



# **Highworth Combined School and Nursery**

## **Visual Calculation Policy**

```
graph TD; A(( )) --- B(( )) --- C(( )) --- D(( )) --- E(( ))
```

Choosing a method

Addition methods

Subtraction methods

Multiplication methods

Division methods

# Choosing a method



$$6 + 7 = 13$$

**Can I do this sum in my head?**

**Can I use more written jottings to help me?**



**Should I use a formal written method?**

At Highworth, we use three steps (or representations) necessary for pupils to develop understanding of each mathematical concept:

### Concrete

- Using objects to act out a new skill or idea

### Pictorial

- Using diagrams or pictures to solve a problem

### Abstract

- Apply new skills in word problem or out of context ideas.





Use the RUCSAC  
method when  
answering word  
problems!

Use RUCSAC to solve word problems:



**Read**



Read the question carefully



**Underline**



Underline the keywords and numbers



**Choose**



Choose the correct operation(s) and a mental or written method of calculation.



**Solve**



Solve it! Make sure you follow the steps.



**Answer**



Check that you've answered the question. What did you need to find out in the first place?



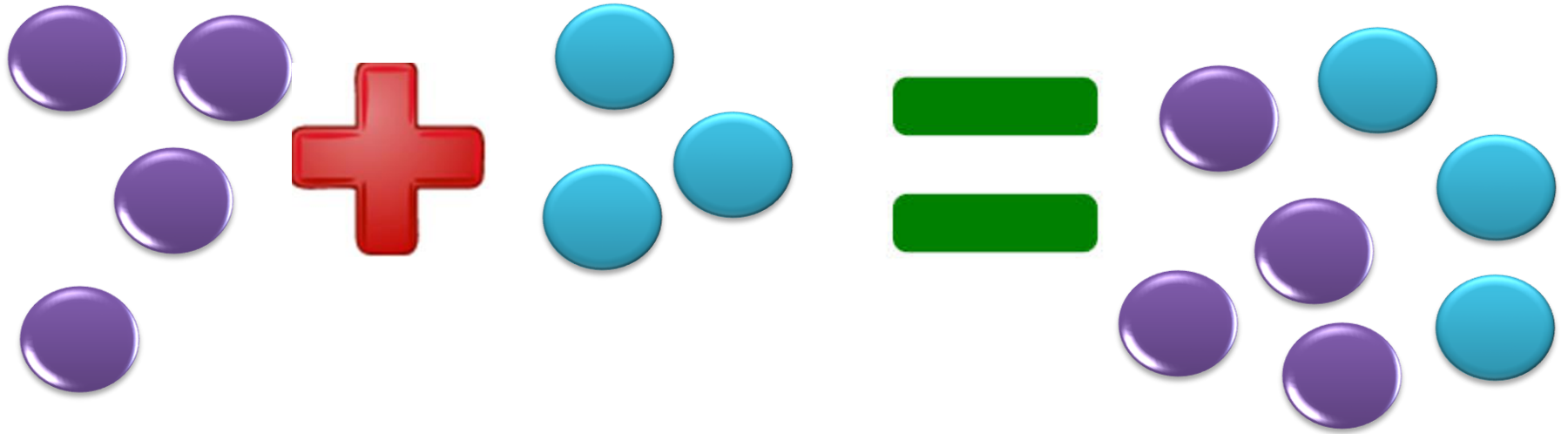
**Check**



Check your answer. Use another method or checking technique (was it close to your estimate?)



