



Key Stage 1

The Calculating Mr One has been developed to support the teaching of numeracy in schools at both Key Stage One and Key Stage Two and to reinforce much of the number work tested in the SATS for years 2 & 6.

The main focus of the play is on number patterns, mental arithmetic and approaches to the four functions, including work with the number line, number bonds, the HTU grid, and multiplication tables.

Each mathematical idea is built upon throughout the play involving the audience directly in both the calculations and the methodology employed in problem solving and encouraging them to use a variety of approaches to achieve a single answer. Throughout the play the work is put into a number of everyday contexts through which the problems are explored.

The following pages provide a summary of the work covered and examples of how it is put into practice in the play, At the back of this booklet you will find the words to the song and the mathematical rhyming couplet which the children learn during the show and pupils' worksheets designed to tie in with the mathematical concepts covered in the play which can be photocopied for use in the classroom.



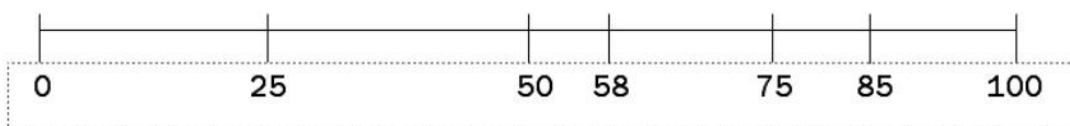
ORDERING NUMBERS

The position of each digit is important. We show that a number, such as 58 is not the same if the order of the numbers is reversed: 58 does not equal 85.

The two numbers made up from the digits 5 and 8 are then located on a hundred number square so that we can see which is the bigger. These two numbers are then positioned on a number line.

THE NUMBER LINE

The number line is introduced. At one end we have 0 and at the other 100. The numbers are placed in their position on the line and their positions discussed



58 will be closest to the middle (ie.50) and 85 closer to 100.

In class roll a dice to create five 2 digit numbers and ask the children to put them on the number line. Ask them to explain why they chose the place they did for each number.

PLACE VALUE

The position of a digit in a number gives its value and we show that each position in an

HTU chart tells us how many hundreds, tens and units there are in a number. Initially the idea is introduced through counting money: firstly the tens are counted then the remaining units and the number is written down. Remember, if there are no tens or units then 0 must be used to hold the place.

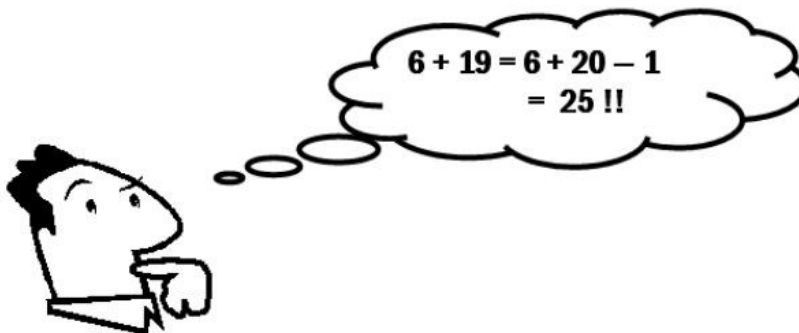
If Bassett, the butler has been paid ten times more than he should have been he would be earning £100 rather than £10 a year. In class work through various two digit numbers making them ten times bigger and smaller. Make sure that some numbers include zeros as place savers.

ESTIMATION

Estimation is approached as a useful tool in several ways: an approximate amount can be used when an exact answer is not needed ie. how many were present at a football match, it can be used to give a guide to the final answer of a calculation or to check it after a calculation has been made and rounding up can be used in mental arithmetic to help with a calculation where figures are rounded up or down to the nearest unit, ten, hundred etc.

Rounding up is used to find an approximate answer for a problem: a jar contains a number of wine gums. How many are there in the jar? Kitty and Bassett estimate the number of gums and then count them to get the exact answer.

Rounding up is used to make mental calculation easier. If you need to add 9 or 19 etc. round it up to 10 or 20 to make the sum easier and then take away the 1.



THE FOUR OPERATIONS

With addition, subtraction, multiplication and division the method employed to solve the problem is taken to be as important as the answer. Number bonds are extremely important to help with mental calculations and times tables are the building blocks of multiplication and division.

ADDITION

Addition is used to introduce the idea of using a variety of methods to perform the same calculations.

We initially approach addition from the counting on method. Using a number square we practice counting on and back in ones and twos. We then try counting on in tens and see that often it is easier to put the biggest number first and count on. Calendars are useful to illustrate counting on: *how many days to my birthday?*



£27 is added to £75 by using a number line and starting at 75 we count on in tens to 95.

Partition is then introduced: We have £95, but need to add on 7 so

$$\begin{aligned}95 + 7 &= 95 + 5 + 2 \\ &= 100 + 2 \\ &= 102\end{aligned}$$

To check the calculation we introduce another way of addition:

$$75 + 27 = 70 + 20 + 5 + 7$$

The tens are added to begin with thus we have

$$70 + 20 = 90$$

The units are then added together, partitioning the 7 once again into 5 and 2:

$$\begin{aligned}5 + 7 &= 5 + 5 + 2 \\ &= 12\end{aligned}$$

The tens and units are then added together, partitioning the 12 into tens and units:

$$\begin{aligned}90 + 12 &= 90 + 10 + 2 \\ &= 102\end{aligned}$$

Mr Bloodhound has also been promised a £3 tip and so we count on three to make a grand total of 105.

