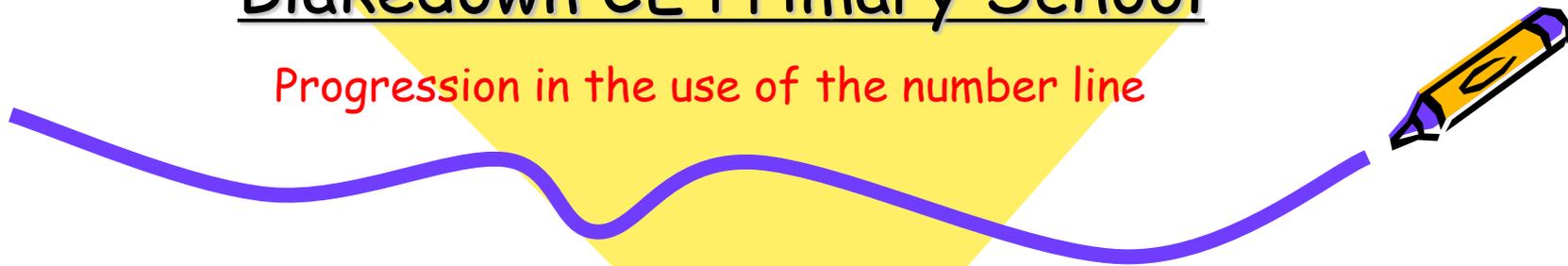


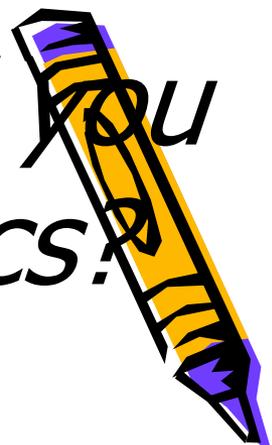
# Maths

Blakedown CE Primary School

Progression in the use of the number line



*Which of these words would you use to describe mathematics?*



easy

exciting

useful

scary

hard

**Maths is...**

boring

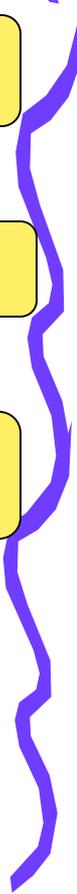
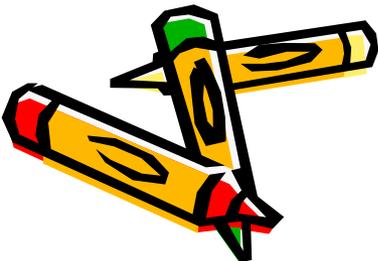
uncomfortable

frightening

challenging

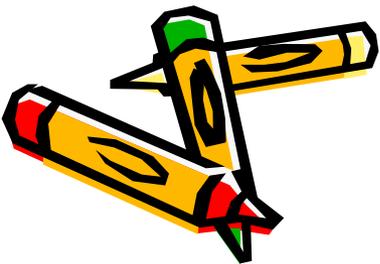
important

fun



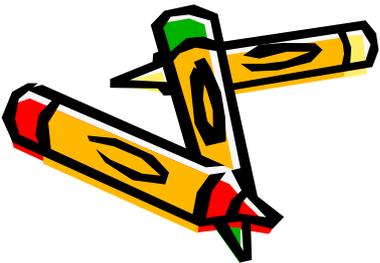
# *Maths is like cabbage...*

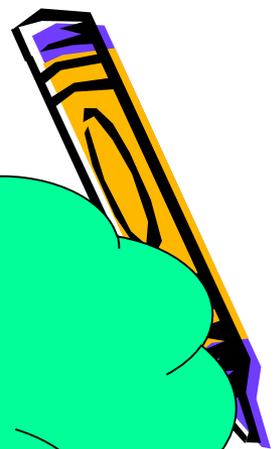
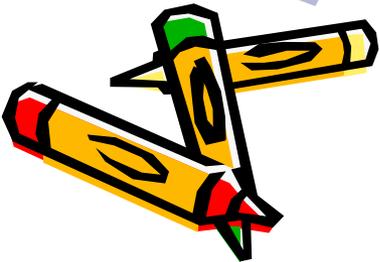
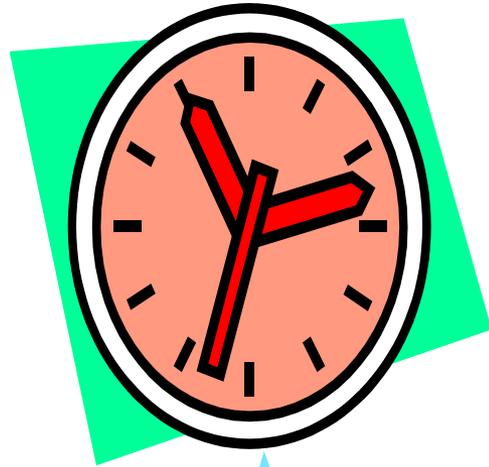
...you love it or hate it,  
depending on how it  
was served up to you  
as a child!



*What maths have you  
done today?*

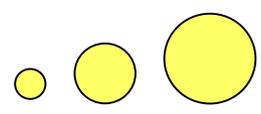
Share this with other people near you.



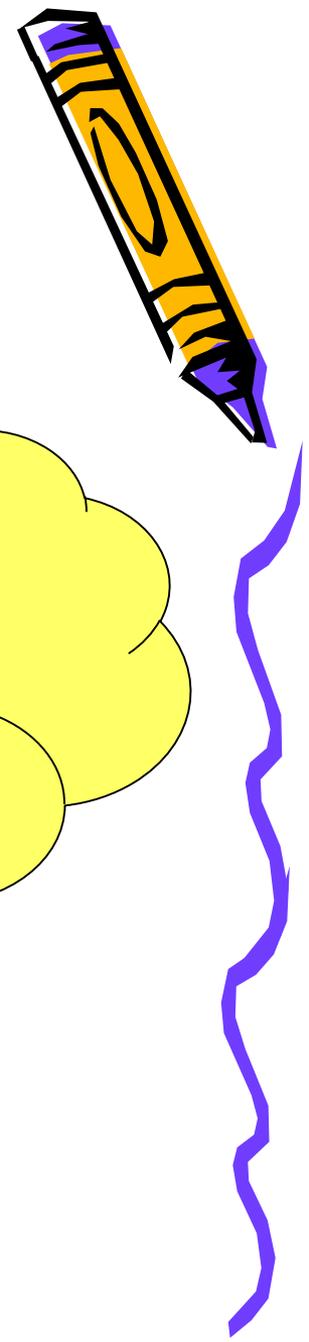


Have I got time to nip to the loo before starting the meeting?