# Addition – Counting

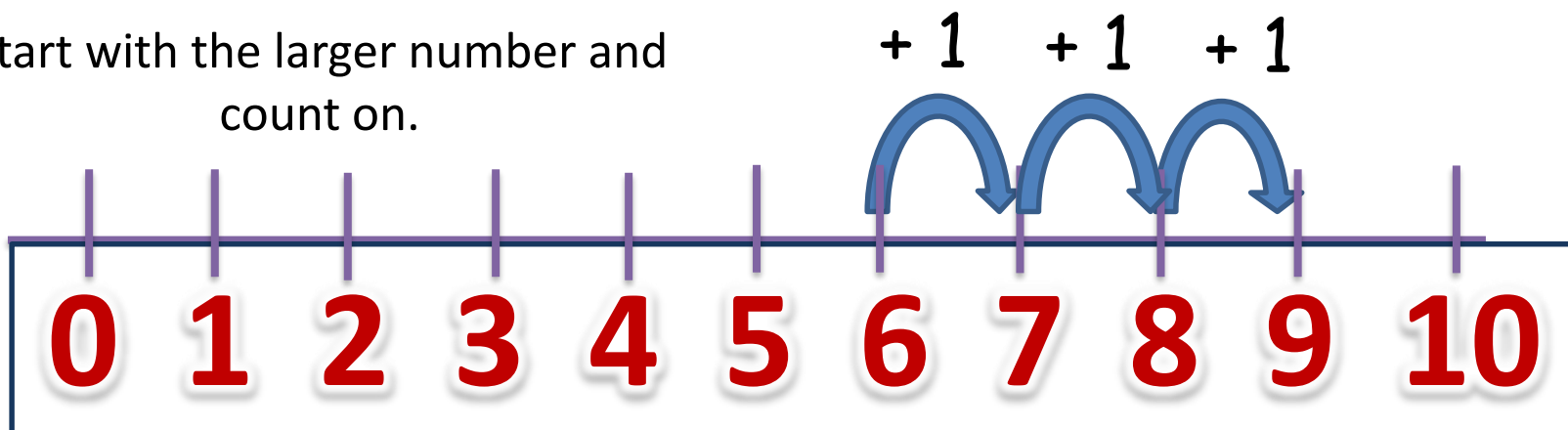


$$4 + 3 = 7$$

# 1. Addition – Counting on

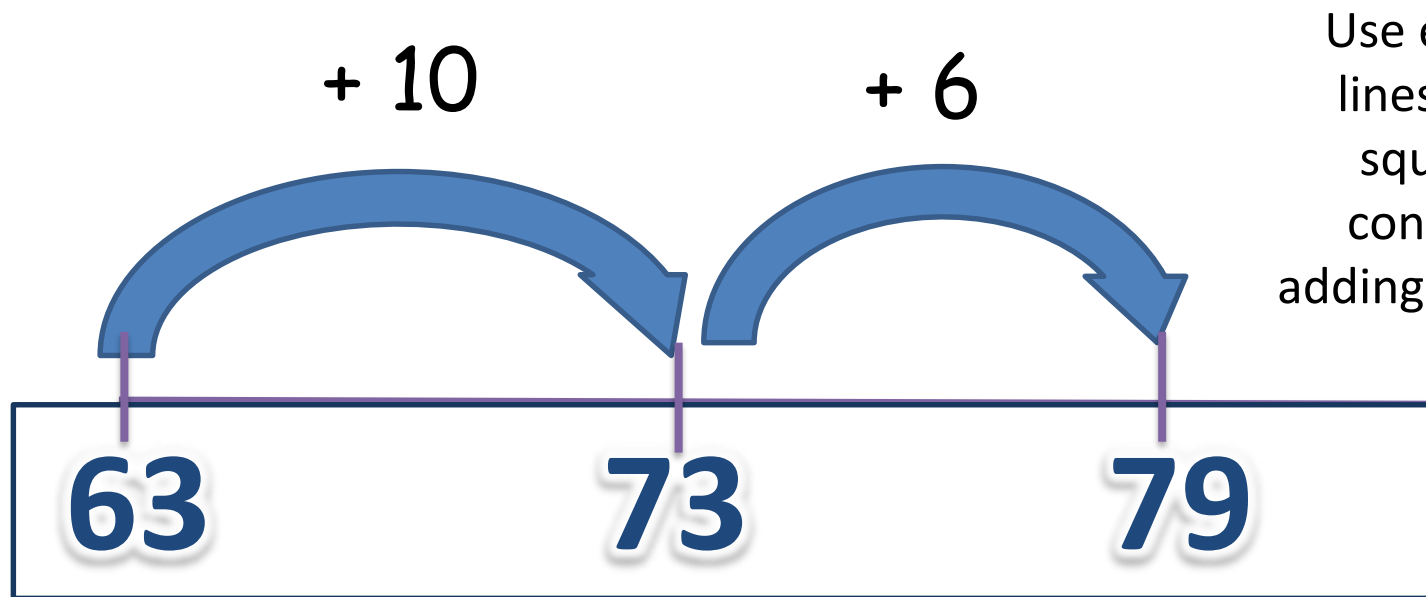
Use numbered number lines to add, by counting on in ones.

Start with the larger number and count on.

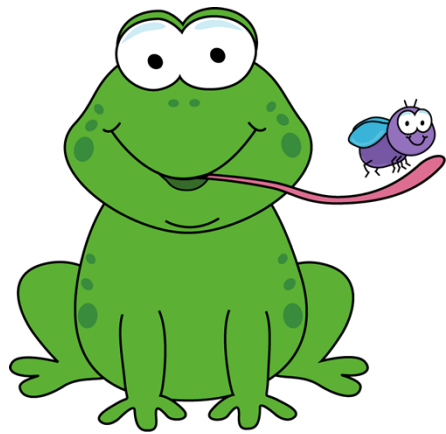


$$6 + 3 = 9$$

## 2. Addition – Leaping Further



Use empty number lines and hundred squares to build confidence when adding 2 digit numbers.



$$63 + 16 = 79$$

# 3 . Addition – Partitioning

$$27 + 12 = 39$$

$$\begin{array}{r} 20 \quad 7 \\ + 10 \quad 2 \\ \hline 30 + 9 = 39 \end{array}$$

# 4 . Addition – Compact Column

	Th	H	T	U
+	3	5	1	7
		3	9	6
<hr/>				
	3	9	1	3
<hr/>				
		<del>1</del>	<del>1</del>	

Remember this number is 500 not 5.

Start with the units

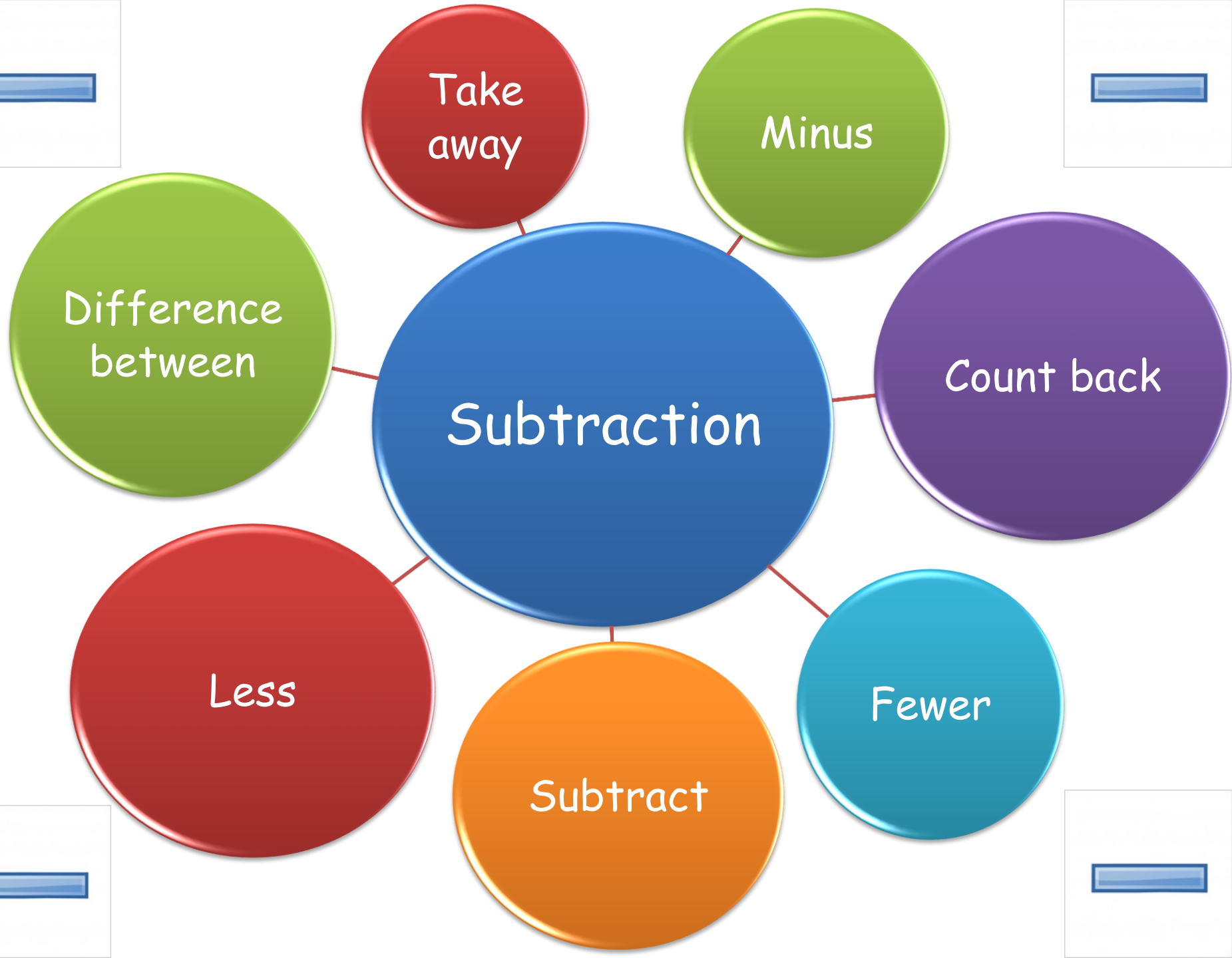
Carry any numbers underneath.

