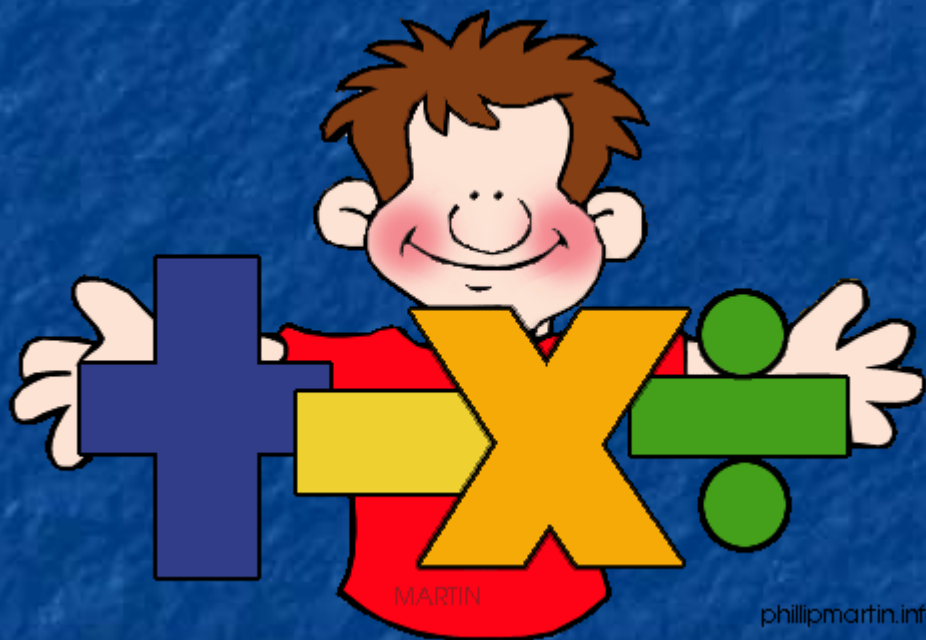


# Maths Workshop for Parents



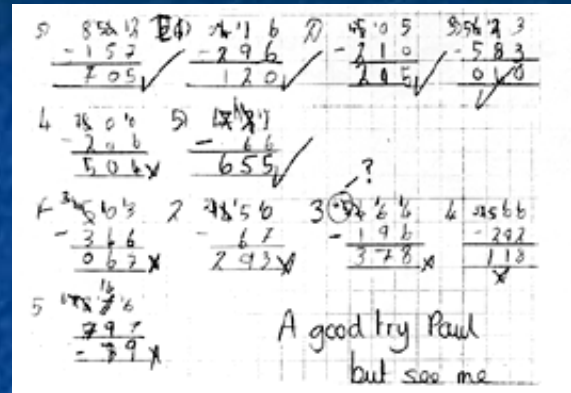
[phillipmartin.info](http://phillipmartin.info)

# Aims of the Workshop

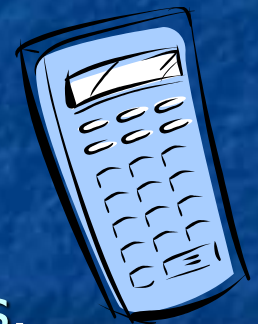
- To provide you with a clear outline of the key features of maths teaching at Langrish Primary School
- To provide you with knowledge that you can use at home to support children's maths development

# Maths in the past!

- In the 1960s, a lot of time was given to practising methods.



- Research shows that despite this some children found certain methods difficult, forgot them rather quickly or made persistent errors.
- Sometimes, the result was a dislike of the subject, which could persist into adult life.
- With the 1970s bringing the introduction of calculators, people began to debate what calculating skills are actually needed in life.





# Today's Curriculum

- It is all about embedding knowledge and understanding.
- If you can't explain it you don't understand it!
- Mental methods as well as formal methods need to be understood and applied by children.

# Good practice in Maths today!

- **Mental calculation** skills are vital.
- Children need the ability to **estimate**.