What time do I need to leave if I've got to drop Sam at Jim's house on the way to school?



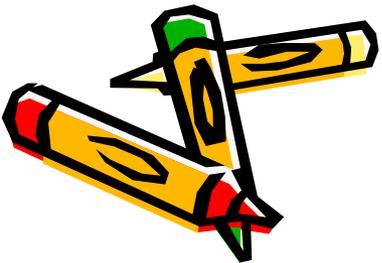
Have I got time and space  
to overtake the car in front  
that's going so slowly?



# The New National Curriculum



- *Purpose of Study*
- *'Mathematics is a creative and highly interconnected discipline...'*
- *'A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.'*



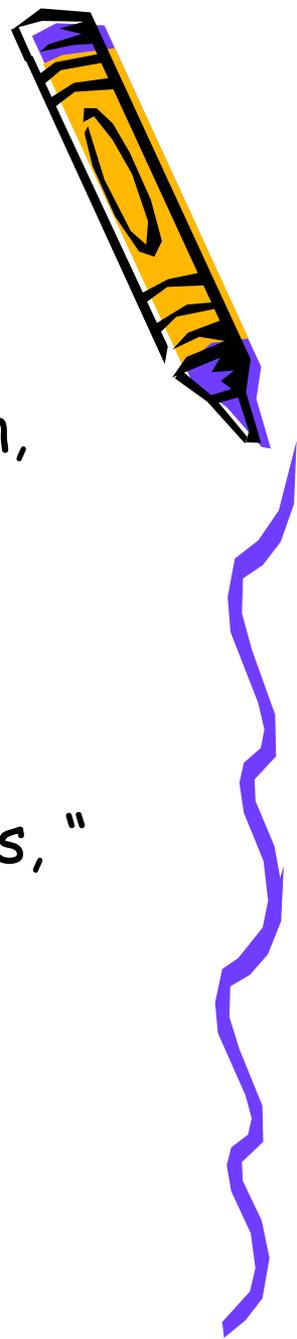
# Progression in Counting Skills.



Counting involves:

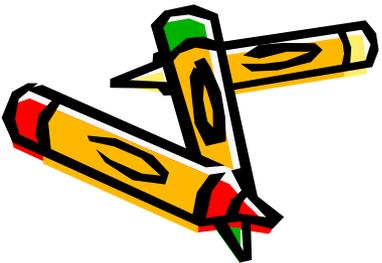
- saying the number names in order,
- matching the numbers to objects counted,
- knowing when you count, the last number you say gives the number in the group
- understanding that objects can't be counted twice
- moving objects into a line so that they can be counted





## Counting and the Structure of Numbers

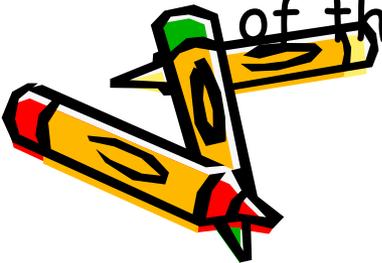
- Counting rituals, where children count in unison, help to create a "can do" culture where all children feel they are succeeding.
- Firstly, the child learns a pattern of noises memorised by repetition in differing situations, "one, two, three, four etc".



## Counting and the Structure of Numbers



- The child then needs to co-ordinate touching an object and saying its number name at the same time, usually with several objects.
- The child has to discover that as each number is spoken it is being used in an ordinal sense, to label objects and order them.
- Finally, the child has to learn that the ordinal number of the last object is the cardinal number of the set.



# Skills In Early Addition



- Counting all
- Counting on from the first number
- Counting on from the larger number -
- Using a known addition fact - instant recall
- Using a known fact to derive a new fact :-

*e.g. using knowledge that  $5 + 5 = 10$  to work out  $5 + 6 = 11$  and  $5 + 7 = 12$ .*

- Using knowledge of place value :-

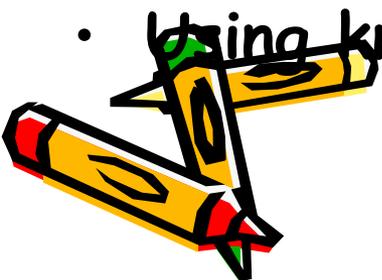
*e.g. using knowledge that  $4 + 3 = 7$  to work out  $40 + 30 = 70$ , or knowledge that  $46 + 10$  is 56 to work out  $46 + 11 = 57$ .*



# Skills In Early Subtraction



- Counting out - either practically or with fingers
- Counting back from - a good strategy when there is only a small number to be subtracted - e.g.  $9 - 3$
- Counting back to - a good strategy when the numbers are very close together - e.g.  $15 - 12$
- Counting up - inverse of counting back - much more common now due to use of number lines to find differences
- Using a known fact - instant recall of facts known by heart
- Using a known fact to derive a new fact
- Using knowledge of place value