## 5. Addition – Compact Column Including decimals

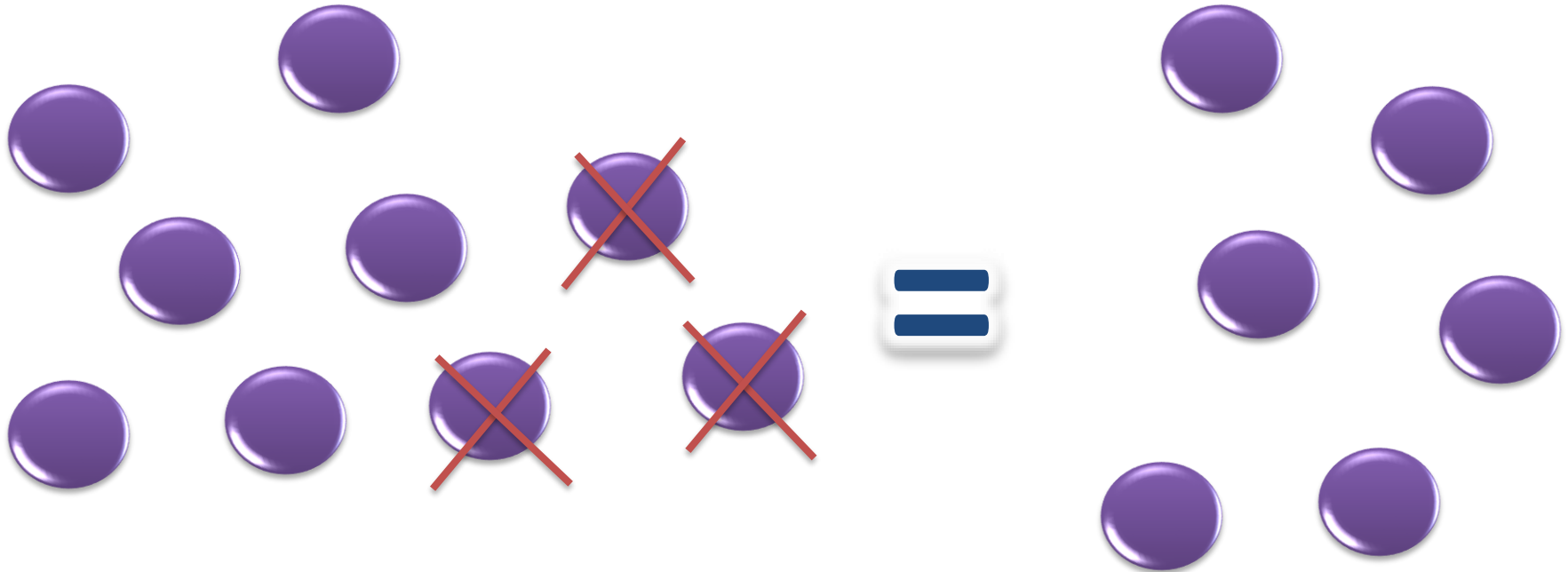
$$\begin{array}{r} + 23.59 \\ 7.55 \\ \hline 31.14 \\ \hline \cancel{1} \cancel{1} \cancel{1} \end{array}$$

The decimal point should be aligned in the same way as the other place value columns, and must be in the same column in the answer



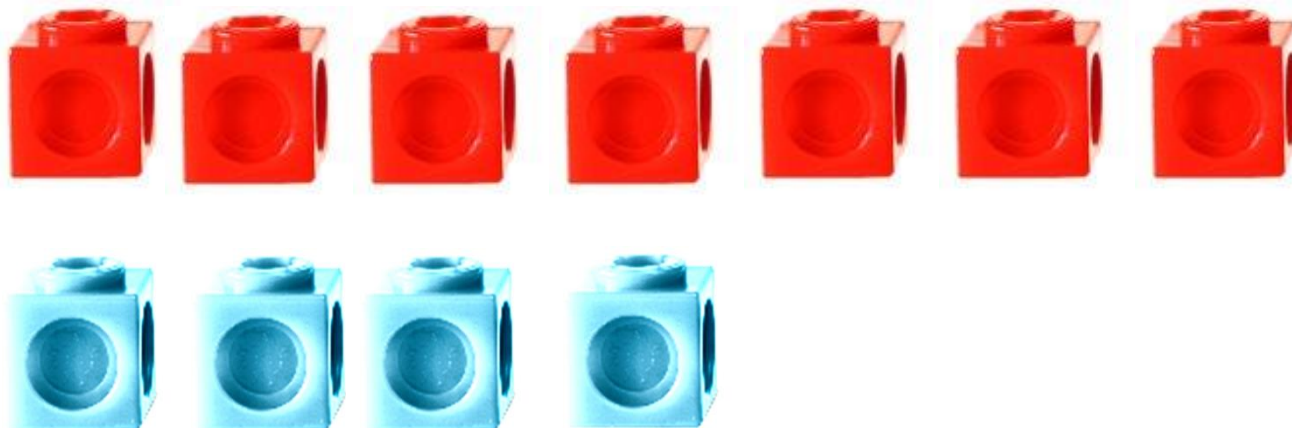


# Subtraction – Take away



$$9 - 3 = 6$$

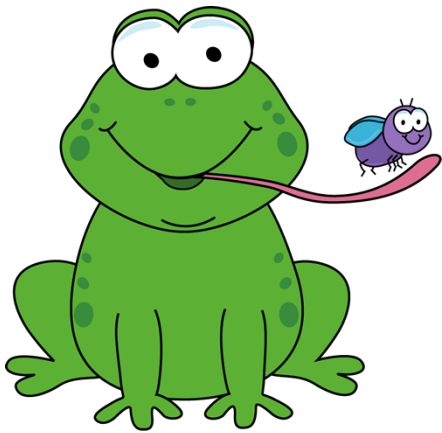
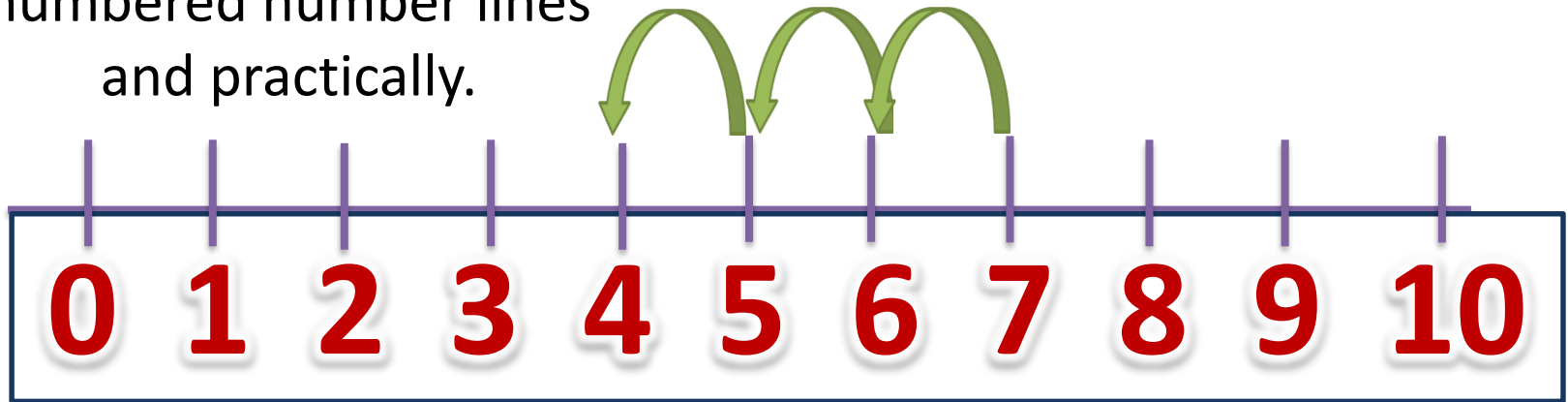
# 1. Subtraction – Finding the difference