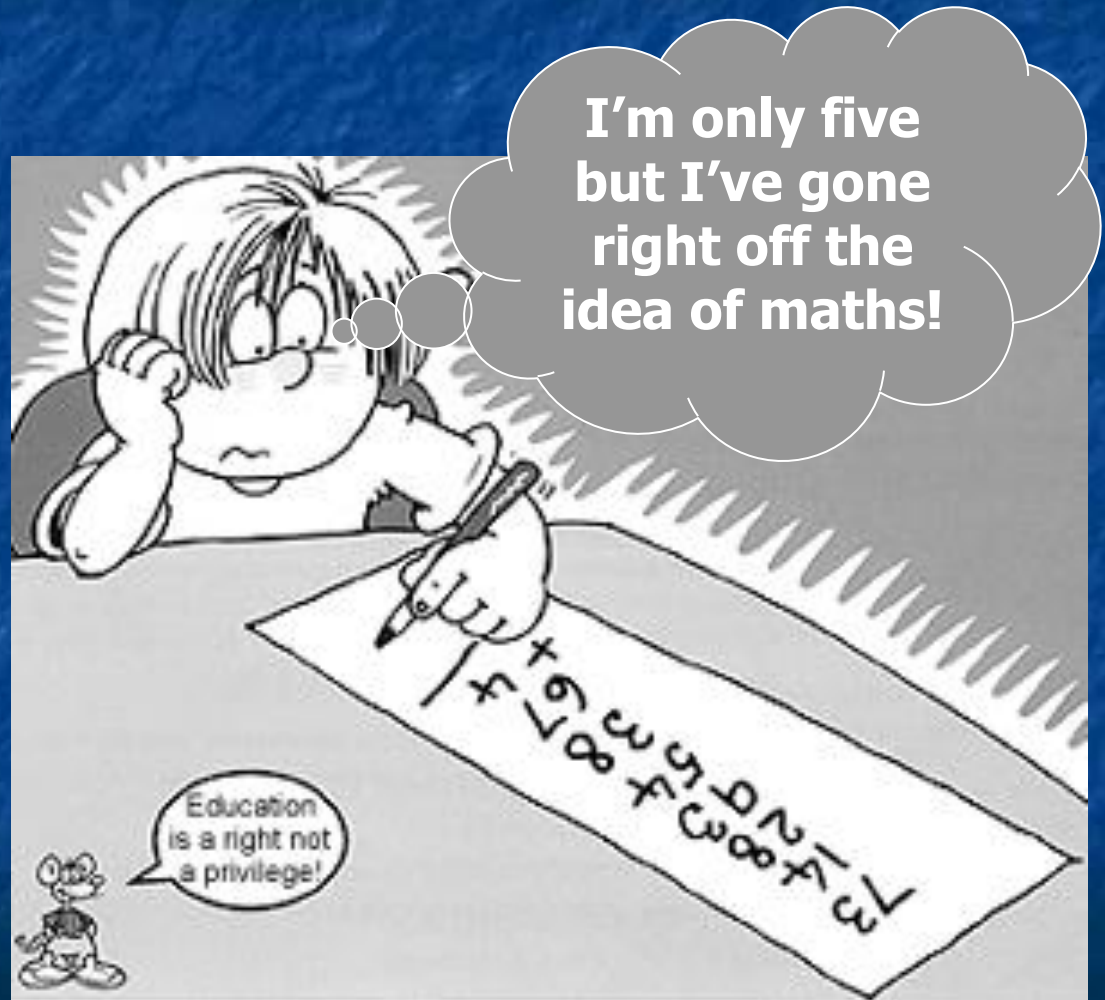
e.g. If I have 18 sweets in one bag  
and 33 sweets in another bag,  
how many do I have altogether?



Children can estimate by adding 20 and 30 and know  
that roughly the answer should be around 50.

# Mental before written

- We need to first develop a **sense of number.**





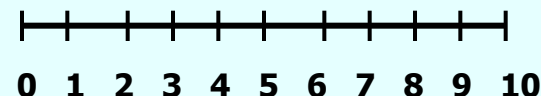
# So how do children learn in maths?