In class set up a three different calculations and ask the children to find different ways of approaching the problems. Before approaching them discuss the different approaches they might employ; re-arranging the calculation, counting on, rounding up or down and adjusting and partitioning. Which method do they think is the best for each calculation and why?

You might like to introduce an HTU chart to help with adding hundreds, tens and units. it can be used to show how to add together 2 three digit numbers: 110 + 470:

H	T	U
4	7	0
1	1	0

Firstly add the hundreds: $400 + 100 = 500$

Next add the tens: $10 + 70 = 80$

Finally add the units and in this case, as there are none, don't forget the zero which holds the units' place:

$$500 + 80 = 580$$

NUMBER BONDS

Number bonds are introduced and with the audience's help we look at number bonds to 10 followed by number bonds to 20. This leads on to solving calculations involving subtraction.

SUBTRACTION

Subtraction is treated as the inverse of addition and again we see there are different methods to use. A calculation is set up:

$$105 - 58 = ?$$

Firstly we see that 'counting back' is a good method to find the answer and using a number line we count back in tens we get:

$$105, 95, 85, 75, 65, 55$$

To subtract the 8 units we partition the 8 into $5 + 3$ then count back once more:

$$55 - 5 = 50$$

$$50 - 3 = 47$$

We look at the connection between addition and subtraction and see how to check an answer by adding the number taken away to the answer:

$$58 + 47$$

We use partition, adding first the tens: $40 + 50 = 90$

Then the units $7 + 8 = 15$

The add the two answers together: $90 + 15 = 105$

So our initial subtraction was correct.

MULTIPLICATION

Multiplication is introduced as repeated addition and the audience call out the multiples of 2, 5 and 10.

The idea of doubling and halving is introduced as 2 times a number

The number square is reintroduced to show the patterns made by the 2, 5 and 10 times tables. We see that with the 10s there is always a nought on the end and that the 5s end in nought or five.

Ebenezer Brainteaser explains that knowing your tables helps as a shortcut—much quicker than adding! The two, five and ten times tables are then repeated once more and are treated as multiples:

$$2, 4, 6, 8, 10, 12, 14, 16, 18, 20$$

10, 20, 30, 40, 50, 60, 70, 80, 90, 100

5, 10, 15, 20, 25, 30, 35, 40, 45, 50

DIVISION

Division is understood as sharing: *there is a certain number of wine gums. How can nine wine gums be shared equally between two people? How many are left over?*

We then see halving as the inverse operation of doubling:

$\frac{1}{2}$ 4 is 2

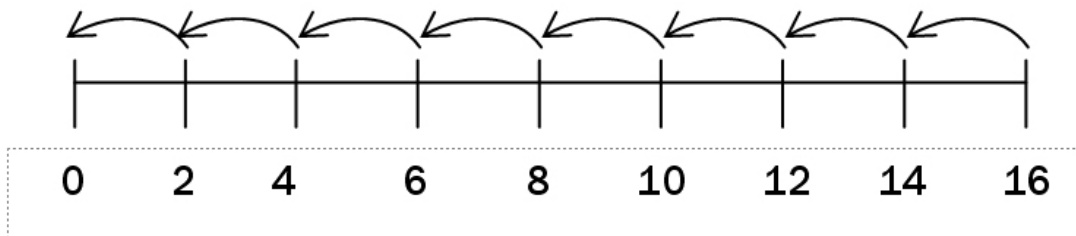
$\frac{1}{2}$ 6 is 3

$\frac{1}{2}$ 8 is 4

When we have a number which does not divide exactly we see that we have a remainder:

$$9 \div 2 = 4 \text{ remainder } 1$$

The problem $16 \div 2$ is set up. Using a number line we see the division as jumps of 2 backwards from 16:



Counting up the number of jumps we see that there are 8 so we can see that

$$16 \div 2 = 8$$

We then check the answer by doubling 8 and find that we have 16.

By revisiting work done on the tables we see that knowledge of our tables can help us know whether a number has factors (the term 'factor' is not used) and therefore when it can be divided exactly by another number.

The audience is invited to tell us whether certain numbers can be divided by 2, 5 or 10. Several numbers are explored, and we see that some numbers have several factors, eg. 10.

10 can be divided by 2, 5 and 10 so all three numbers are factors of 10

SONG WORDS

Here are the words to the song learnt by the children and repeated throughout the play.

'IT'S ALL IN THE METHOD'

It's all in the method
The method's all in all!
To calculate there isn't just one way!
Why not try some 'counting on'
But you must adjust your sum
And from the biggest number count away.
With subtraction and addition
It's good to try 'partition'
Why not split your numbers into tens and ones.
Another way again
Pairs of numbers that make ten.
A multitude of workings can be done.
And don't forget to mug up on your number bonds and tables
And the world of calculation will be effortless and fun!