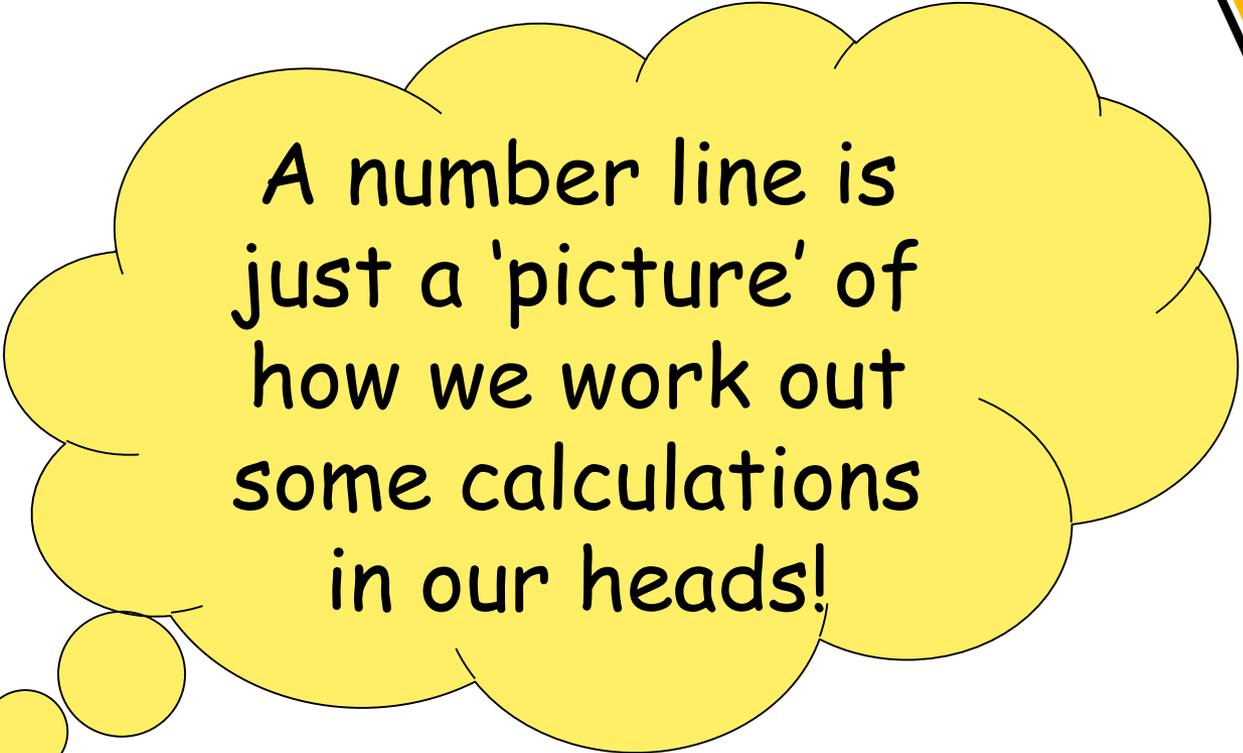
# Understanding Place Value



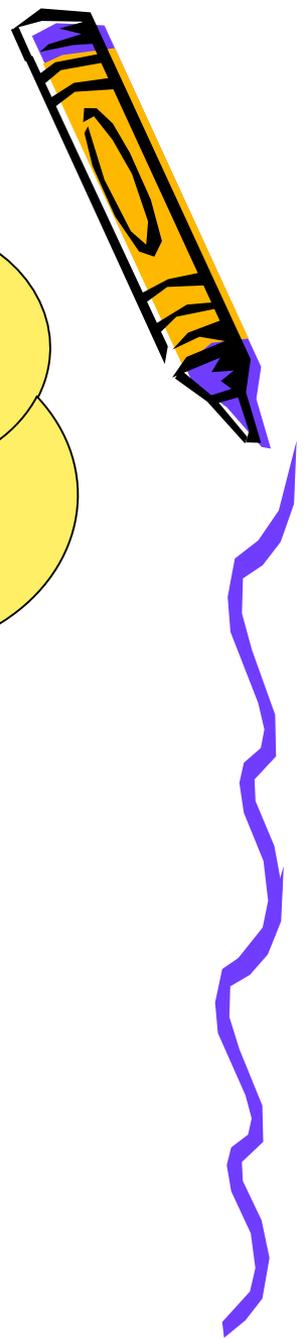
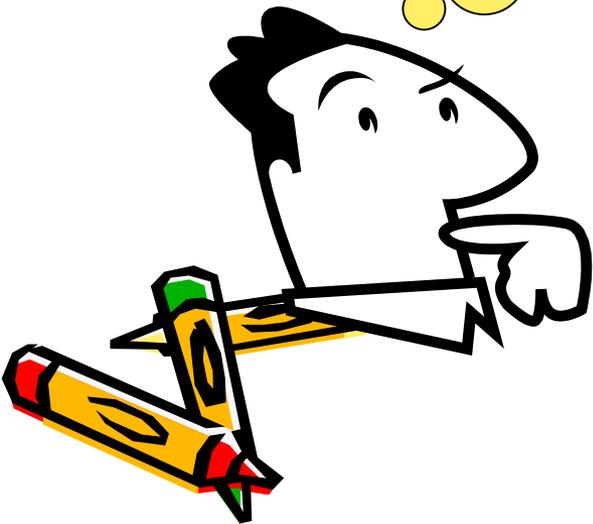
- Place value understanding needs to be:
  - Developed as a specific concept
  - Reinforced regularly in mental starters and the yearly teaching programme
  - Practised throughout all areas of mathematics
- Without a clear understanding of place value, children will be unable to access the majority of the Key Stage 1 and Key Stage 2 calculation objectives
- The key strategy for building up children's place value understanding is to present activities using a variety of key models and images

These images need to be used simultaneously to make links between them

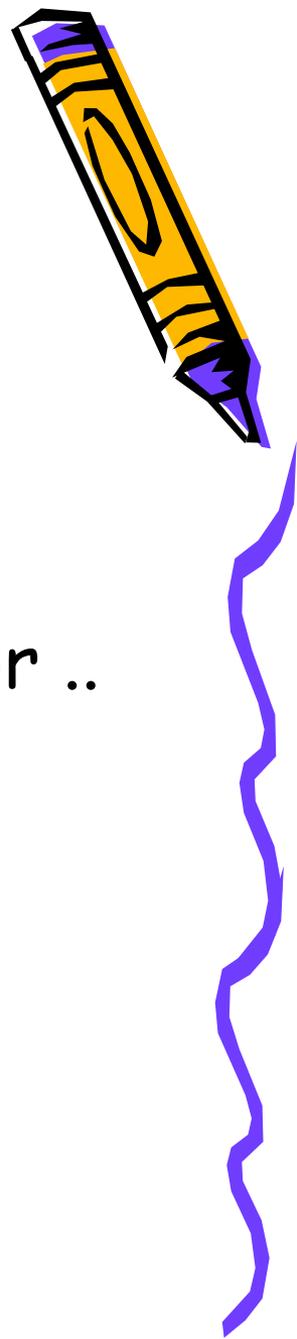




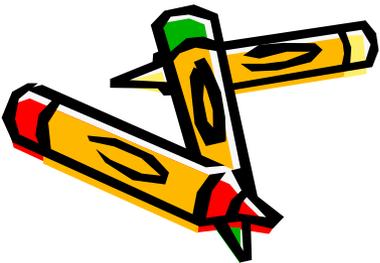
A number line is  
just a 'picture' of  
how we work out  
some calculations  
in our heads!



# Addition & Subtraction

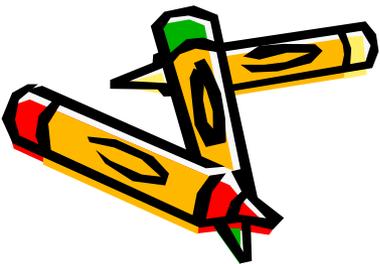


- Using number lines:
  - We add by 'counting on'
  - We **subtract** by either 'counting on' or ..
  - 'counting back' depending on the numbers involved
  - We also **subtract** by finding the 'difference'





A number line can support children's understanding in using and applying maths, counting and understanding number, knowing and using facts and calculating.



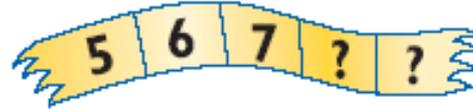
# Models and images for counting on and back in ones and tens

5, 6, 7, ?

8

10, 9, 8, 7, ?

6



50, 60, 70, ?

80

100, 90, 80, 70, ?