- **Counting** of objects and mental counting.
- Early stages of calculation with learning of addition and subtraction **number facts**, with recording.



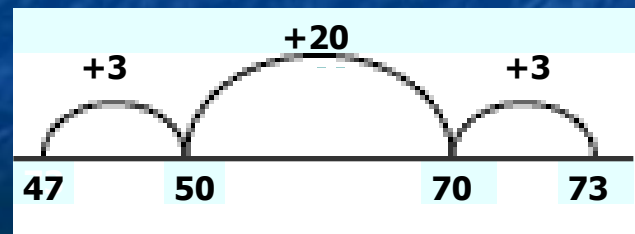
$$5 + 8 = \blacksquare \quad \text{or} \quad 13 = \blacksquare + 5$$

- Work with **structured number lines**



- Work with **larger numbers, unstructured number lines** and informal **jottings**.

e.g.  $47 + 26$





- Your turn: You can decide whether you want to add the O, T or H first .
- Q1)  $43 + 9$
- Q2)  $48 + 56$
- Q3)  $127 + 145$
- Q4)  $362 + 165$
- Q5)  $263 + 1792$



# Hands on addition and subtraction

H	T	O

# Addition cont .....

**Beginning to record vertically** – the expanded written method

$$126 + 57 =$$

**Estimate:**  $126 + 57$  is nearly  $130 + 60$  so estimate answer should be near 190.

<b>126</b>	
<b>+ 57</b>	
<hr/>	
<b>13</b>	<b>(6+7)</b>
<b>70</b>	<b>(20+50)</b>
<b>100</b>	<b>(100+0)</b>
<hr/>	
<b>183</b>	

# Addition cont .....

**Standard vertical method involving carrying – the formal written method.**

When children are confident working with larger numbers using the previous strategies, they will be introduced to 'carrying' digits.

$$2856 + 1095$$

**Estimate:  $2900 + 1100 = 4000$  Answer should be less as I have rounded up.**

$$\begin{array}{r} 2856 \\ + 1095 \\ \hline 3951 \\ 11 \end{array}$$

$$\begin{array}{r} 47 \\ + 76 \\ \hline 123 \\ 11 \end{array} \quad \begin{array}{r} 368 \\ + 493 \\ \hline 861 \\ 11 \end{array}$$



# Column Addition

- Try these questions
- Q1)  $27 + 84$
- Q2)  $162 + 64$
- Q3)  $145 + 253$
- Q4)  $417 + 485$
- Q5)  $17306 + 62871$
- Q6)  $391.9 + 425.3$

# Achieving Maths Mastery

## Inverse operation

$$79859 - ? = 46860$$

$$? + 54689 = 54759$$

## Puzzles

Making  
resources for  
younger  
children

## Magic squares

The sum is 170.

5	70	75	20	→170
60	35	30	45	→170
40	55	50	25	→170
65	10	15	80	→170
170	170	170	170	170

## Missing digits

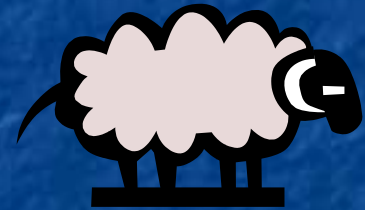
$$26?8 + ?256 = 5894$$

# Good practice in Maths today!

- All children need to learn maths in a **real life context**.

As well as knowing  $7 \times 7 = 49$ . Children need to be able to do the following:

There are 7 fields, each field has 7 sheep in them. How many sheep are there in total?



- Children need to be able to **explain** how they have calculated something using a method that suits them. If they can't explain it, they don't fully understand it.
- **Written calculations**, are taught but when children are ready.



