clear place value columns.



Moving forward the children use a more compact method.

Pure Arithmetic

- KS1 Question

$$54 - 8 =$$

$$+ 8 = 12$$

- KS2 Question

$$424 - 51 =$$

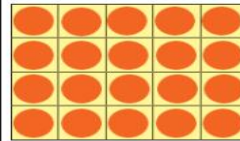
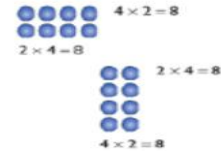
Multiplication

Arrays- showing commutative multiplication

Create arrays using counters/ cubes to show multiplication sentences.



Draw arrays in different rotations to find **commutative** multiplication sentences.



Link arrays to area of rectangles.

Use an array to write multiplication sentences and reinforce repeated addition.



$$5 + 5 + 5 = 15$$

$$3 + 3 + 3 + 3 + 3 = 15$$

$$5 \times 3 = 15$$

$$3 \times 5 = 15$$

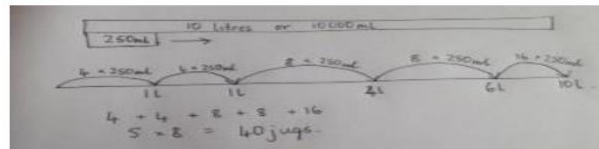
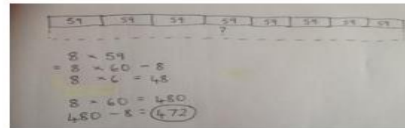
Column multiplication

Children can continue to be supported by place value counters at the stage of multiplication.



It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.

Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.



Start with long multiplication, reminding the children about lining up their numbers clearly in columns.

If it helps, children can write out what they are solving next to their answer.

$$\begin{array}{r} 32 \\ \times 24 \\ \hline 128 \\ 640 \\ \hline 768 \end{array}$$

(4 x 2)
(4 x 30)
(20 x 2)
(20 x 30)

This moves to the more compact method.

$$\begin{array}{r} 231 \\ 1342 \\ \times 18 \\ \hline 13420 \\ 10736 \\ \hline 24156 \\ 1 \end{array}$$

Pure Arithmetic



- KS1 Question

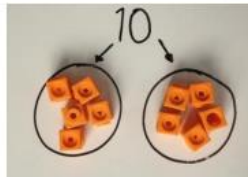
$$7 \times 4 =$$

- KS2 Question

$$\begin{array}{r} 729 \\ \times \underline{54} \end{array}$$

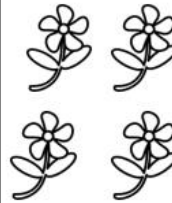
Dividing

Sharing
objects into
groups



I have 10
cubes, can you
share them
equally in 2
groups?

Children use pictures or shapes to share quantities.

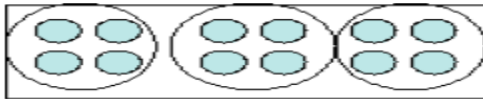


$$8 \div 2 = 4$$

Share 9 buns between three
people.

$$9 \div 3 = 3$$

Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.



Encourage them to move towards counting in multiples to
divide more efficiently.

Begin with divisions that
divide equally with no
remainder.

$$\begin{array}{r} 218 \\ 4 \overline{) 872} \\ \underline{8} \\ 7 \\ \underline{7} \\ 2 \\ \underline{2} \\ 0 \end{array}$$

Move onto divisions with a
remainder.

$$\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{) 432} \\ \underline{4} \\ 3 \\ \underline{3} \\ 2 \end{array}$$

Finally move into decimal
places to divide the total
accurately.

$$\begin{array}{r} 14.6 \\ 35 \overline{) 511.6} \\ \underline{35} \\ 16 \\ \underline{14} \\ 21 \\ \underline{21} \\ 0 \end{array}$$

Pure Arithmetic

- KS1 Question

$$60 \div 5 =$$

- KS2 Question

$$221 \div 17 =$$

How can you help?

- Learn Tables – Test them regularly – cd songs – apps
- Talk about – What time is it? How long will it take? Calendars, days of the week etc.
- Talk about money and time at home when they are used. How much change? What time should we leave?
- Number bonds
- Confidence.
- Ask – can we help you further?