60



5 ... 6

6 ... 5

5 and 1 more is 6  
1 less than 6 is 5

Imagine one more spot

Imagine one less spot

23p  
33p, 43p...

23p and 10p more is 33p  
and 10p more makes 43p

54p  
44p, 34p...

54p in the purse. Take 10p  
out, another 10p and so on

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

36...46,  
56, 66

76...66,  
56, 46

6 + 10 = 16    96 - 10 = 86  
16 + 10 = 26    86 - 10 = 76  
26 + 10 = 36    76 - 10 = 66  
36 + 10 = 46    etc.  
36 + 20 = 56    76 - 30 = 46

5 ... 6, 7

7 ... 6, 5

5 and 2 more is 7  
2 less than 7 is 5

5 ... 6, 7, 8

5 in the bag and 3 more

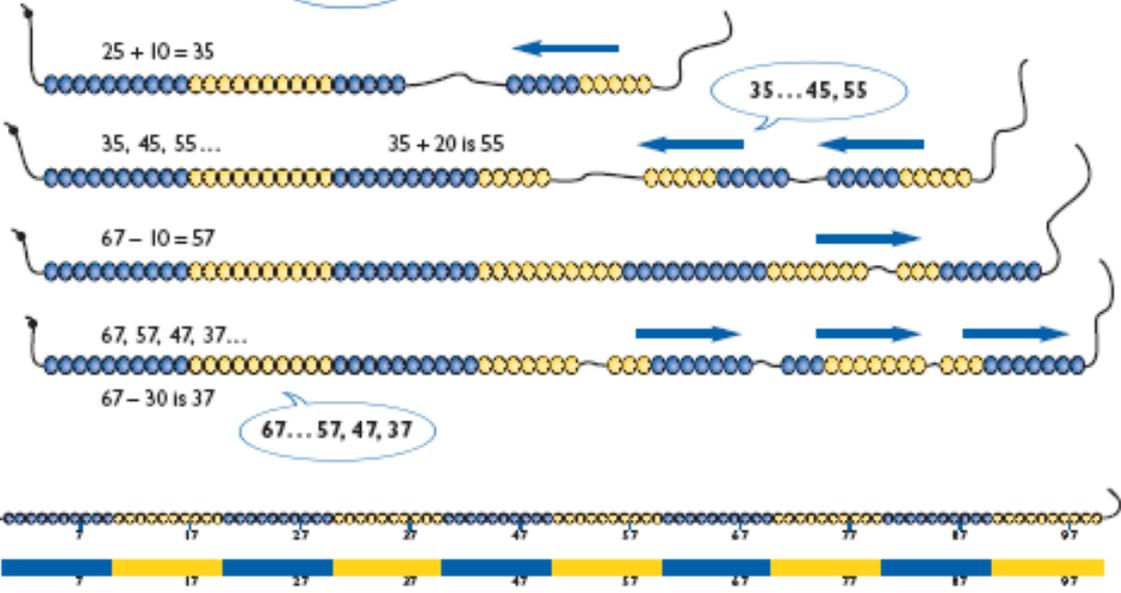
5 ... 6, 7, 8

8 ... 7, 6, 5

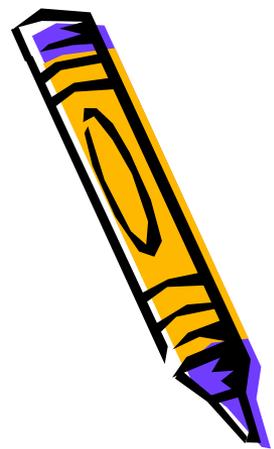
5 and 3 more is 8  
3 less than 8 is 5

6 ... 5, 4

6 in the bag, take 2 out

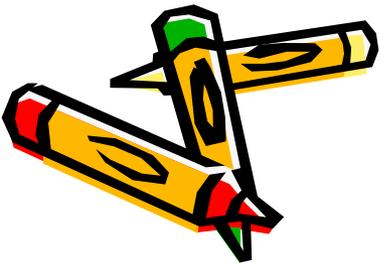


# Maths in the Early Years

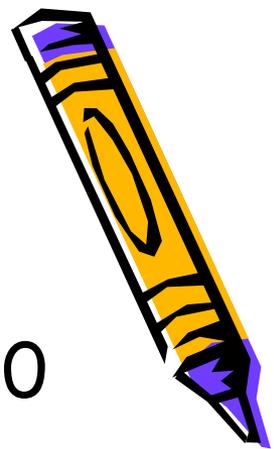


Children beginning to build mathematical concepts, skills and knowledge.

They are curious about the world, are motivated, enthusiastic and engaged by experiences offered and initiated by themselves.



# *Number: ELG 2012/13*



- count reliably with numbers from 1 to 20
- place numbers in order
- say which number is one more or one less than a given number
- using quantities and objects, they add and subtract two single-digit numbers
- count on or back to find the answer
- solve problems, including doubling, halving and sharing.



Home school maths links are an important part of Foundation Stage experience.



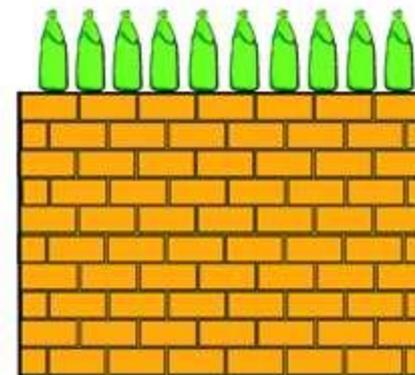
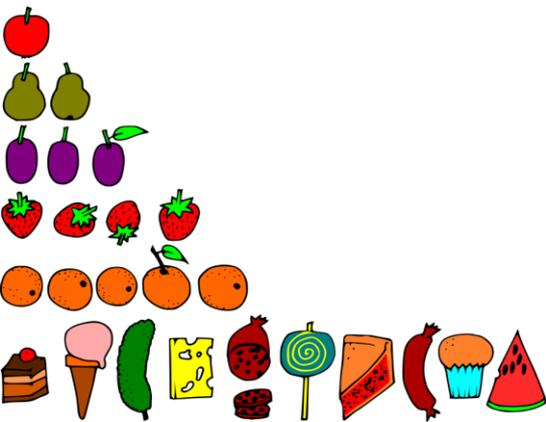
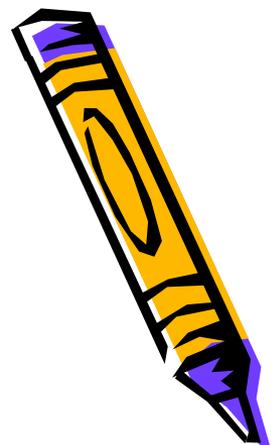
Opportunities to link maths to practical experiences and play.  
Helps children see maths in the real world.