# Non-negotiable leaflets

## Year 2

- Compare and order numbers up to 100 and use  $<$   $>$   $=$
- Read and write all numbers to 100 in digits & words
- Say 10 more/less than any number to 100
- Count in steps of 2, 3 & 5 from zero and in 10s from any number (forwards and backwards)
- Recall and use multiplication & division facts for 2, 5 & 10 tables
- Recall and use  $+/-$  facts to 20
- Derive and use related facts to 100
- Recognise place value of any 2-digit number
- Add & subtract: 2-digit nos & ones; 2-digit nos & tens ; Two 2-digit nos; Three 1-digit nos
- Recognise and use inverse ( $+/-$ )
- Calculate and write multiplication & division calculations using multiplication tables
- Recognise, find, name and write  $\frac{1}{3}$ ;  $\frac{1}{4}$ ;  $\frac{2}{4}$ ;  $\frac{3}{4}$
- Write and recognise equivalence of simple fractions
- Tell time to five minutes, including quarter past/to

# Technical things for you to remember

- It is exchanging not 'borrowing'
- Encourage your children to use mathematical language
- Encourage them to use different methods
- Use the inverse operation to check their calculation

# Remember what is important in maths!

- A focus on **mental calculations**.
- The ability to **estimate**.
- To use maths in a **real life context**.
- To ask children to **explain** how they have calculated something using a method that suits them.
- Teach children **written calculations**, but only when they are ready.



# Thank you for coming

Keep an eye on the Maths page on the website for further information!

# Addition cont .....

## 8. Adding decimals

As with all vertical methods, children should know how to line up place value columns and the decimal point under each other.

$$£5.75 + £3.18 =$$

$$\text{Estimate: } £6.00 + £3.00 = £9.00$$

$$\begin{array}{r} £5.75 \\ + £3.18 \\ \hline 0.13 \text{ (0.05+0.08)} \\ 0.80 \text{ (0.70+0.10)} \\ 8.00 \text{ (5.00+3.00)} \\ \hline £8.93 \end{array}$$

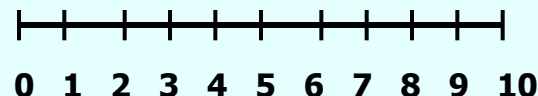
$$\begin{array}{r} £5.75 \\ + £3.18 \\ \hline £8.93 \\ 1 \end{array}$$

# Subtraction

1. **Practical** subtraction of real objects.
2. **Mental subtraction** of number facts.
3. Use of a **structured number line** to add.

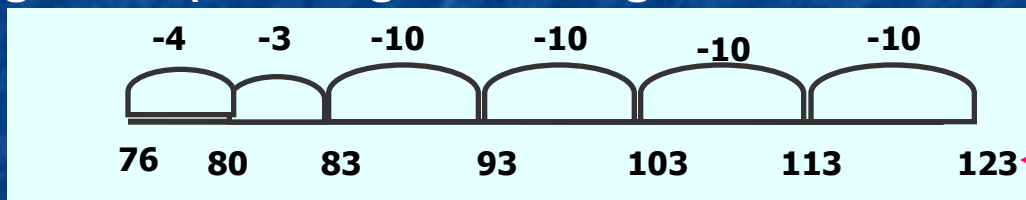


4. Use of an **unstructured number line**.  
 $123 - 47 =$



Estimate first  $120 - 50 = 70$

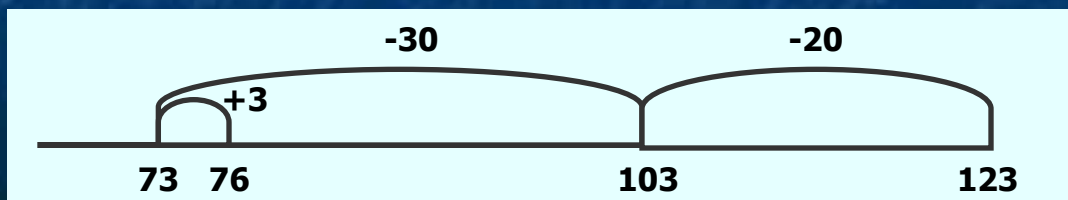
Counting back- (most significant digit first, in this case tens, then units)



Start here.



