Maths Calculation Booklet

Devised as part of Wales Learning Community

Page

Statements in bold throughout this booklet are criteria that we assess the children against.

Is beginning to use the vocabulary of addition and subtraction.

Addition	Subtraction
more than	less than
plus	minus
increase	decrease
greater than	smaller than
altogether	how many left?
sum	difference between
count on	count back
total	take away

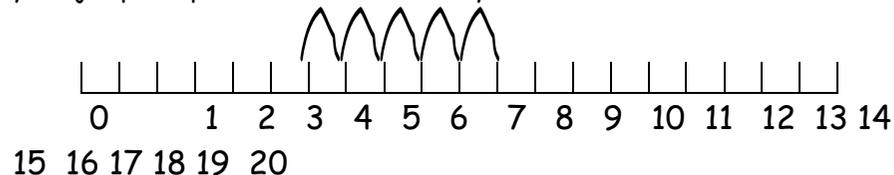**To understands adding as combining 2 or more groups.**

Qu. I have got 6 apples and 5 pears how much fruit have I got altogether?

Using counters
Count out 6 objects then 5 and then count them altogether

Using number line
Find the biggest number (6) and then count on 5. Remember to count your jumps/hops and not the number you started on.

0   1   2   3   4   5   6   7   8   9   10 11 12 13 14
15 16 17 18 19 20

        6 + 5 = 11

Mentally
Put the biggest number in your head. Put how many fingers up you need to add on. Count on from the number in your head.

**To understand subtraction as taking away objects from a group.**

Qu. There are 8p in my purse and I spend 5p how much have I got left?

Using counters
Count out 8p (using pennies) then physically take away 5p and count how much is left.

Using number line
Find the biggest number (8) and then count back 5. Remember to count your jumps/hops and not the number you started on.

0   1   2   3   4   5   6   7   8   9   10 11 12 13 14
15 16 17 18 19 20
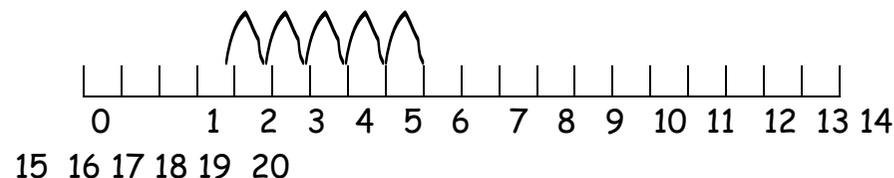
        8 – 5 = 3

Mentally
Put the biggest number in your head. Put how many fingers up you need to add on. Count on from the number in your head.

**To compare 2 sets to find a numerical difference.**

Qu. I have got 11 strawberries and 14 apples. How many more apples than strawberries do I have?

Count on from the smallest number to find the difference or count back from the biggest (practice both so children know it doesn't matter whether you count on or back – you will get the same answer)

1 2 3
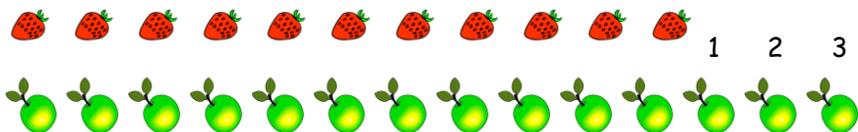
I can find the difference on a number line.

It is easier to count up from the smaller number.

0   1   2   3   4   5   6   7   8   9   10 11   12 13 14
15 16 17 18 19 20
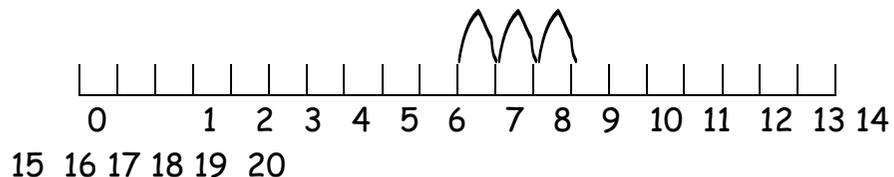
11 + 3 = 14 so the difference is 3 or 14 – 11 = 3

To add and subtract numbers when solving problems involving up to 10 objects – in a range of contexts.

Qu. At my birthday party there were three girls and five boys. How many children in total came to my birthday party?

I know that because it says how many in total I have to add the numbers together 3 + 5.

