



*Parents' Guide to  
Mathematics at  
The Bythams Primary School  
Year 6*

*Dear Parents,*

*This booklet is to help you understand how the main four operations in Maths are taught at Bythams School. Each guide has the main objectives for the year group and how it is taught in the concrete, pictorial and the abstract. The concrete is all about physical things, such as cubes, bead strings and counters which the children manipulate to understand the objectives. The pictorial is when concepts are shown in a pictorial form such as photos, diagrams and number lines. The abstract moves to formal methods and word problems to understand the objectives. All three methods are used in conjunction with one another, not as a progression.*

## Objective and Strategies

## Concrete

## Pictorial

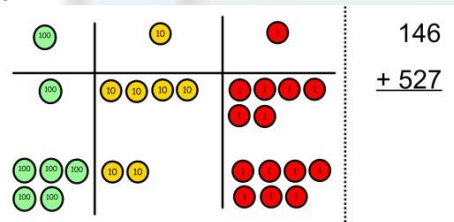
## Abstract

### Addition

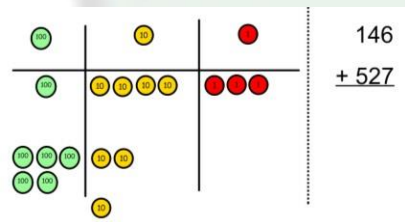
### Column method- regrouping

(Decimals – with different amounts of decimal places)

Make both numbers on a place value grid.



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

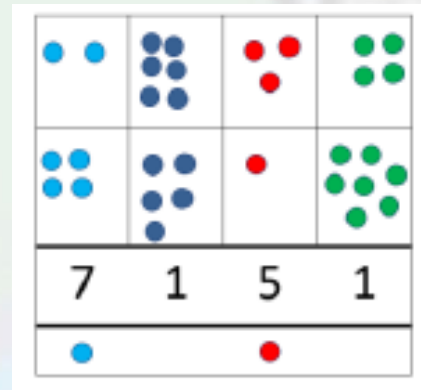


Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added.

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

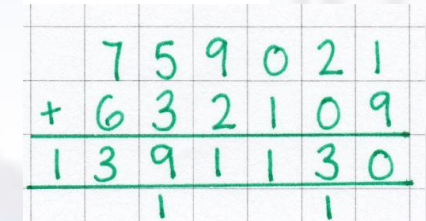
As children move on to decimals, money and decimal place value counters can be used to support learning.

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.

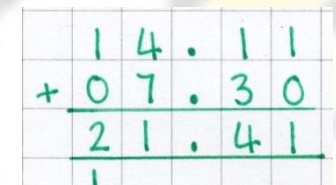
$$\begin{array}{r} 20 + 5 \\ 40 + 8 \\ 60 + 13 = 73 \end{array}$$



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

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

$$\begin{array}{r} £ 23.59 \\ + £ 7.55 \\ \hline £ 31.14 \\ 1 \quad 1 \quad 1 \end{array}$$



## Objective and Strategies

### Subtraction

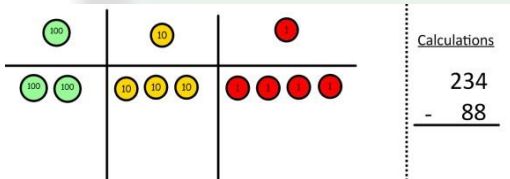
### Column method with regrouping

(Decimals – with different amounts of decimal places)

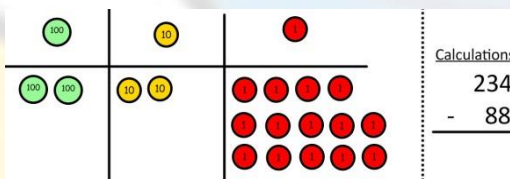
## Concrete

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

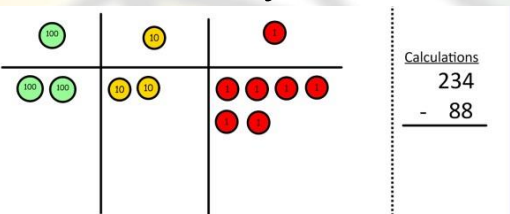
Make the larger number with the place value counters



