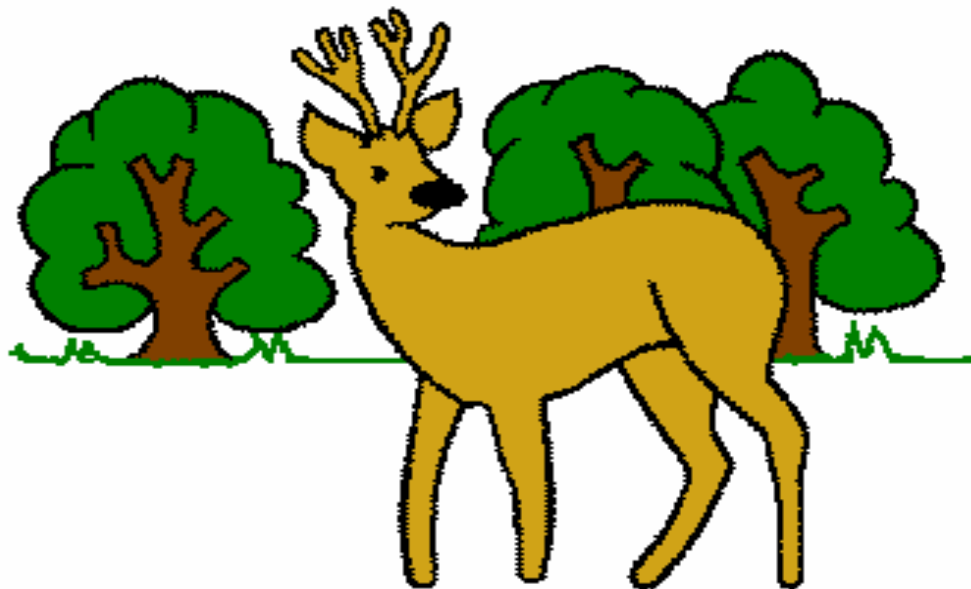


Medstead C of E Primary



Mathematics
Information
Booklet

Introduction

Since the start of the National Numeracy Strategy, there has been a greater emphasis on mental calculations and the use of a wider variety of calculation strategies to solve mathematical problems.

You can help your child in many ways. Learning number bonds and multiplication tables is a good start. You can also pose your child everyday number problems within a context. Asking them how they worked out their answer is a very valuable exercise.

There are times when children will need to use a written method to solve a mathematical problem. This is where this booklet comes in. This booklet is designed to support your child's mathematics work in the classroom. We are sharing some of the methods that we are encouraging children to use in class so that you can consolidate them at home.

As the children go through the school, they will see the methods they use move towards the more formal.

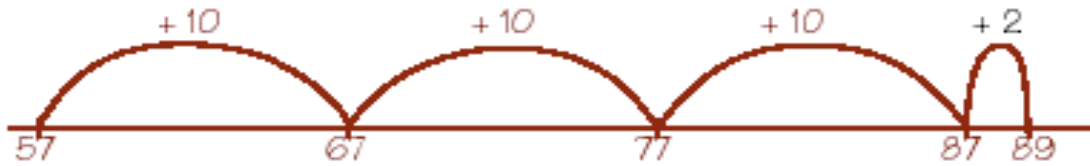
Children do make progress at different rates and this is reflected in the learning they undertake in the classroom.

We hope that you find the booklet useful.

Addition

1. Counting up in tens and then units using an unstructured number line.

$$57 + 32 = 89$$



2. Partitioning.

$$126 + 61 = 187$$

Partition the numbers into hundreds, tens and units and then add each column. At the end of the calculation put the number back together.

$$\begin{array}{r} 126 + 61 = 100 + 20 + 6 \\ + \quad \quad \quad 60 + 1 \\ \hline 100 + 80 + 7 = 187 \end{array}$$

3. When this is understood the children progress to vertical format

$$\begin{array}{r} 687 \\ + 153 \\ \hline 700 (600 + 100) \\ 130 (80 + 50) \\ \underline{10} (7 + 3) \\ 840 \end{array}$$