or





# Subtraction cont .....

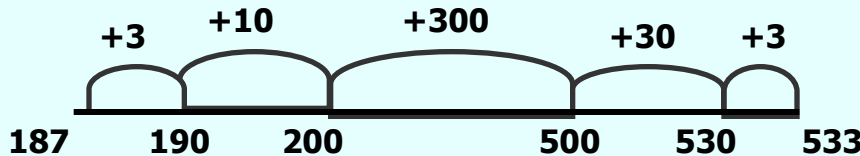
## 5. Counting on (Complimentary addition)

How shopkeepers counted out change (before the till took over!) Children will be taught to find the **difference** by counting on in the following ways.

$$533 - 187 =$$

Estimate :  $530 - 190 = 340$  (carried out mentally as  $530 - 200 + 10 = 340$ )

Start at  
this  
end.



Add the  
numbers on  
top of the  
number line to  
get the  
answer.

The difference is:  $3 + 10 + 300 + 30 + 3$   
or  $300 + 40 + 6$   
 $= 346$



# Subtraction cont .....

## 6. Towards standard vertical subtraction

When children are confident in finding the difference between larger numbers using number lines, they will begin to be introduced to a more efficient vertical procedure.

$$\begin{array}{r} 533 \\ - 187 \\ \hline 13 \text{ (to make 200)} \\ 300 \text{ (to make 500)} \\ 33 \text{ (to make 533)} \\ \hline 346 \end{array}$$

This first vertical method is again based on counting on.



# Subtraction cont .....

## 7. Subtraction by decomposition

Children will then be shown decomposition; they must really understand place value to do this.

$$\begin{array}{r} 83 \\ - 55 \\ \hline \end{array} \text{ is the same as } \begin{array}{r} 80 + 3 \\ 50 + 5 \\ \hline \end{array}$$

This can be rewritten as

$$\begin{array}{r} 70 + 13 \\ - 50 + 5 \\ \hline 20 + 8 = 28 \end{array}$$

Ten is taken from 80 and added to the three.



A hundred is taken from 500 and added to 20.

$$\begin{array}{r} 533 \\ - 187 \\ \hline \end{array} \text{ is the same as } \begin{array}{r} 500 + 30 + 3 \\ - 100 + 80 + 7 \\ \hline \end{array}$$

A hundred now needs to be moved as well.

$$\begin{array}{r} 500 + 20 + 13 \\ - 100 + 80 + 7 \\ \hline \end{array}$$

$$\begin{array}{r} 400 + 120 + 13 \\ - 100 + 80 + 7 \\ \hline 300 + 40 + 6 = 346 \end{array}$$



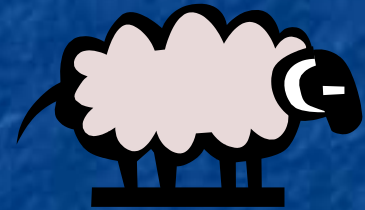


# Good practice in Maths today!

- All children need to learn maths in a **real life context**.

As well as knowing  $7 \times 7 = 49$ . Children need to be able to do the following:

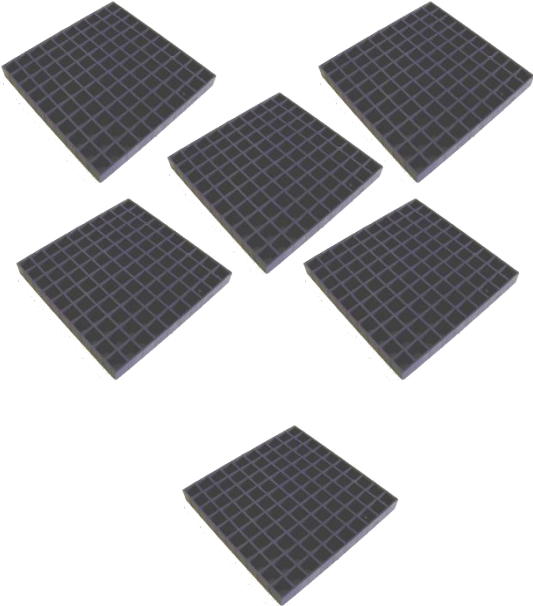
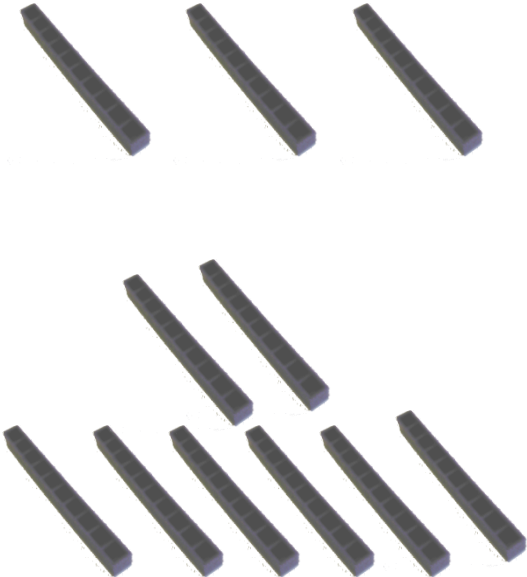