7 is 3 more than 4

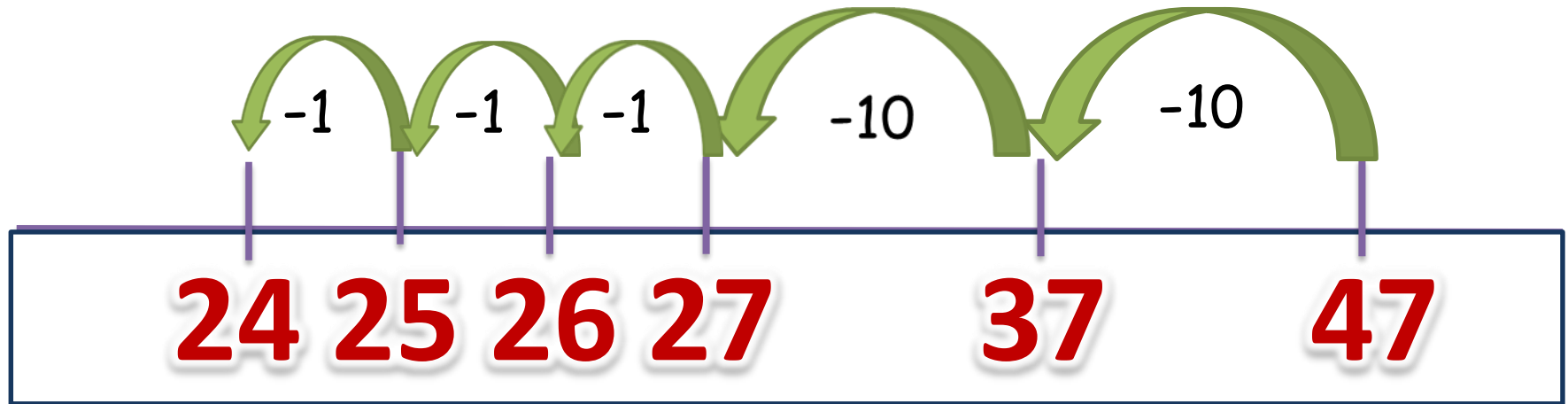
## 2. Subtraction – Counting back

Model subtraction using  
hundred squares,  
numbered number lines  
and practically.



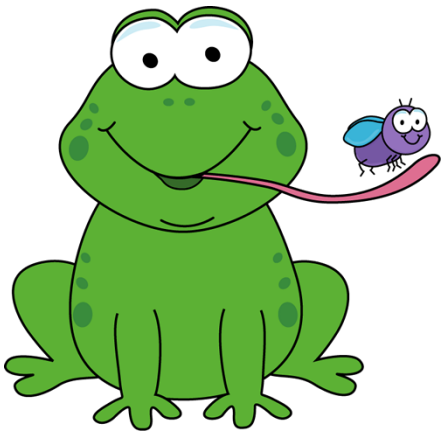
$$7 - 3 = 4$$

# 3. Subtraction – Leaping Back

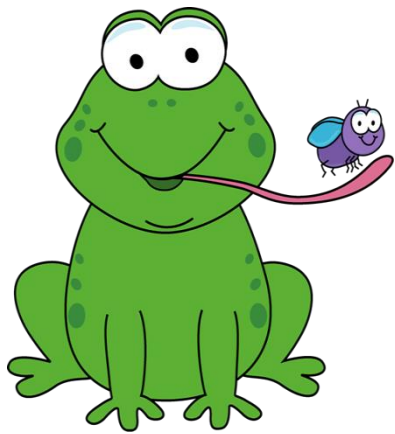
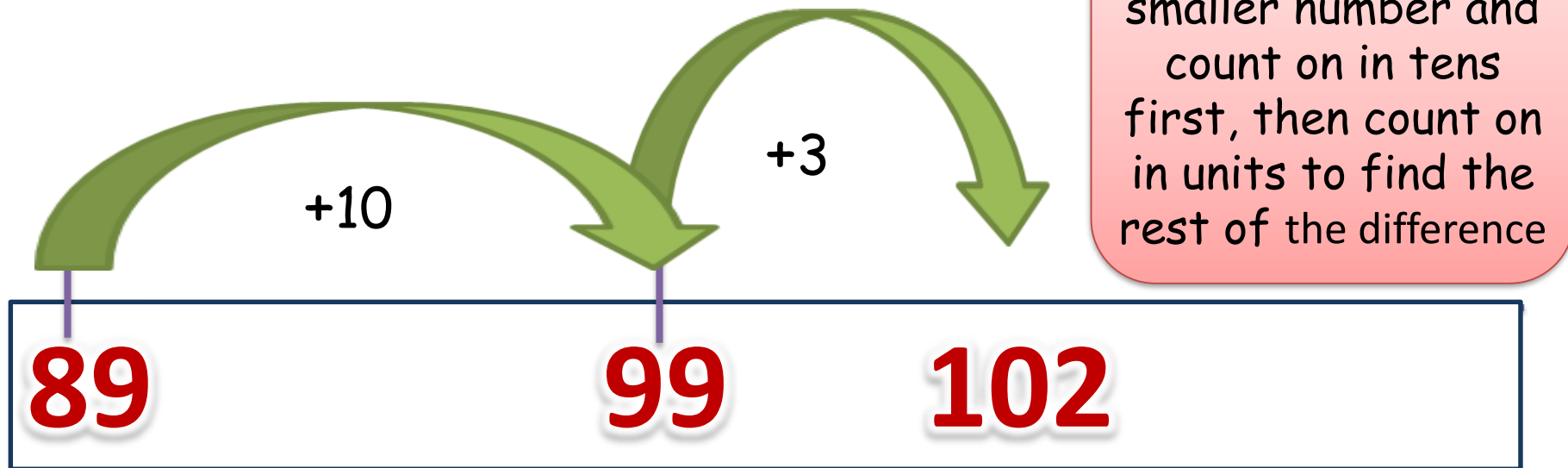


Partition the second number and subtract the tens first

$$47 - 23 = 24$$



# 4. Subtraction – Counting On



Continue to reinforce counting on as a strategy for close together numbers and also for numbers that are nearly multiples of 10, 100, 1000 or £s

$$102 - 89 = 13$$

# 5. Subtraction – Compact Column

Teaching the skill of 'borrowing', ensuring that children understand the place value of the digits they work with. E.g. they recognise the '5' as a '50', and the '7' as '700'.

