

SOME MENTAL APPROACHES

Mental Calculation Methods

Calculation methods are important. We teach specific mental 'in your head' strategies which develop logical thinking and promote a grasp of mathematical understanding. Jottings (scribbling on the side of page or in draft to assist with 'working out') will be used. These jottings are not used as part of the formal written methods adopted by the school for example, in mathematics exercise books, with the exception of children working at level 2 or below.

Mental strategies include:

Counting

Place value + Partitioning 19 = 1 ten and 9 units 190 as 1 hundred and 9 tens

http://home-ed.info/maths/place_value.html

<http://www.ictgames.com/sharknumbers.html>

Times tables instant recall Up to 12x tables random order

http://home-ed.info/maths/multiplying_fingers.htm

Associated Division Facts Up to 12x tables random order (inverse)

Chunking

Counting on

Near multiples

Doubling

Halving

Crossing tens and hundreds boundaries

Compensation and A

MENTAL CALCULATIONS – used whenever possible – do not write if it can be calculated mentally

Counting

Integers

Count forward and backwards in 1s (to 1,000,000 by Y6)

Count forward and backwards in 2s, 5s, 10s crossing 100. (e.g. 5, 10, 15, 20105, 100, 95, 90 . .)

Count forward and backwards in 3s, 6s, 4s, 8s, 7s, 9s crossing 100.

Counting forward and backwards in 100s, 1000s, 25s, 50s, 200s, 250s, 500s.

Counting forward and backwards in negative number in same increments as above (-5, -10, -15 . . .)

Decimals

Following same sequence as above using decimal numbers

Number Bonds

Number bonds e.g. $3+7=10$; $30+70=100$ $300+700=1000$

to tens, hundreds, thousands and then units and decimals

$6+?=10$ $?+3=10$ $25+?=100$ $19+?=50$ $750+?=$

$0.2+?=1$ $?+3.75=10$ $0.25+?=0.5$

A number bond is a mental picture of the relationship between a number and the parts that combine to make it. The concept of number bonds is very basic. A whole thing is made up of parts. If you know the parts, you can put them together (add) to find the whole. If you know the whole and one of the parts, you take away the part you know (subtract) to find the other part.

http://home-ed.info/maths/number_bonds.html

Using Near Doubles

$6 + 7 =$ say aloud: double 6 is 12, then add 1 = 13

Partitioning and Recombining

$34 + 45 =$ say aloud: 30 + 40 is 70. 4 add 5 is 9. 70 + 9 is 79

Using Inverse Knowledge

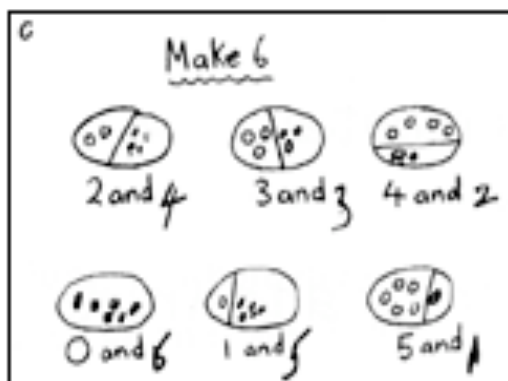
If $19 + 1 = 20$ then the inverse rule is that $20 - 1$ must equal 19. And $20 - 19 = 1$.

If I know that $36 + 19 = 55$ then I also know $19 + 36 = 55$. Further, that $55 - 19 = 36$ and that $55 - 36 = 19$

Whilst we are a junior school, we adopt the following methodology for children working at all levels up to level 2 as found in good infant practice.

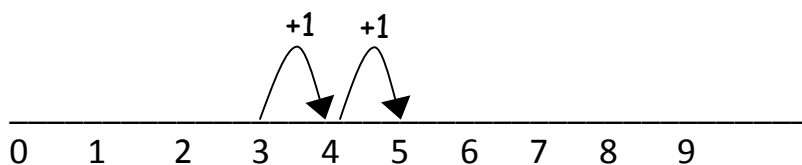
YR and Y1

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures, etc.



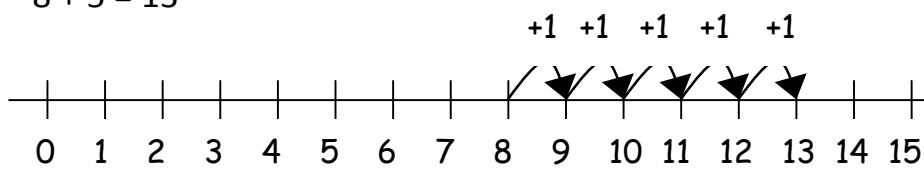
They use numberlines and practical resources to support calculation and teachers **demonstrate** the use of the numberline.

Say aloud: 3 add 1 is 4, add one is 5. So 3 add two is 5. Children can point on the number line to trace out with their finger as they say aloud their calculation.