In class it is a combination of child initiated activity and systematic adult directed maths teaching.

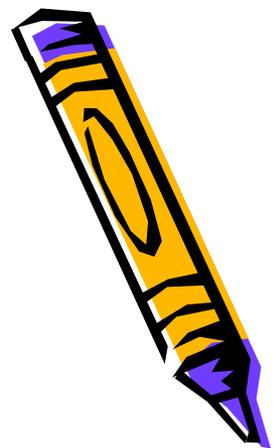


# Maths is developed through:

- Stories
- Songs
- Games
- Imaginative play
- Planned experiences based on real life situations.
- Time for sustained concentration.



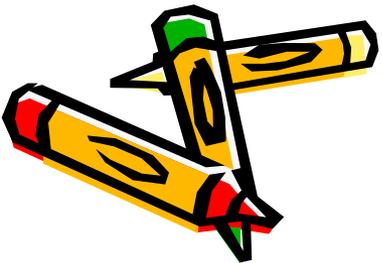
Shall we count the wheels  
on the tricycles?



1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----



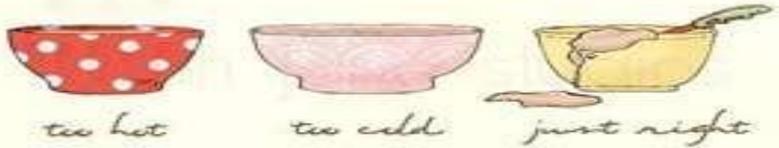
Can you find the number  
on the number track?



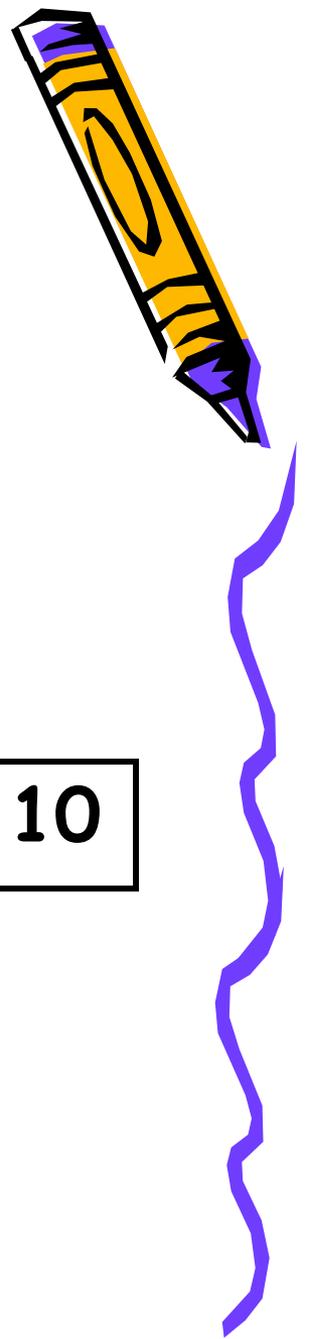


1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

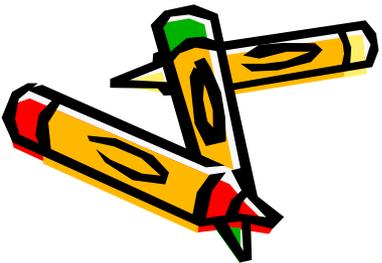
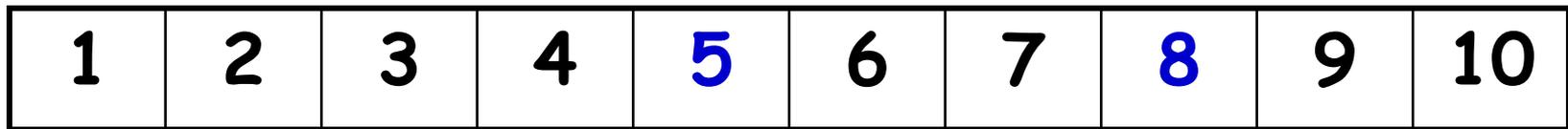
How many plates do we need for the three bears?



Can we put a circle around that number?



If we stand on number 5 on the number track how many jumps must we make to reach the number 8?





If I have 3 apples and 2 apples.  
I have 5 apples altogether.

$$3 + 2 = 5$$



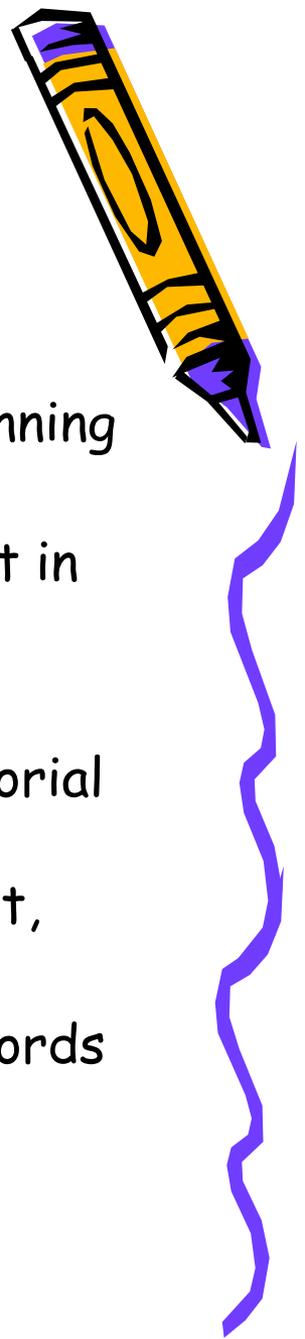
If I have 6 apples and I eat 2,  
I have 4 apples left.



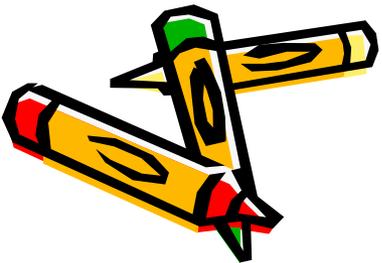
$$6 - 2 = 4$$



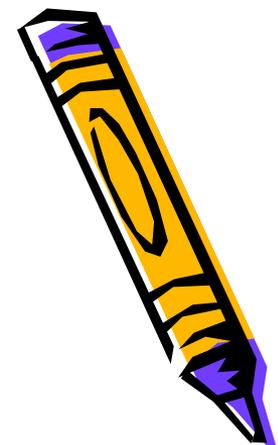
# EY current expectation- to Year 1 - New National Curriculum



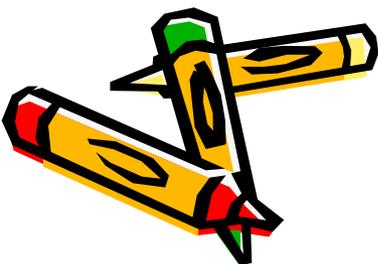
- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens
- given a number, identify one more and one less
- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least
- read and write numbers from 1 to 20 in numerals and words