	Th	H	T	U
	2	<sup>6</sup> 7	<sup>1</sup> 5	4
-	1	5	6	2
<hr/>				
	1	1	9	2
<hr/>				



# 6 . Subtraction – Compact Column with decimals

$$\begin{array}{r} \begin{array}{cccccc} 0 & 9 & 1 & 3 & 1 \\ \cancel{1} & \cancel{0} & 5 & . & \cancel{4} & 0 & 9 \\ - & 3 & 9 & . & 0 & 8 & 0 \\ \hline & 6 & 6 & . & 3 & 2 & 9 \end{array} \end{array}$$

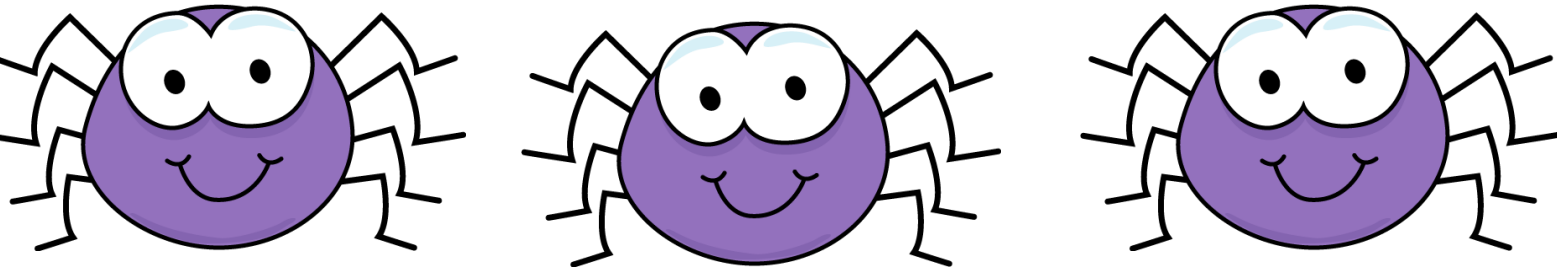
Empty decimal places can be filled with zero to show the place value in each column.





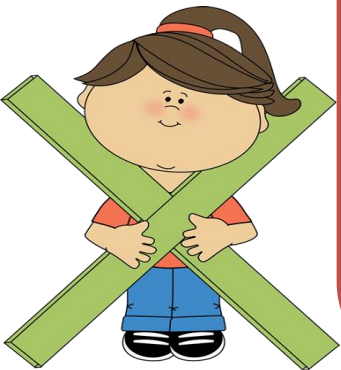


# Multiplication - Repeated Addition

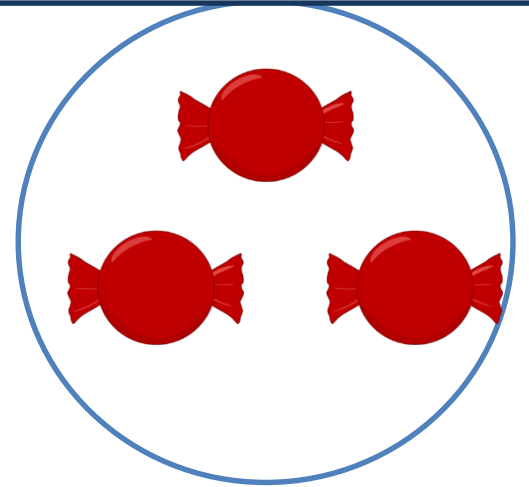
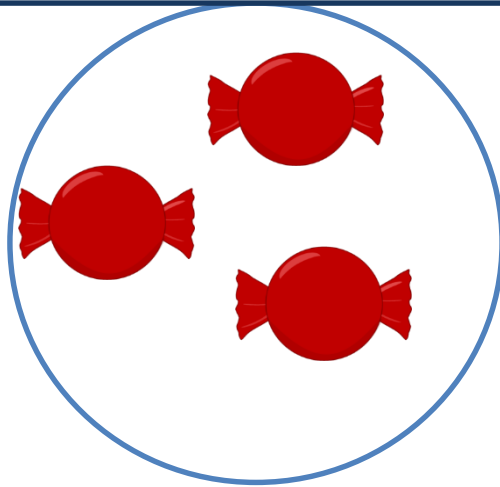
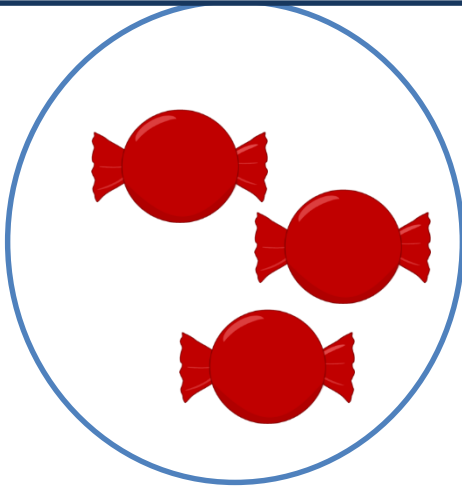


$$8 + 8 + 8 = 24$$

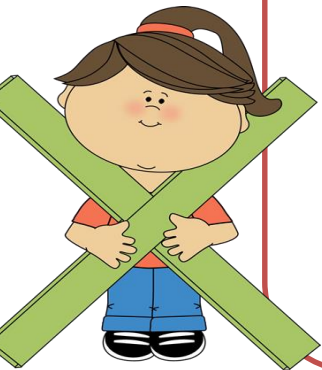
Spiders have 8 legs. How many  
legs do 3 spiders have  
altogether?