There are 7 fields, each field has 7 sheep in them. How many sheep are there in total?



- Children need to be able to **explain** how they have calculated something using a method that suits them. If they can't explain it, they don't fully understand it.
- **Written calculations**, are taught but when children are ready.

# Subtraction continued...

$$\begin{array}{r} 533 \\ - 187 \\ \hline \end{array} = \begin{array}{r} 500 + 30 + 3 \\ 100 + 80 + 7 \end{array} = \begin{array}{r} 500 + 20 + 13 \\ 100 + 80 + 7 \end{array} = \begin{array}{r} 400 + 120 + 13 \\ 100 + 80 + 7 \end{array} = \mathbf{346}$$

H	T	U
		

# Subtraction cont .....

## 8. Subtraction by decomposition

Only when children are completely secure in this we will teach them standard vertical subtraction using decomposition.

$$\begin{array}{r} 4 \ 12 \ 1 \\ \cancel{5} \cancel{3} \ 3 \\ - 1 \ 8 \ 7 \\ \hline 3 \ 4 \ 6 \end{array}$$

**Not all children will ever reach this stage.**



# Multiplying by 10, 100 and 1,000

How would you do this calculation?

$$120 \times 10 =$$

And this one?

$$34.56 \times 10 =$$

Would you use the same method?

# Dividing by 10, 100 and 1,000

How would you do this calculation?

$$450 \div 10 =$$

And this one?

$$43.21 \div 10 =$$

Would you use the same method?

# One method fits all!!

The children are taught to move the digits depending on whether they are multiplying or dividing.

This method builds on their understanding of place value.



# Multiplication

To multiply by 10, move the digits 1 place to the left.

$$345 \times 10 =$$

Th H T U

3 4 5

x 10 becomes

Th H T U

3 4 5 0

The number  
has become  
10 times  
bigger.



# To multiply by 100

Th H T U •  $\frac{1}{10}$   $\frac{1}{100}$

3 4 • 5 6 x 100 becomes

Th H T U •  $\frac{1}{10}$   $\frac{1}{100}$   
3 4 5 6 • 0 0

The number  
has become  
100 times  
bigger.



Each digit has moved 2 places to the left

# Division

To divide by 10, move the digits 1 place to the right.

$$345 \div 10 =$$

Th H T U

3 4 5  $\div$  10 becomes

Th H T U  $\bullet \frac{1}{10}$

3 4  $\bullet$  5

The number  
has become  
10 times  
smaller.





# To divide by 100

The number  
has become  
100 times  
smaller.