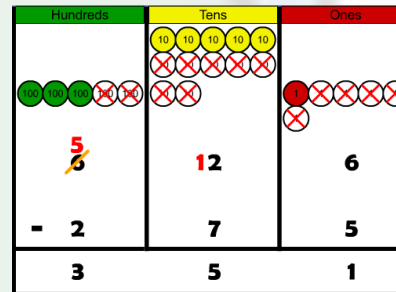
Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.



Now I can subtract my ones.



## Pictorial



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.

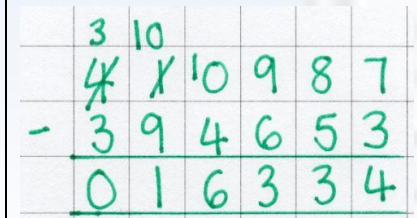


When confident, children can find their own way to record the exchange/regrouping.

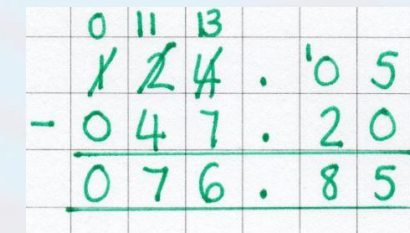
Just writing the numbers as shown here shows that the child understands the method and

## Abstract

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

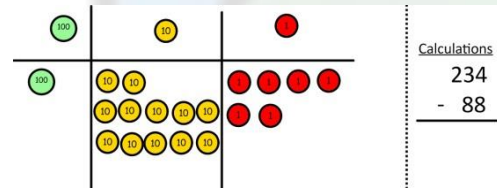


This will lead to an understanding of subtracting any number including decimals.

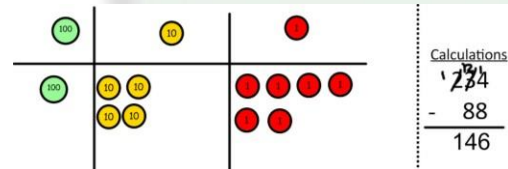




Now look at the tens, can I take away 8 tens easily? I need to exchange one hundred for ten tens.



Now I can take away eight tens and complete my subtraction



Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.

knows when to exchange/regroup.

## Objective and Strategies

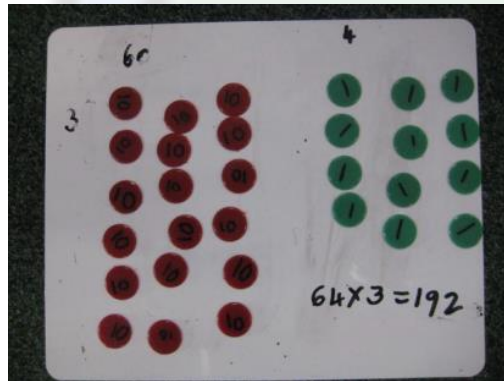
### Multiplication

#### Column multiplication

(multi digit up to 4 digits by a 2 digit number)

## Concrete

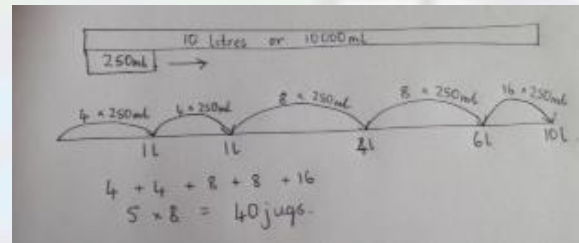
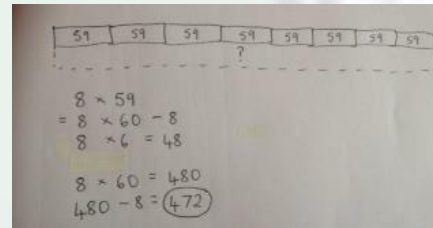
Children can continue to be supported by place value counters at the stage of multiplication.