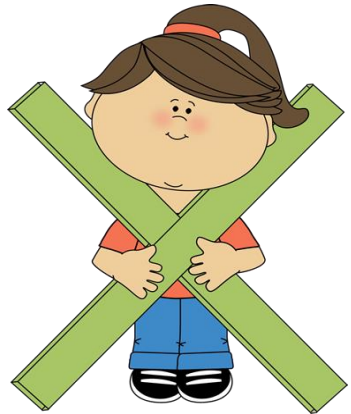
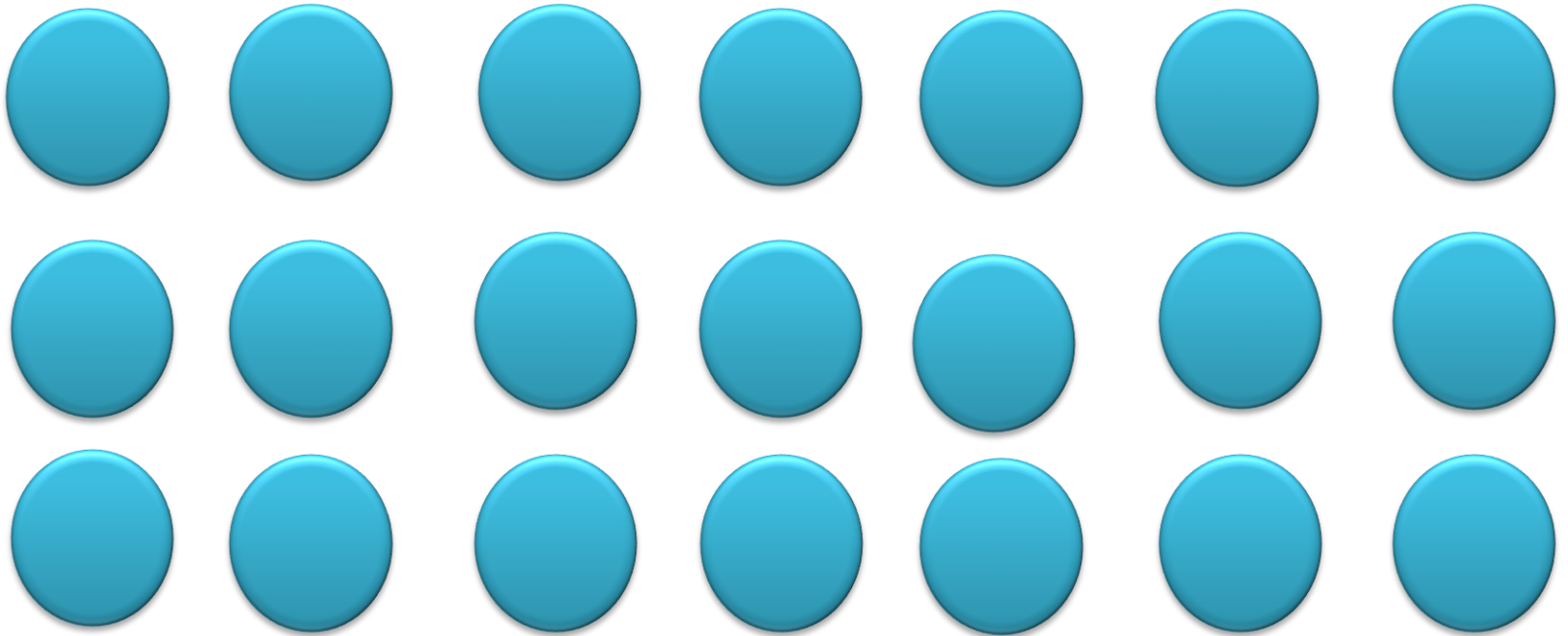
# 1. Multiplication - Repeated Addition



**There are 3 sweets in a bag and 3 bags of sweets. How many sweets altogether?**



## 2. Multiplication - Arrays



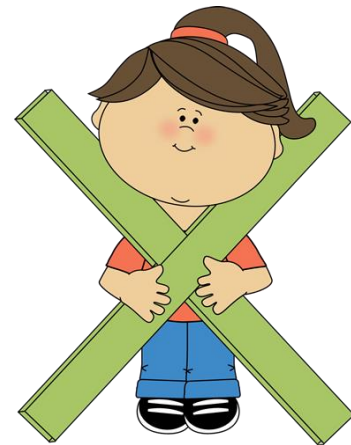
$$3 \times 7 = 21 \quad \text{or} \quad 7 \times 3 = 21$$

# 3 .Multiplication – The Grid Method

<del>×</del>	4
300	1200
20	80
7	28
<hr/> <hr/>	
	1308

Make sure you do not add the 4 in the total

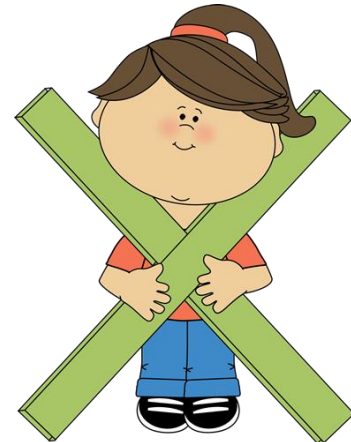
Partition the number into the grid



# 4. Multiplication – Expanded Column Method

$$\begin{array}{r} 327 \\ \times 4 \\ \hline 28 \\ 80 \\ \hline 1200 \\ \hline 1308 \end{array}$$

Short  
Multiplication



# 5. Multiplication – The Grid Method

×	10	8	
10	100	80	1 8 0
3	30	24	+ 5 4
			<u>2 3 4</u>

Long  
Multiplication

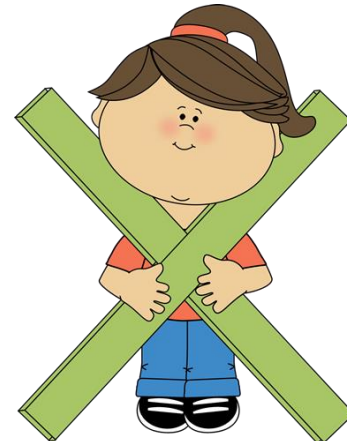
$$18 \times 13 = 234$$



# 5. Multiplication – Expanded Column Method

$$\begin{array}{r} 26 \\ \times 14 \\ \hline 104 \\ 260 \\ \hline 364 \end{array}$$

Long  
Multiplication



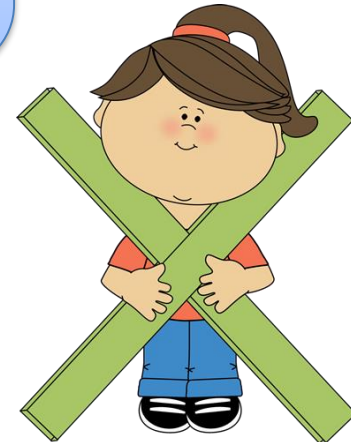


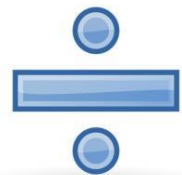
# 6. Multiplication – Decimals

Include  
multiplying more  
complex numbers  
and decimals.

$$\begin{array}{r} 3.19 \\ \times 8. \\ \hline 25.52 \\ \hline 17 \end{array}$$

Remember place  
value, make sure  
numbers are in the  
correct column.