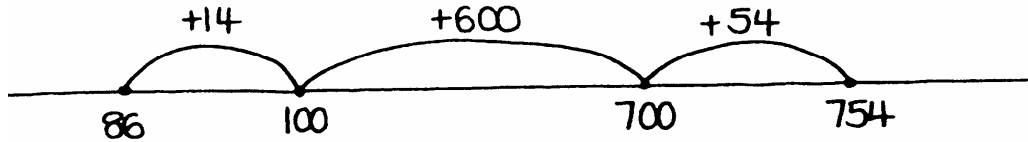
4. When this is understood the children progress to using the standardised format

$$\begin{array}{r} 687 \\ + 153 \\ \hline 840 \\ 1 \end{array}$$

Subtraction

1. Adding on using an unstructured number line.

$$754 - 86 = 668$$



2. Column subtraction is then introduced by counting up.

$$\begin{array}{r} 542 \\ - 187 \\ + 13 \quad (\text{to make } 200) \\ + 300 \quad (\text{to make } 500) \\ + \underline{42} \quad (\text{to make } 542) \\ \hline 355 \end{array}$$

3. Decomposition

Using partitioning initially:

$$\begin{array}{r} 754 = 700 + 50 + 4 \\ - \underline{86} \quad - \underline{80 + 6} \\ \\ = 700 + 40 + 14 \quad \text{adjust from T to U} \\ - \underline{80 + 6} \\ \\ = 600 + 140 + 14 \quad \text{adjust from H to T} \\ - \underline{80 + 6} \\ 600 + 60 + 8 = 668 \end{array}$$

$$\begin{array}{r} 9 \\ 3 \cancel{10} 10 \\ \underline{4008} \\ - \underline{2995} \\ \hline 1013 \end{array}$$

This method allows the children to understand the process of decomposition before moving on to the standardised format shown on the right.

Multiplication

Children need to develop concrete knowledge of multiplication and division facts for each multiplication table before moving onto the next table.

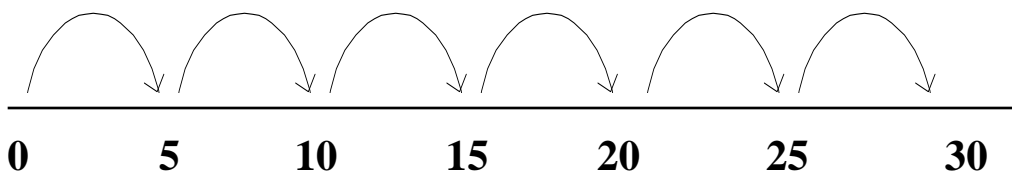
The multiplication grid at the back of the booklet is a useful learning tool. Children can look for patterns, practise counting in different amounts and play games involving the tables facts.

Number lines are used to help solve multiplication problems.

For example: How much money would I have if I had six £5 notes?

$£5+£5+£5+£5+£5+£5 =$ six jumps of 5 on the number line

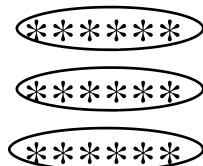
$£5 \times 6 = £30$



Arrays

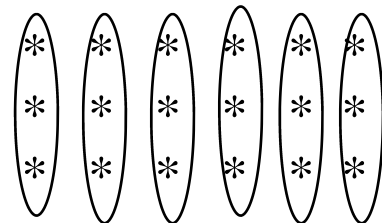
Children need to recognise the different ways an array can be expressed. For example:

3 x 6 is three groups of six



$$3 \times 6 = 18$$

6 x 3 is six groups of



$$6 \times 3 = 18$$

Grid Method: $16 \times 18 =$
 $(10+6) \times (10+8) =$

x	10	8	
10	100	80	$100+80=180$
6	60	48	$60+48=108$

then + $\begin{array}{r} 180 \\ 108 \\ \hline 288 \end{array}$

[because $10 \times 10 = 100$ $10 \times 8 = 80$ so $16 \times 18 = 288$
and $6 \times 10 = 60$ $6 \times 8 = 48$]

Standard written method (HTUxU)

Leading to

$$\begin{array}{r} 346 \\ \times \quad 9 \\ \hline 2700 \quad (300 \times 9) \\ + \quad 360 \quad (40 \times 9) \\ \hline \quad 54 \quad (6 \times 9) \\ \hline 3114 \end{array}$$

$$\begin{array}{r} 346 \\ \times \quad 9 \\ \hline 3114 \\ \hline \quad 4 \quad 5 \end{array}$$

Long multiplication (TUxTU)