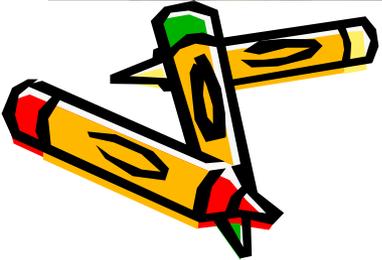


*'It is essential to display number lines because children need to have a reference for their conversations.'*



- Number tracks:
- should be visible, flexible, creative, touchable & moveable
- should go beyond numbers to 10 or 20
- should be changed regularly to keep the interest of the children - linked to the current 'theme' or 'topic'?
- should be available outside - paving slabs to jump along, put things on, encouraging counting games
- should be linked to play - washing line with numbered socks, tee-shirts, big dominoes, numbered bags, birthday badges





If a farmer has 13 apples on one tree and 11 apples on another.

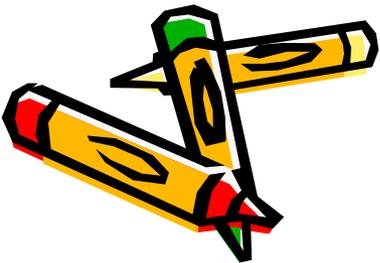
How many apples does he have altogether?



---

8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

13 apples and 11 apples  
Equals 24 apples



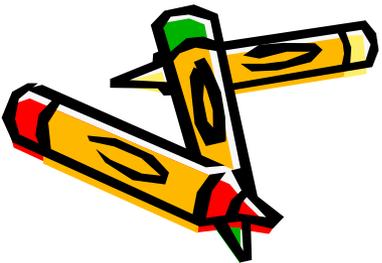
$$13 + 11 = 24$$

If a farmer has 18 apples on  
a tree and he picks 3.  
How many apples will be left?



---

8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

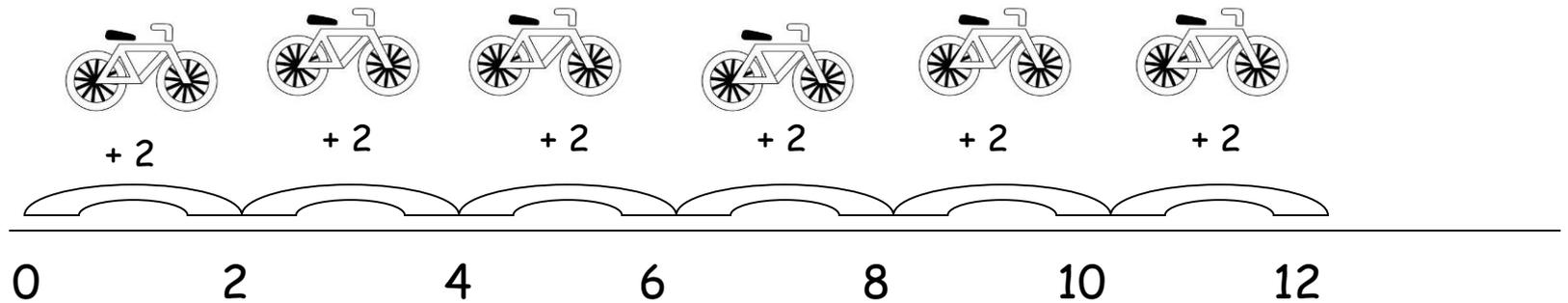


18 apples take away 3 apples  
Equals 15 apples

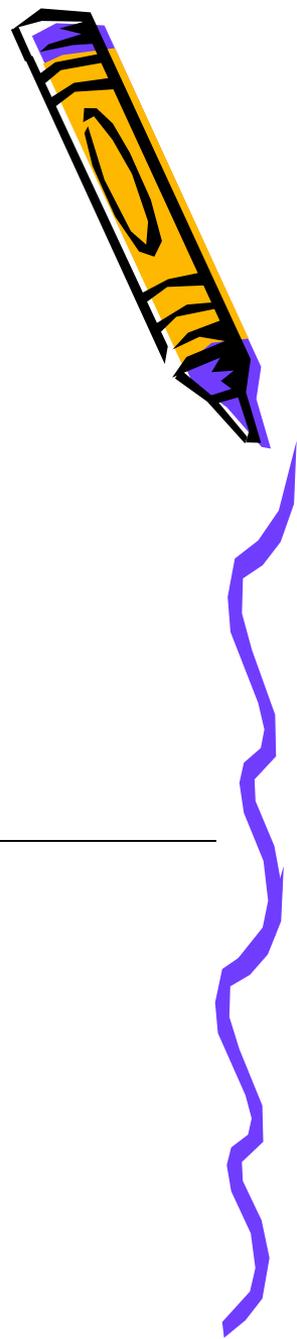
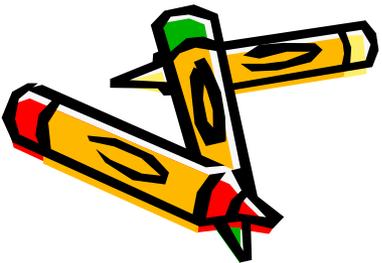
$$18 - 3 = 15$$

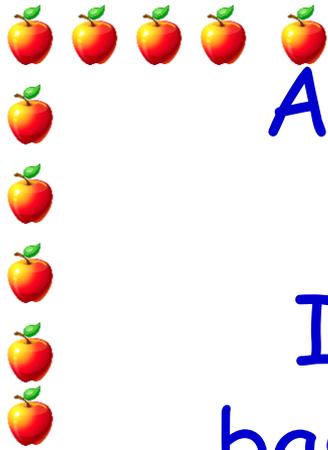


*If I have 6 bicycles,  
how many wheels  
would there be?*



$$2 + 2 + 2 + 2 + 2 + 2 = 12 \text{ wheels}$$



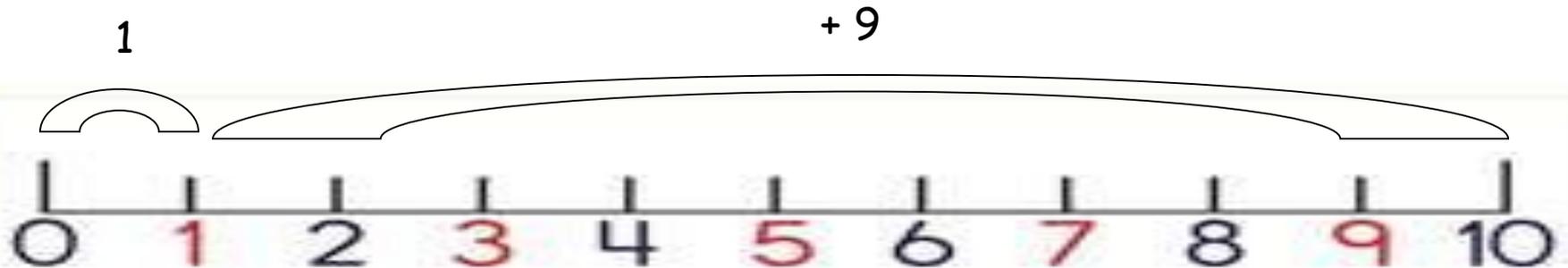


A farmer has ten apples  
in two baskets.