Divisor

Share

Divide

Quotient

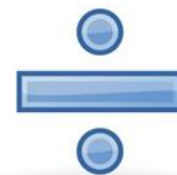
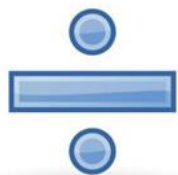
Division

Factor

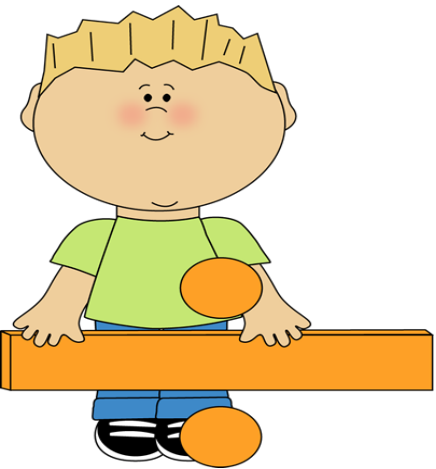
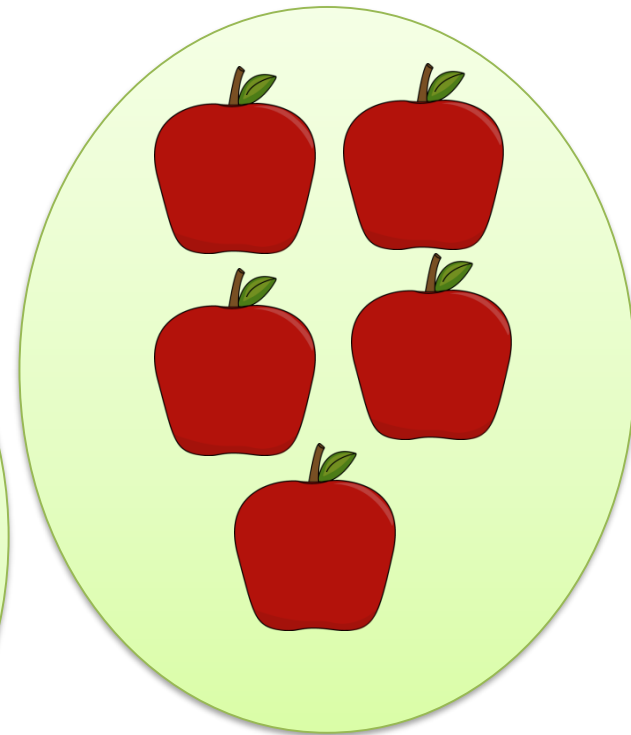
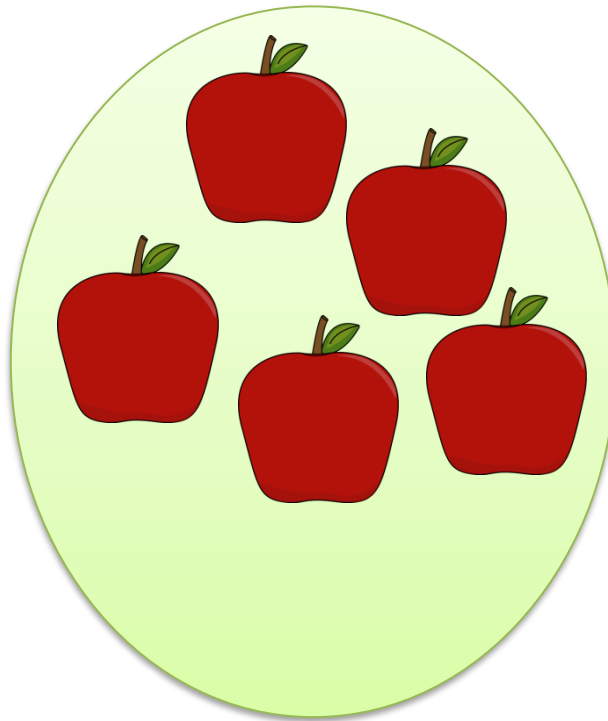
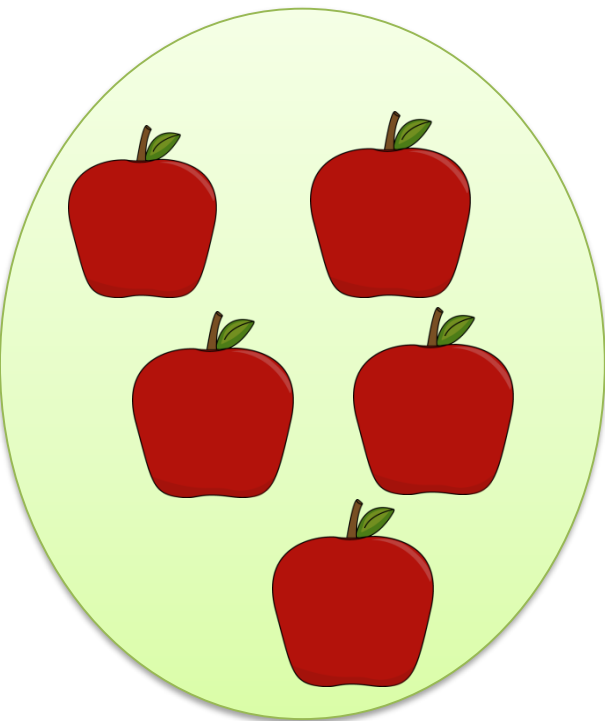
Remainder