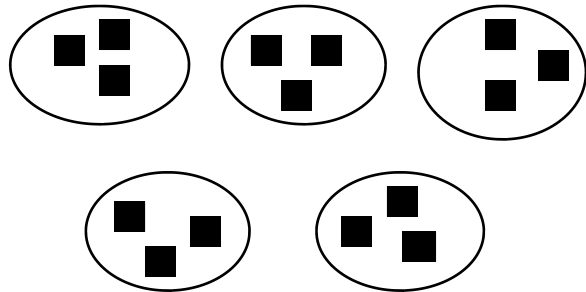
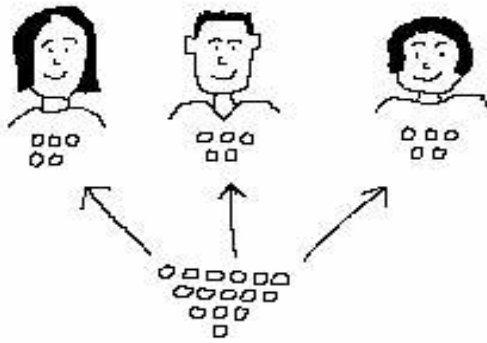
$$\begin{array}{r} 72 \\ \times \quad 38 \\ \hline 2160 \quad (72 \times 30) \\ + \quad 576 \quad (72 \times 8) \\ \hline 2736 \\ \hline 1 \end{array}$$

Division

Sharing

$$15 \div 3 = 5$$

Grouping

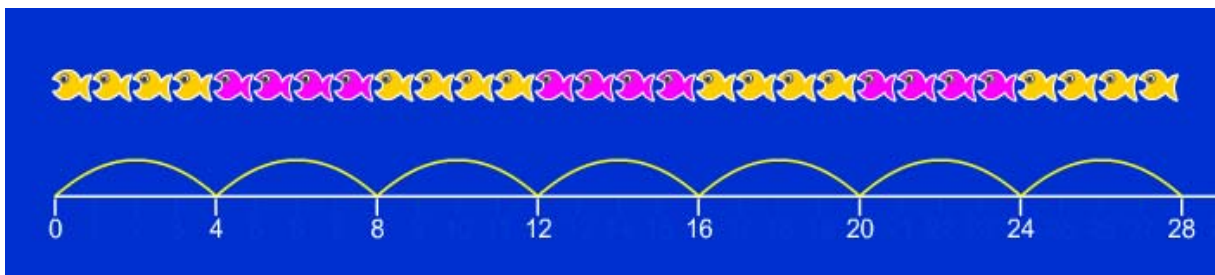


How many threes in fifteen?

15 shared between three

Multiplication facts can be used to help solve division problems.

For example: $28 \div 4 = ?$ Can be solved by using a number line and counting in fours. You can see there are 7 lots of 4. So $28 \div 4 = 7$.



Chunking

Using multiples of a divisor (chunking)

$$\begin{array}{r} 256 \div 7 = \quad 256 \\ - \underline{70} \quad (10 \times 7) \\ 186 \\ - \underline{140} \quad (20 \times 7) \\ 46 \\ - \underline{42} \quad (6 \times 7) \\ 4 \end{array}$$

Answer: 36 remainder 4

Short division HTU ÷ U

$$\begin{array}{r} \underline{32 \text{ r}4} \\ 6 \overline{) 196} \\ \underline{18} \\ 16 \\ \underline{12} \\ 4 \end{array}$$

Long Division

Long division can also be achieved using the subtraction method or the more conventional method. In each case it is essential that the pupil sets their work out in a logical fashion and maintains strict control over place value.

$$\begin{array}{r} \underline{333 \text{ r}13} \\ \underline{19 \overline{) 6340}} \\ - \underline{5700} \\ 640 \\ - \underline{570} \\ 70 \\ - \underline{57} \\ \underline{13} \end{array}$$