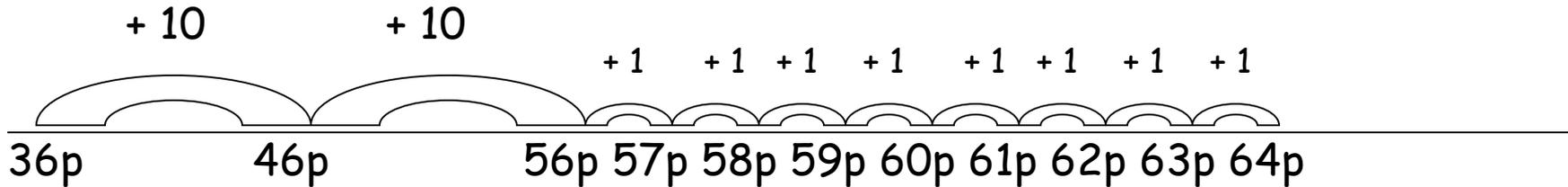
If he has 1 in the first  
basket how many will be in  
the other basket?



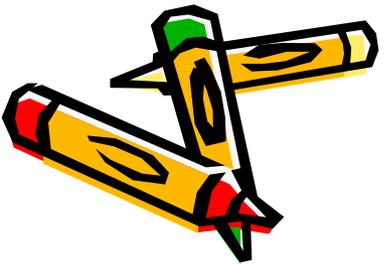
$$1 + 9 = 10$$



I have 36p and my mum gives me 28p pocket money.

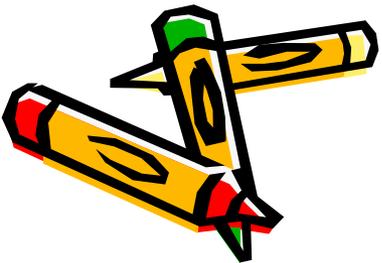
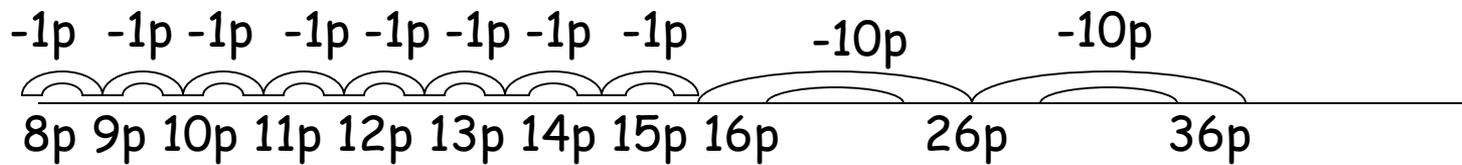


How much money do I have altogether?



$$\begin{aligned} 36\text{p} + 28\text{p} &= 64\text{p} \\ 36 + 10 &= 46 \\ 46 + 10 &= 56 \\ 56 + 8 &= 64\text{p} \end{aligned}$$

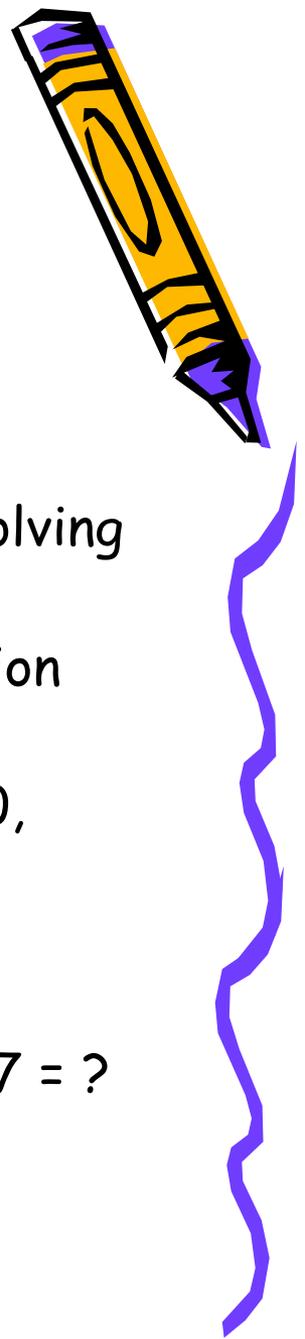
I have 36p. I spend 28p.  
How much do I have left?



$$36p - 28p = 8p$$



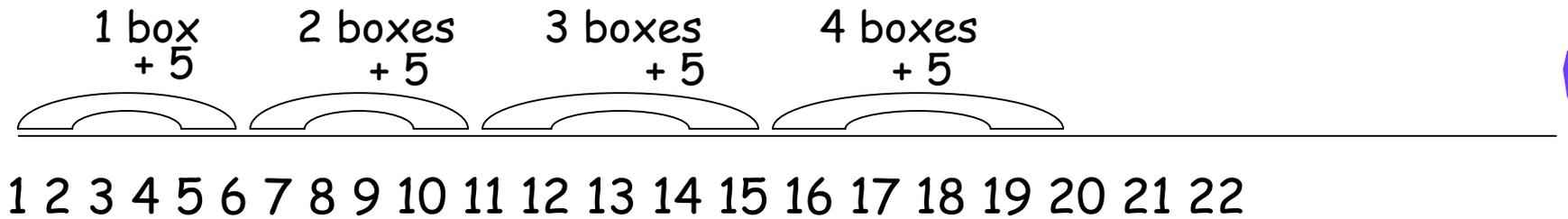
# Expectations of addition and subtraction in the New National Curriculum



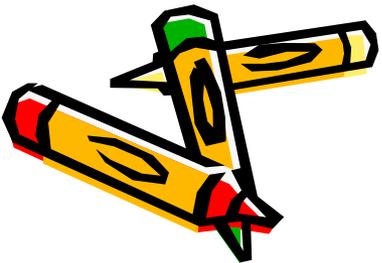
- Pupils should be taught to:
- read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as  $7 = ? - 9$ .