Equal  
groups of

Halve



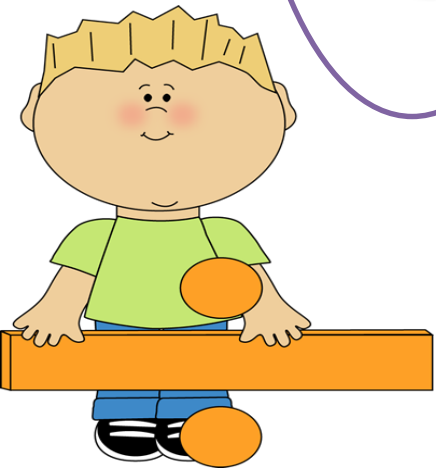
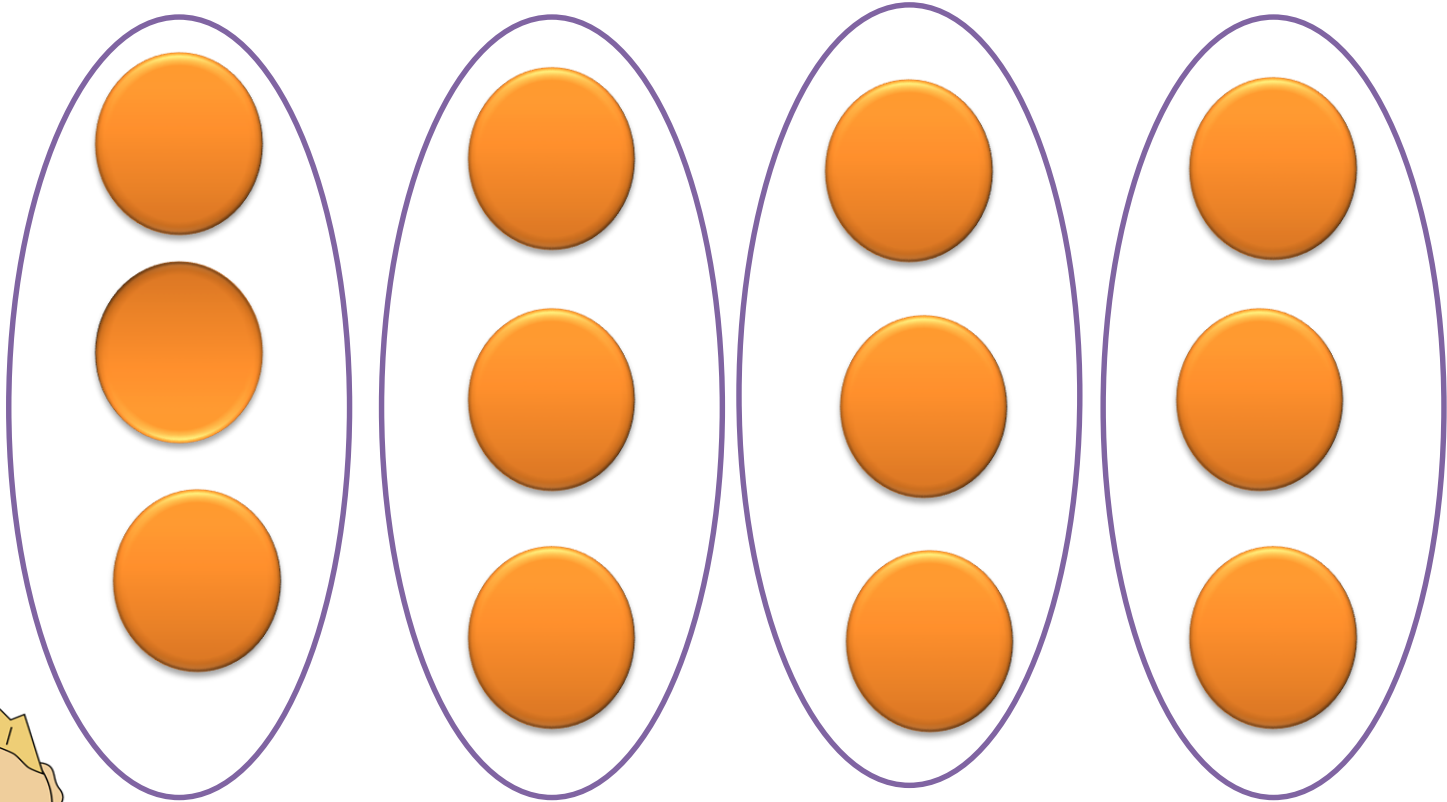
# 1 . Division –Sharing



$$15 \div 3 = 5$$

$$15 \div 5 = 3$$

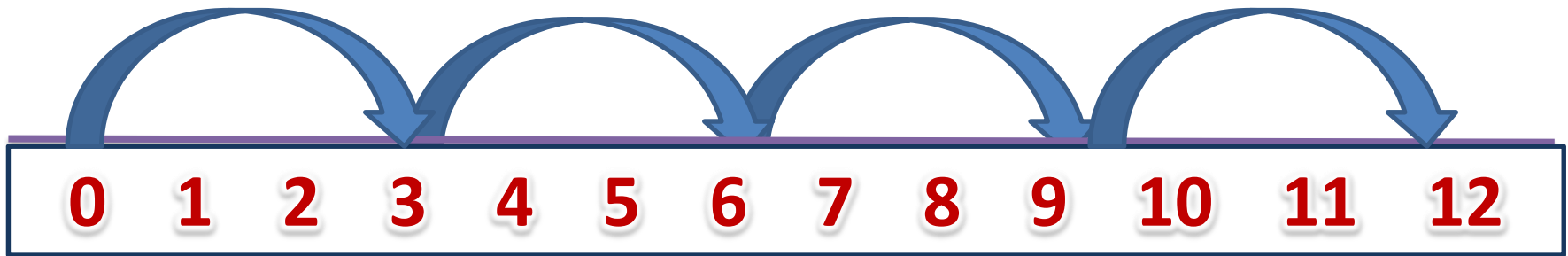
## 2. Division - Arrays



$$12 \div 4 = 3$$

$$12 \div 3 = 4$$

# 3. Division – On a number line



**$12 \div 3$  as 'How many groups of 3 are in 12?'**

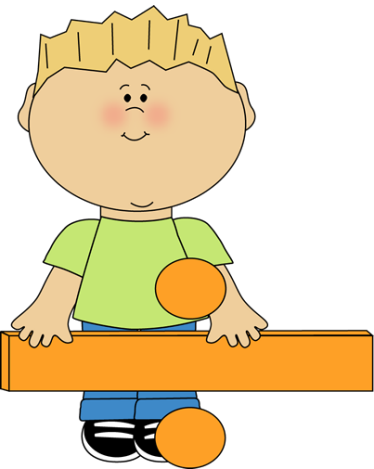
This helps to see the link between division and grouping

# 4 / 5. Division - Short Division

Remind children of correct place value, that 96 is equal to 90 and 6, but in short division, pose: How many 3's in 9? = 3

$$\begin{array}{r} 1061r4 \\ 5 \overline{) 5309} \end{array}$$

The diagram shows a short division problem. The divisor is 5, and the dividend is 5309. The quotient is 1061 with a remainder of 4. A red horizontal line is drawn above the dividend, and a red vertical line is drawn to the left of the dividend, forming a box around the numbers 5309. The quotient digits 1, 0, 6, 1, and the remainder r4 are written above the dividend. The divisor 5 is written to the left of the dividend. The dividend digits 5, 3, 0, 9 are written inside the box. A small 3 is written above the 0 in the dividend.



Start with one digit numbers without remainders

# 5/6 . Division – Chunking

$$\begin{array}{r} 22 \\ 36 \overline{) 792} \\ \underline{- 360} \phantom{00} \\ 432 \\ \underline{- 360} \phantom{00} \\ 072 \\ \underline{- 072} \phantom{00} \\ 00 \end{array}$$

Circle the groups of 36 you have 'chunked' off the total.

$$36 \times 10 = 360$$

$$36 \times 10 = 360$$

$$36 \times 2 = 72$$

Keep chunking until there is less than 36 left