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.

## Pictorial

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



## Abstract

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.

$$216 \times 7 = 1512$$

$$\begin{array}{r} 216 \\ \times 7 \\ \hline 42 \quad (7 \times 6) \\ 70 \quad (7 \times 10) \\ + 1400 \quad (7 \times 200) \\ \hline 1512 \\ 1 \end{array}$$

This moves to the more compact method of short multiplication.

$$216 \times 7 = 1512$$

$$\begin{array}{r} 216 \\ \times 7 \\ \hline 1512 \\ 14 \end{array}$$

This can then be applied to multiplying 4 digits by a two digit number.

$$\begin{array}{r} 3423 \times 14 = 47,922 \\ 3423 \\ \times \quad 14 \\ \hline 13692 \\ + 34230 \\ \hline 47922 \end{array}$$

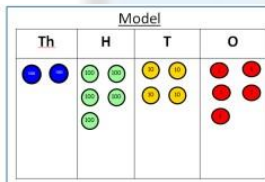
## Objective and Strategies

### Division

### Long division

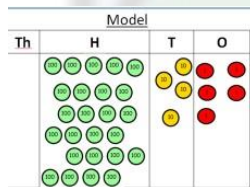
(up to 4 digits by a 2 digit number interpret remainders as whole numbers, fractions or round)

## Concrete



$2544 \div 12$   
How many groups of 12 thousands do we have? None

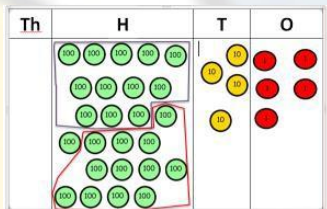
Exchange 2 thousand for 20 hundreds.



$$\begin{array}{r} 0 \\ 12 \overline{) 2544} \end{array}$$

How many groups of 12 are in 25 hundreds? 2 groups. Circle them.

We have grouped 24 hundreds so can take them off and we are left with one.



$$\begin{array}{r} 02 \\ 12 \overline{) 2544} \\ \underline{24} \\ 1 \end{array}$$

## Pictorial

Instead of using physical counters, students can draw the counters and circle the groups on a whiteboard or in their books.

Use this method to explain what is happening and as soon as they have understood what move on to the abstract method as this can be a time consuming process.

## Abstract

Long division – expanded or ‘chunking’

Begin with divisions that divide equally with no remainder.

$$152 \div 4 = 38$$

$$\begin{array}{r} 38 \\ 4 \overline{) 152} \\ - 120 \quad (30 \times 4) \\ \hline 032 \\ - 032 \quad (8 \times 4) \\ \hline 000 \end{array}$$

Move onto divisions with a remainder.

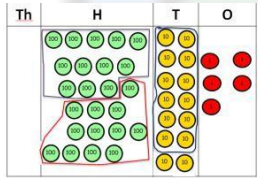
$$367 \div 12 = 30 \text{ r } 7$$

$$\begin{array}{r} 30 \text{ r } 7 \\ 12 \overline{) 367} \\ - 120 \quad (10 \times 12) \\ \hline 247 \\ - 120 \quad (10 \times 12) \\ \hline 127 \\ - 120 \quad (10 \times 12) \\ \hline 007 \end{array}$$

↑ remainder as cannot be divided by 12.