Th H T U •  $\frac{1}{10}$   $\frac{1}{100}$

3 4 5 6 • 0 0  $\div 100$  becomes

Th H T U •  $\frac{1}{10}$   $\frac{1}{100}$   
3 4 • 5 6

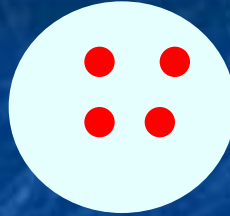
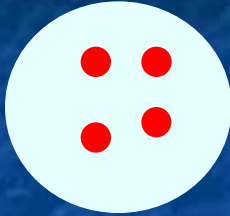
Each digit has moved 2 places to the right

Multiply and Divide by 10, 100 and 1000

# Multiplication

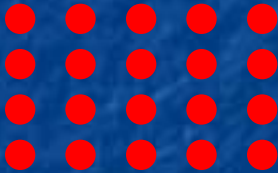
## 1. Practical Multiplication - $2 \times 4$

2 lots of 4.



## 2. Use of arrays

$4 \times 5$



This is  
an  
array.



## 3. Repeated addition

$$4 \times 5 =$$

$$5 + 5 + 5 + 5 = 20$$

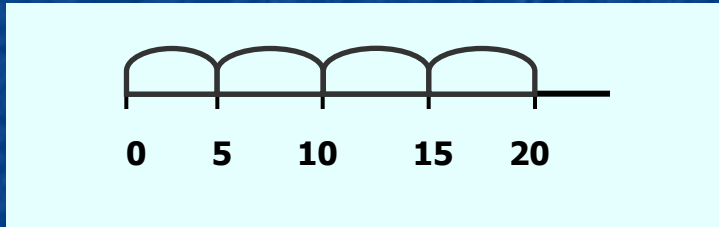
$$\text{or } 4 + 4 + 4 + 4 + 4 = 20$$



# Multiplication cont .....

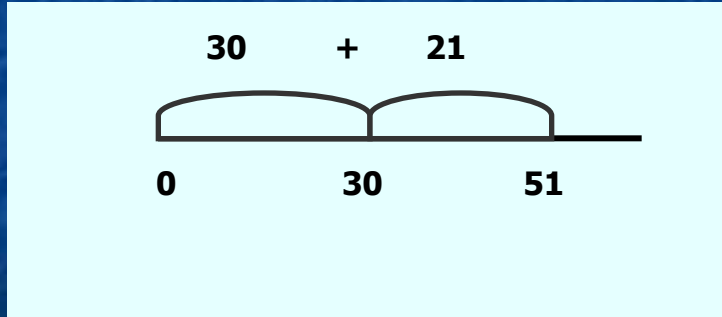
4. **Repeated addition** can also be done on a number line.

$$4 \times 5$$



5. **Partitioning – Simple recording**

$$17 \times 3 = (10 \times 3) + (7 \times 3)$$
$$30 \quad + \quad 21 \quad = 51$$



Number lines  
can be used  
to do the  
addition part!



# Multiplication cont .....

**4. The Grid Method** This is our key strategy for beginning to formally record multiplication.  $17 \times 3 = (10 \times 3) + (7 \times 3)$

X	10	7
3	30	21

$$30 + 21 = 51$$

**5. Multiplying two 2 digit numbers**  $18 \times 23$   
Estimate  $20 \times 20 = 400$ .

X	10	8
20	200	160
3	30	24

$$200 + 160 + 30 + 24 = 360 + 54$$
$$360 + 54 = 414$$

Add the numbers inside the grid together to get the answer.

Try to add the numbers together mentally. If not, use a written method.



$$\begin{array}{r} 360 \\ + 54 \\ \hline 4 \\ 110 \\ 300 \\ \hline 414 \end{array}$$

# Multiplication cont .....

6. 3 digit by 2 digit  $156 \times 25 =$

Estimate  $160 \times 20 = 3200$

x	100	50	6
20	<b>2000</b>	<b>1000</b>	<b>120</b>
5	<b>500</b>	<b>250</b>	<b>30</b>

$$\begin{array}{r} 3120 \\ + 780 \\ \hline 3900 \\ 1 \end{array}$$

7. 3 digit by 3 digit  $152 \times 385$

Estimate  $150 \times 400 = 60000$ .

x	100	50	2
300	<b>30000</b>	<b>15000</b>	<b>600</b>
80	<b>8000</b>	<b>4000</b>	<b>160</b>
5	<b>500</b>	<b>250</b>	<b>10</b>

$$\begin{array}{r} 45\,600 \\ + 12\,160 \\ \hline 760 \\ \hline 58\,520 \\ 11 \end{array}$$