0x2=0	0x3=0	0x4=0	0x5=0	0x6=0	0x7=0	0x8=0	0x9=0	0x10=0	0x11=0	0x12=0
1x2=2	1x3=3	1x4=4	1x5=5	1x6=6	1x7=7	1x8=8	1x9=9	1x10=10	1x11=11	1x12=12
2x2=4	2x3=6	2x4=8	2x5=10	2x6=12	2x7=14	2x8=16	2x9=18	2x10=20	2x11=22	2x12=24
3x2=6	3x3=9	3x4=12	3x5=15	3x6=18	3x7=21	3x8=24	3x9=27	3x10=30	3x11=33	3x12=36
4x2=8	4x3=12	4x4=16	4x5=20	4x6=24	4x7=28	4x8=32	4x9=36	4x10=40	4x11=44	4x12=48
5x2=10	5x3=15	5x4=20	5x5=25	5x6=30	5x7=35	5x8=40	5x9=45	5x10=50	5x11=55	5x12=60
6x2=12	6x3=18	6x4=24	6x5=30	6x6=36	6x7=42	6x8=48	6x9=54	6x10=60	6x11=66	6x12=72
7x2=14	7x3=21	7x4=28	7x5=35	7x6=42	7x7=49	7x8=56	7x9=63	7x10=70	7x11=77	7x12=84
8x2=16	8x3=24	8x4=32	8x5=40	8x6=48	8x7=56	8x8=64	8x9=72	8x10=80	8x11=88	8x12=96
9x2=18	9x3=27	9x4=36	9x5=45	9x6=54	9x7=63	9x8=72	9x9=81	9x10=90	9x11=99	9x12=108
10x2=20	10x3=30	10x4=40	10x5=50	10x6=60	10x7=70	10x8=80	10x9=90	10x10=100	10x11=110	10x12=120
11x2=22	11x3=33	11x4=44	11x5=55	11x6=66	11x7=77	11x8=88	11x9=99	11x10=110	11x11=121	11x12=132
12x2=24	12x3=36	12x4=48	12x5=60	12x6=72	12x7=84	12x8=96	12x9=108	12x10=120	12x11=132	12x12=144

+	-	×	÷	>	=
add, increase, combine, plus, total, and, count on, sum of, more than	subtract, minus, difference, decrease, less than, take away	multiply, times, sets of, product, power of, square	divide, share, into, group, split, give	greater than	equals, is, means, same as, will be, answer is, represents
				<	
				less than	

Factors, Multiples and Products - When you multiply the two numbers multiplied are **factors**, the answer is the **product**. eg $2 \times 3 = 6$; 2 and 3 are **factors** of 6; 6 is the **product** of 2 and 3.

$4 \times 6 = 24$ so 24 is a **multiple** of 4 and 6. 24 is also a **multiple** of 1,2,3,8 and 12.

Square numbers - The square of a number is the answer you get when you multiply a number by itself. eg $5^2 = 5 \times 5 = 25$
1,4,9,16,25,36,49,64,81,100,121,144

Shape

Polygon – 2D shape with 3 or more sides

Polyhedron – 3D shape with 4 or more faces

Equilateral Triangle – 3 equal sides & angles, symmetry – rotation order 3, reflect 3 axes, interior angles = 180°

Isosceles Triangle – 1 pair equal sides and 1 pair equal angles, symmetry – reflect 1 axis, interior angles = 180°

Right angled triangle – 3 sided shape with one interior angle of 90° , interior angles = 180°

Square – 4 equal sides, 4 right angles two pairs of parallel sides, symmetry – rotational order 4, reflective 4 axes

Rectangle – 2 pairs of equal and parallel sides, 4 right angles symmetry – rotational order 2, reflective 2 axes

Parallelogram- 2 pairs of equal and parallel sides, opposite sides equal, symmetry – rotational order 2

Kite- 2 pairs equal sides, symmetry – reflective 1 axis

Pentagon – 5 sides **Hexagon** – 6 sides **Octagon** – 8 sides **Circle** – one side, no angles

Solid shapes

Cube

Cone

Cylinder

Prism

Cuboid

Capacity

millilitre – ml
litre - l

1000 millilitres = 1 litre

750 millilitres = $\frac{3}{4}$ litre

500 millilitres = $\frac{1}{2}$ litre

250 millilitres = $\frac{1}{4}$ litre

Length

millimetre – mm metre – m
kilometre – km centimetre – cm

10mm = 1cm 100 cm = 1 m

1000 mm = 1 m 1000 m = 1km

500mm = $\frac{1}{2}$ m 750mm = $\frac{3}{4}$ m

250mm = $\frac{1}{4}$ m

500m = $\frac{1}{2}$ km 750m = $\frac{3}{4}$ km

250m = $\frac{1}{4}$ km

Mass

Gram – g
Kilogram – kg

1000g = 1 kg

750g = $\frac{3}{4}$ kg

500g = $\frac{1}{2}$ kg

250g = $\frac{1}{4}$ kg