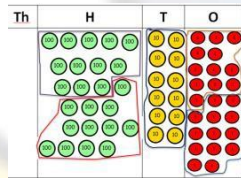


Exchange the one hundred for ten tens so now we have 14 tens. How many groups of 12 are in 14? 1 remainder 2



$$\begin{array}{r} 021 \\ 12 \overline{) 2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 2 \end{array}$$

Exchange the two tens for twenty ones so now we have 24 ones. How many groups of 12 are in 24? 2



$$\begin{array}{r} 0212 \\ 12 \overline{) 2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

### Long Division

Use this method if dealing with increasingly larger numbers, but often long short (expanded method) is followed by short division.

$$\begin{array}{r} 0318r5 \\ 20 \overline{) 6365} \\ \underline{-60} \phantom{0} \leftarrow (3 \times 20) \\ \phantom{0} 36 \phantom{0} \\ \underline{-20} \phantom{0} \leftarrow (1 \times 20) \\ \phantom{0} 165 \\ \underline{-160} \phantom{0} \leftarrow (8 \times 20) \\ \phantom{0} 5 \end{array}$$

Children are not required to write these multiplications, they are there to help with the explanation.

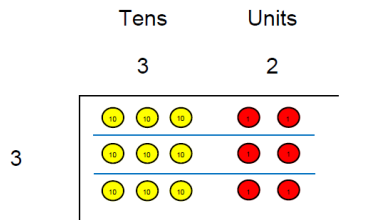
## Objective and Strategies

### Division

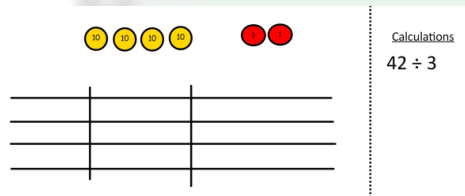
#### Short division

(up to 4 digits by a 2 digit number interpret remainders as whole numbers, fractions or round)

## Concrete

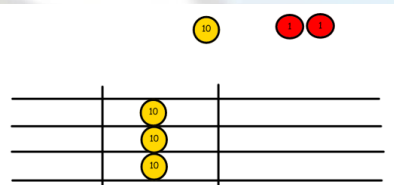


Use place value counters to divide using the bus stop method alongside

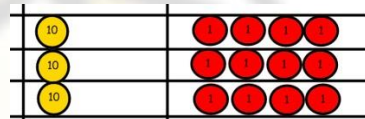


$$42 \div 3 =$$

Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.



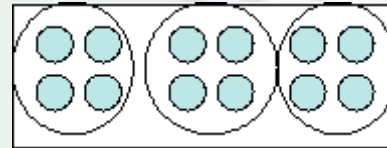
We exchange this ten for ten ones and then share the ones equally among the groups.



We look how much in 1 group so the answer is 14.

## Pictorial

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.

## Abstract

Short division – 'bus-stop' method

Begin with divisions that divide equally with no remainder.

$$152 \div 4 = 38$$

$$\begin{array}{r} 038 \\ 4 \overline{) 152} \end{array}$$

Move onto divisions with a remainder.

$$367 \div 12 = 30 \text{ r } 7$$

$$\begin{array}{r} 030 \text{ r } 7 \\ 12 \overline{) 367} \end{array}$$

Finally move into decimal places to divide the total accurately.

$$\begin{array}{r} 14.6 \\ 35 \overline{) 511.0} \end{array}$$

## What you can do at home to help your child make progress

- *work out the best value for money when shopping*
- *watch documentaries and discuss the maths involved in climate change or other environmental concerns*
- *talk about their work with reference to a textbook or online resource such as BBC Bitesize*
- *explore the interest earned on a range of savings accounts, the cost of obtaining money for a mortgage or the cost involved in using credit, for example, children can be encouraged*
- *to use an ICT spreadsheet to calculate and compare interest rates*
- *talk about supermarket offers, for example, “3 for the price of 2”, “Buy 1 get 1 free”, “Two for £2”, “Buy one get one half price”. Work out together which is the cheapest or best value*
- *calculate percentage of sales discounts*
- *adapt recipe amounts for different numbers of people*
- *play the ‘estimate the size of the shopping bill’ game, that is, round every item to the nearest 50p and see how the estimated bill compares to the actual cost*
- *consider the probabilities of certain events happening when playing simple games with dice, for example, the chance of gaining a particular total when two dice are thrown*
- *read timetables and maps when planning a journey*
- *look at local ordnance survey maps and talk about how bearings are measured from your city, town or village to other nearby places.*