# Multiplication cont .....

8. Once children are confident with the grid method, they will be introduced to the following strategies for recording.

Short multiplication

$$17 \times 3$$

leads to

$$\begin{array}{r} 17 \\ \times 3 \\ \hline 21 \text{ (7x3)} \\ 30 \text{ (10 x 3)} \\ \hline 51 \end{array}$$

$$\begin{array}{r} 17 \\ \times 3 \\ \hline 51 \\ 2 \end{array}$$

9. Long multiplication  $184 \times 32$

Estimate  $180 \times 30 = 5400$ .

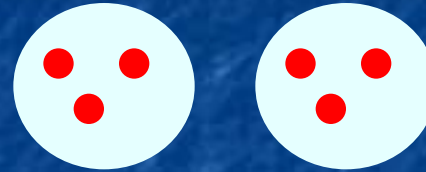
$$\begin{array}{r} 184 \\ + 32 \\ \hline 368 \text{ (184 x 2)} \\ 5520 \text{ (184 x 30)} \\ \hline 5888 \end{array}$$

# Division

1. **Sharing or Grouping** – Division is initially represented pictorially.

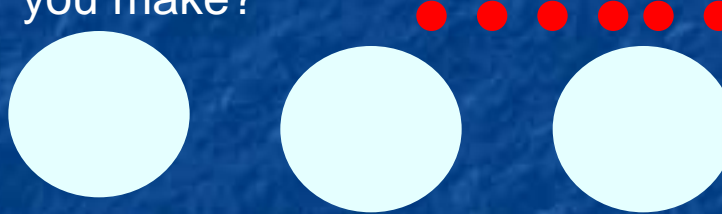
$$6 \div 2 = 3$$

6 sweets **shared** between 2 people. How many each?

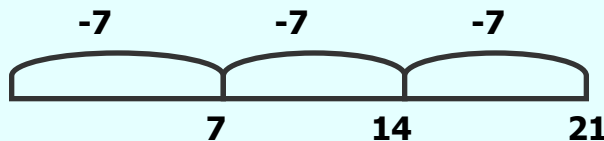


Sharing and grouping are two totally different concepts that children need to understand.

There are 6 people in a room. Put them into **groups** of 2. How many groups can you make?



2. Using a number line to show division.



$$21 \div 7 = 3$$

# Division cont .....

## 3. Using Multiples of the Divisor - Chunking.

$$90 \div 5 = 18$$

$$\begin{array}{r} 90 \\ - 50 \quad (10 \times 5) \\ \hline 40 \\ - 40 \quad (8 \times 5) \\ \hline 0 \end{array}$$

Start with 90  
and take away  
multiples of 5.



## 4. Short division

$$87 \div 4 = 21 \text{ r } 3$$

$$\begin{array}{r} 4 \overline{) 87} \\ - 40 \quad (10 \times 4) \\ \hline 47 \\ - 40 \quad (10 \times 4) \\ \hline 7 \\ - 4 \quad (1 \times 4) \\ \hline 3 \end{array}$$



# Division cont .....

## 5. Using Chunking with larger numbers.

$$875 \div 24 = 36 \text{ r } 11$$

$$\begin{array}{r} 4 \overline{) 875} \\ - \underline{240} \quad (10 \times 24) \\ 515 \\ - \underline{240} \quad (10 \times 24) \\ 395 \\ - \underline{240} \quad (10 \times 24) \\ 155 \\ - \underline{120} \quad (5 \times 24) \\ 35 \\ - \underline{24} \quad (1 \times 24) \\ 11 \end{array}$$

## 6. Leading to sums using decimals.

# Remember what is important in maths!

- A focus on **mental calculations**.
- The ability to **estimate**.
- To use maths in a **real life context**.
- To ask children to **explain** how they have calculated something using a method that suits them.
- Teach children **written calculations**, but only when they are ready.