Qu. There are five caterpillars on a leaf and then a bird eats two of them. How many caterpillars are left on the leaf?

How many are left means some have to be taken away I have to take the smallest number away from the biggest number 5 – 2 = 3

Qu. Amy is seven. Her sisiter Megan is ten. How much older is Megan than Amy?

I need to find the difference between 10 and 7.

0   1   2   3   4   5   6   7   8   9   10 11   12 13 14
15 16 17 18 19 20
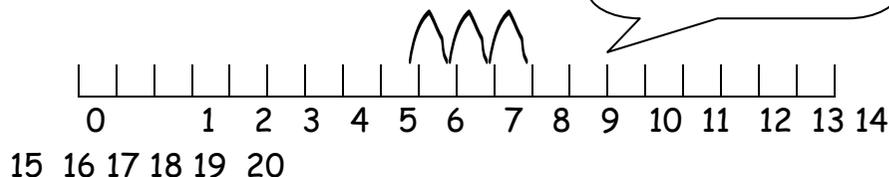
10 – 7 = 3 or 7 + 3 (count on) = 10

Qu. How old will each child be in two years' time?

I know I need to count on 2 years to each age so I need to add 2 more to each number – I would do this in my head.

To use bonds to 10, 20 and 100 to add or subtract a pair of numbers mentally.

Number Bonds to 10

Knowing which numbers add up to 10 is a crucial building block for calculation learning.

eg   3 + 7 = 10   7 + 3 = 10

Knowing these facts also means that the child knows

eg   10 - 7 = 3   and   10 – 3 = 7

Number bonds to 20

Children build on previous knowledge.
If they know that   3 + 7 = 10
they also know that   13 + 7 = 20   and   7+ 13 = 20.

They should also know the related subtractions
                        20 - 7 = 13   and   20 – 13 = 7

Number bonds to 100

Children build on previous knowledge.
If child knows   3 + 7 = 10
They also know that   30 + 70 = 100   and   70 + 30 = 100

They should also know the related subtractions
                        100 - 70 = 30   and   100 – 30 = 70

To use knowledge of inverse to solve addition and subtraction problems.

Children are shown practically and with different models how addition and subtraction are related.

Trio cards

15
7   ?

Number lines
+5
18   23
-5
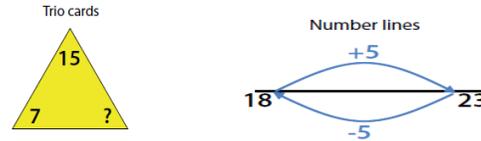
Qu. Place the numbers 6, 13 and 19 into these number sentences

☐ + ☐ = ☐   ☐ - ☐ = ☐
☐ + ☐ = ☐   ☐ - ☐ = ☐

To add and subtract a single-digit number to and from a 2-digit number.
Children are taught to count on or backwards on a number line or 100 square to solve questions - 57 – 3 and 23 + 5.
They then move on to being able to do this mentally by putting bigger number in their head and counting back or forwards.

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

57 – 3.
I can count back in ones from 57.

23 + 5. I can count on in ones from 23

Qu. There are 57 children going on a school trip. 3 children are poorly and can't go. How many children get on the bus?

To add numbers with two digits, using a written method. To record their strategies in writing.

One way of adding is to partition the numbers into parts, add the parts and then recombine to find the total.

$$45 + 13 =$$

Partition the numbers into tens and ones (units):

Add the tens together: 40 + 10 = 50
Add the ones together: 5 + 3 = 8

Recombine the numbers to give the total:

$$50 + 8 = 58$$

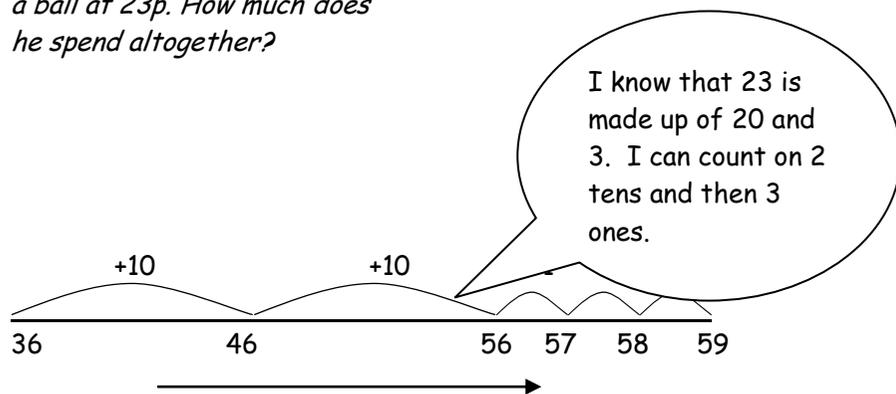Addition and subtraction sentences are always presented
HORIZONTALLY:

45 + 13 =
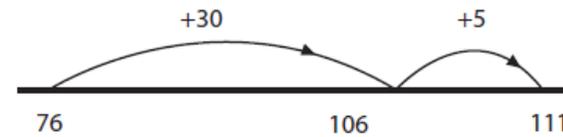
and **NOT** vertically

45
+13

Use the empty number line to add two-digit numbers by partitioning the second number and counting on in tens then ones.

Qu. Harry has a car at 36p and a ball at 23p. How much does he spend altogether?

I know that 23 is made up of 20 and 3. I can count on 2 tens and then 3 ones.

+10   +10

36   46   56 57 58 59

Children can then move on to counting in multiples of tens.

76 + 35:

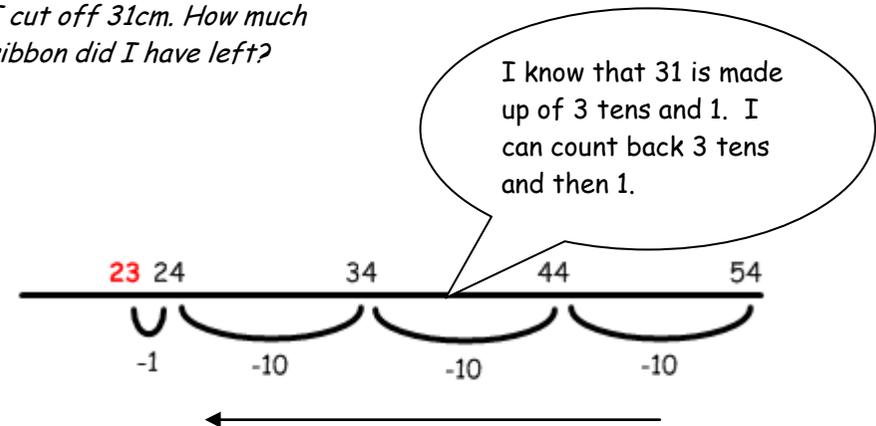+30   +5

76   106   111

To subtract numbers with two digits, using a written method. To record their strategies in writing.

Always start on the largest number and then partition the second number into tens and ones (units).

Qu. The ribbon was 54cm long.
I cut off 31cm. How much
ribbon did I have left?

I know that 31 is made up of 3 tens and 1. I can count back 3 tens and then 1.

23 24   34   44   54

-1   -10   -10   -10

**To add and subtract numbers with two digits mentally.**

Children working in level 3 should begin to add and subtract 2 digit numbers mentally. They should be able to do this by having practiced using the written method of using empty number lines at level 2.

Qu. A bag of apples costs 27p. How much change do you get from 50p?

+3   +20

27   30   50
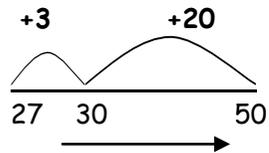
> I can find the difference by counting up. I can put 27 in my head and use my number bonds to get to the next multiple of 10. I can then count on in tens until I reach 50.

or

-7   -20

23   30   50
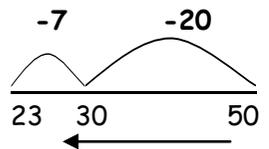
> I can count backwards in tens to 30 and then use my bonds to know that taking away 7 leaves 23.

Children need to be confident in being able to count on and back in multiples of 10. They also need to be able to identify the next multiple of 10.

To confidently add and subtract numbers with three digits using written methods

Qu. There are 193 children at St John Fisher Primary School and 278 children at Ballifield Primary School, how many more children go to Ballifield?

> I need to work out how many more 278 is than 193.