*There are 5 cakes in one box.  
How many cakes in 4 boxes?*



5 cakes in each box.  
4 boxes equals 20 cakes altogether.

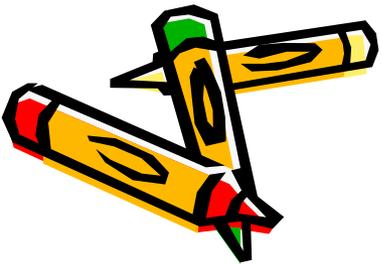
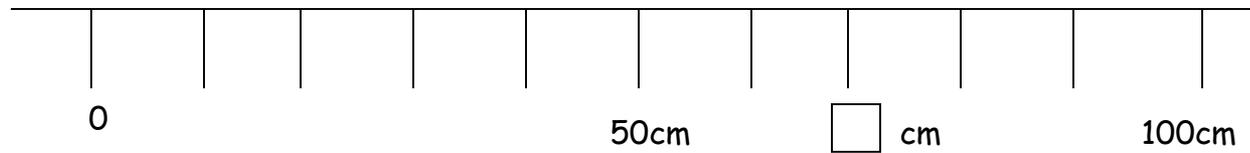


$$5 \times 4 = 20$$

Sam has 3 apples.  
Anne has 5 apples.  
How many more apples  
does Anne have?



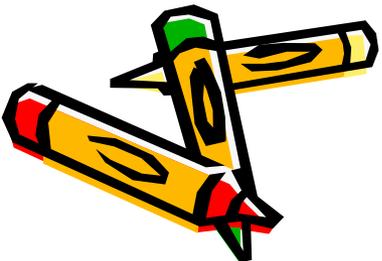
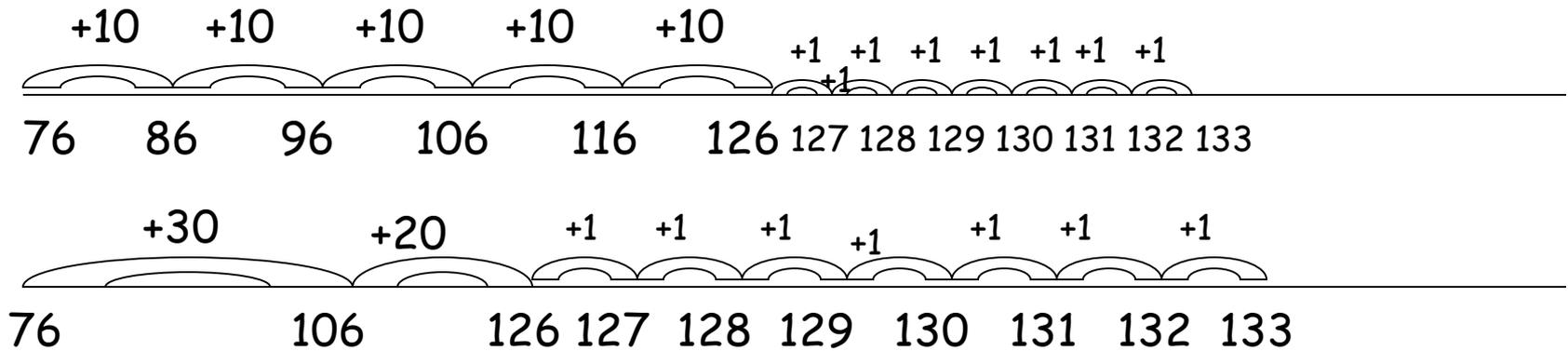
What is the  
missing measurement?



There are 76 marbles in one jar  
and 57 marbles in another jar.

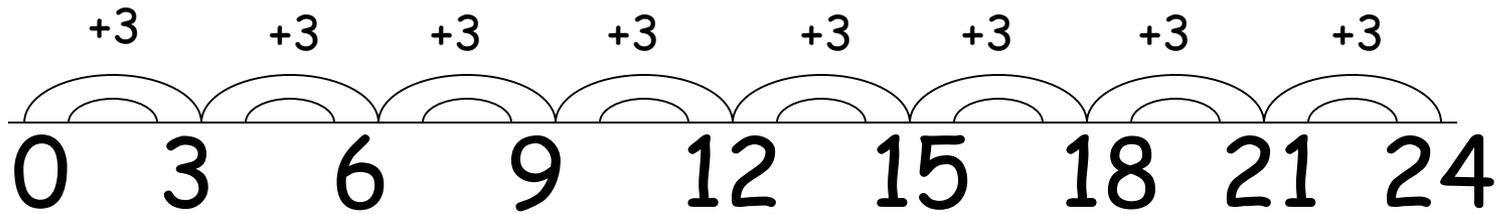


How many marbles are there altogether?

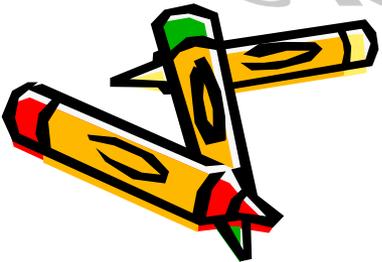


There are 3 cakes  
in one box.

How many cakes in 8 boxes?



$$3 \times 8 = 24 \text{ cakes}$$

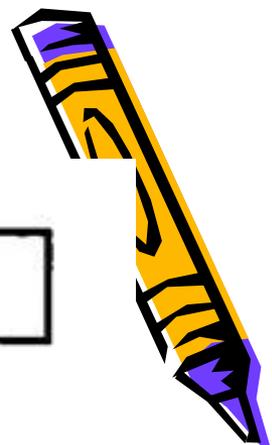


16

Calculate  $15.05 - 14.84$

$$\begin{array}{r} 15.05 \\ -14.84 \\ \hline 01.81 \end{array}$$

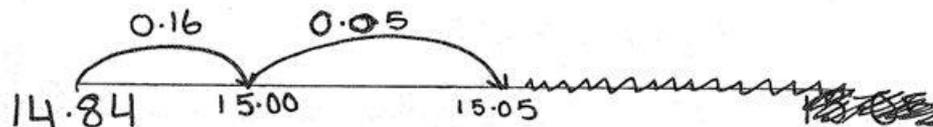
 01.81



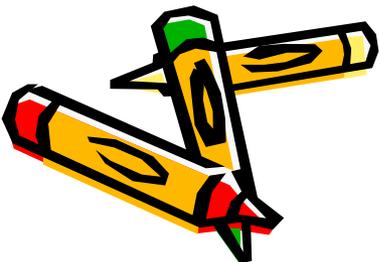
16

Calculate  $15.05 - 14.84$

0.21  
 ~~0.66~~



$$0.16 + 0.05 = \cancel{0.66} 0.21$$



Thank you for coming today...



Do you feel confident you can help your child learn by using a number line?

☺ I can do it!