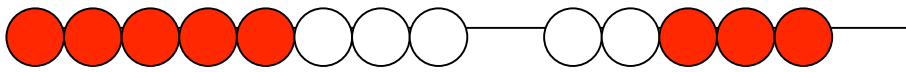


Move on to using bigger numbers (a 30cm ruler is very useful!). Or to count using fingers. So saying: 8,

$8 + 5 = 13$



Bead strings or bead bars can be used to illustrate addition including bridging through ten by counting on 2 then counting on 3.

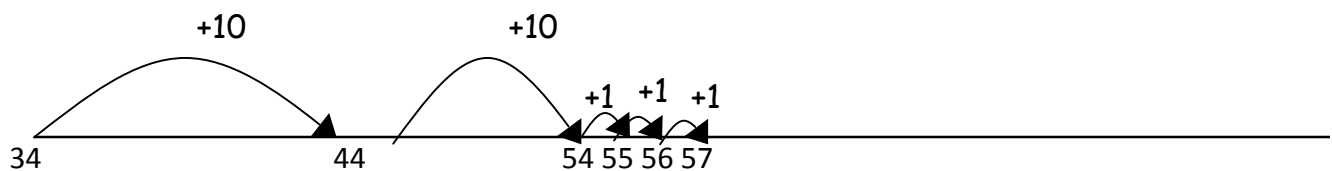


Y2

Children will begin to use 'empty number lines' themselves starting with the larger number and counting on.

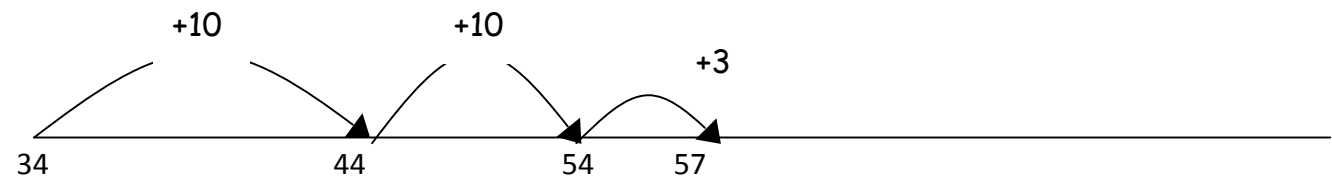
- ✓ First counting on in tens and ones.

$$34 + 23 = 57$$



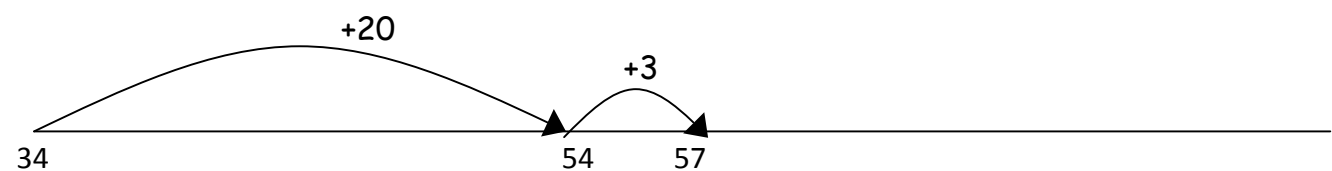
- ✓ Then helping children to become more efficient by adding the units in one jump (by using the known fact $4 + 3 = 7$).

$$34 + 23 = 57$$



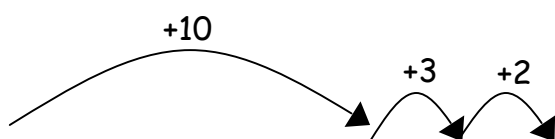
- ✓ Followed by adding the tens in one jump and the units in one jump.

$$34 + 23 = 57$$



- ✓ Bridging through ten can help children become more efficient.

$$37 + 15 = 52$$

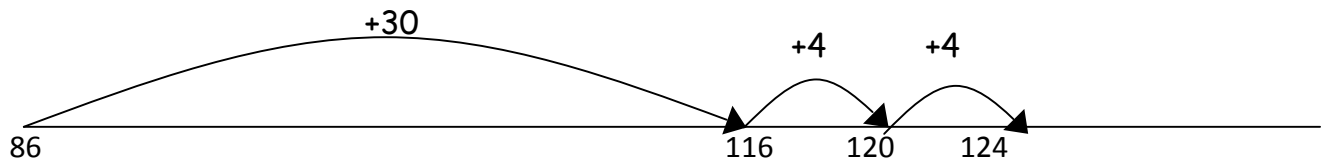


Y3

Children will continue to use empty number lines with increasingly large numbers, including compensation where appropriate.

- ✓ **Count on from the largest number** irrespective of the order of the calculation.

$$38 + 86 = 124$$



- ✓ Compensation

$$49 + 73 = 122$$