> I need to work out the difference between the numbers by finding the difference. I do this by counting up from the smaller number

+7   78

O   193   200   278
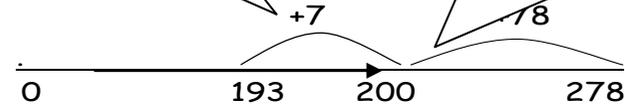
Count up to number that is easy to count from e.g next multiple of 10 or 100.
Add up the jumps you have made. E.g 78 + 7 = 85

Therefore 278 – 193 = 85 and 193 + 85 = 278

(You can count to any number that is easiest for you e.g. 193 + 10 = 203 then 203+70= 273   273 + 5 = 278

Qu. How many children go to both schools altogether?

> I need to add both numbers together (find the sum/ total).

193 + 278 =

> I need to partition both numbers. I then can add both the hundreds, then both the tens, then both units.

100 + 200 = 300   300 + 160 = 460
90 + 70 = 160   460 + 11 = 471
3   + 8 = 11

**To begin to multiply and divide two digit numbers by 2, 3, 4, 5 and 10.**

Qu. If Lucy saves £32 for three weeks. How much money will she have altogether?

Children need to be confident with their place value knowledge to be able to multiply numbers by 10. They will use this knowledge when multiplying two digit numbers by multiples of 10.
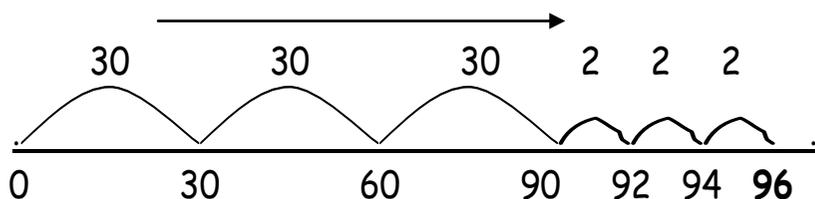
$32 \times 3 =$

Multiply the tens first 30×3

| | 30 | 30 | 30 |
| 0 | 30 | 60 | 90 |
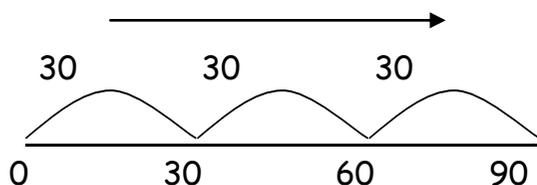
Then multiply the ones 2×3

| 30 | 30 | 30 | 2 | 2 | 2 |
| 0 | 30 | 60 | 90 | 92 | 94 | **96** |

The answer to 32×3 is 96

When children are confident to multiply on a number line they will move onto using grid.
Thirty two is partitioned into tens and ones and put into the grid:
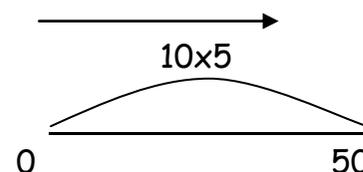The multiplying number is then put into the grid

×	30	2
3		

×	30	2
3	90	6

To multiply and divide two digit numbers by 2, 3, 4, 5 and 10 with whole number answers and remainders
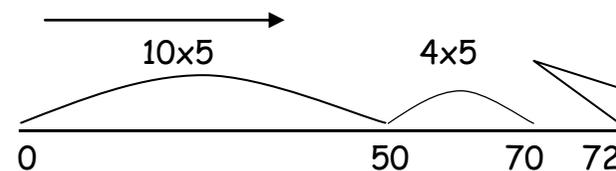
Qu. The 5 of us collected 72 treats at Halloween and we need to divide them equally between us. How can we do this? Are there any treats left over?

> I need to work out $72 \div 5 =$

Number line method

> How many lots of five are there in 72?
> What do I know from my 5 times table?
> I know 10 lots of 5 are 50, so I can take off 10 lots of 5.

> How many have I got left? $72 - 50 = 22$
> How many lots of 5 are there in 22?

$4 \times 5 = 20$ and $22 - 20$ gives us a remainder of 2

Chunking method

```
      72
    - 50     10 x 5
      22
    - 20     4 x 5
       2
```

The answer is 14 remainder 2

> I know that 10 lots of 5 are 50, so I can take 10 lots off and I know 4 lots of 5 are 20, so I can then take that off which then leaves my remainder of 2:

Traditional 'Bus Stop' method

$$\frac{1\,4\ r\,2}{5)7^22}$$