

Mathematical Language

Words linked to +

add, addition, and, count on, plus, sum, more, altogether, increase

Words linked to -

take away, subtract, subtraction, count back, minus, less, decrease, difference between

Words linked to \times

multiply, multiplication, multiple, double, array, times, lots of

Words linked to \div

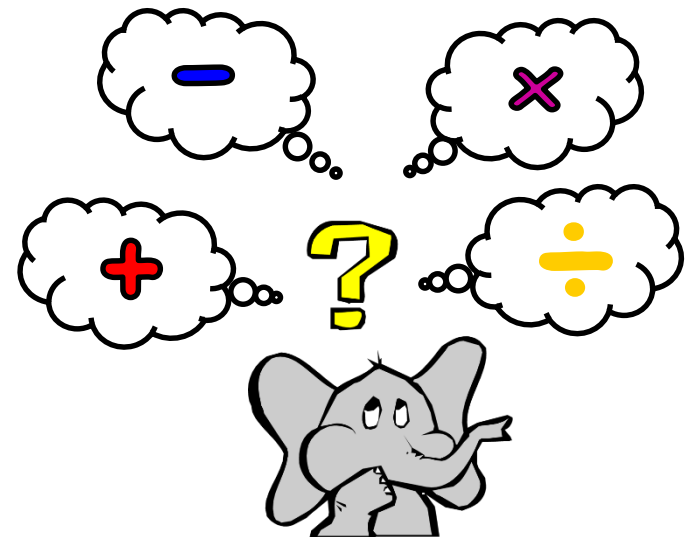
group, divide, division, divided by, divisible, factor, share, half, halve, remainder, quotient

Words linked to =

equals, makes, same as

Number sentence	e.g. $2 + 4$, $5 - 3$, 6×3 , $12 \div 3$
Partition	splitting a number up e.g. $123 \dots 100 + 20 + 3$
Recombine	putting a number back together e.g. $100 + 20 + 3 \dots 123$
Bridging	crossing over 10/100 etc
Exchanging	e.g. swapping a 10 for 10 ones
Place value	the value of each digit in a number e.g. hundreds, tens and ones (units)

Progression in Calculations

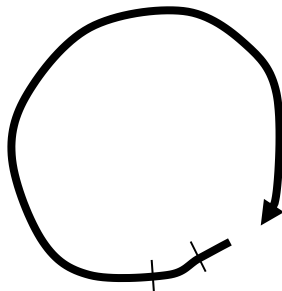


A Learning Guide

All children will develop efficient methods of calculation with all four operations choosing an appropriate method (mental, mental with jottings, written, calculator) to solve a range of different problems.

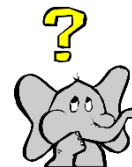
Children develop at different rates. The onus is on developing mathematical understanding, a feel for number, NOT just learning a mechanical method that is prone to error - to develop learners for life.

Did you know that if you bend a number line around it could make the face of a clock or the dial on a pair of scales?



The Basics

three 3



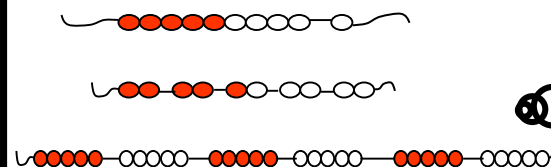
Recognise, read and write numbers

Know what numbers mean
Understand place value

1 ten 3 ones



13 thirteen



Count on and back in steps of the same size



Put numbers in order

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

40

8



Partition a number and recombine it

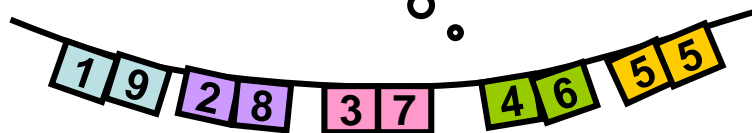
Addition



HEADS first!
Estimate.
Don't move
on until you
understand.

Go back if
you need to.

Know your number
bonds.
Pairs of numbers that
make 10 or 20



Number Bonds

$$1 + 9 = 10$$

$$9 + 1 = 10$$

$$2 + 8 = 10$$

$$8 + 2 = 10$$

$$3 + 7 = 10$$

$$7 + 3 = 10$$

$$4 + 6 = 10$$

$$6 + 4 = 10$$

$$5 + 5 = 10$$

Know that addition is counting on
and that it can be done in any order

$$1 + 2 = 3$$



$$2 + 1 = 3$$



$$2 + 5 = 7$$

2 count on 5



$$5 + 2 = 7$$

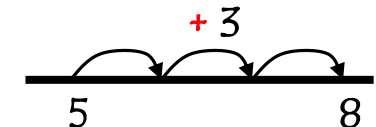
5 count on 2



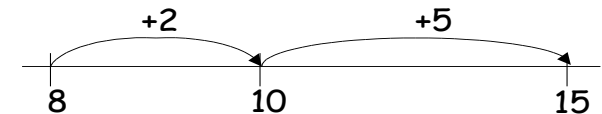
Add single digit numbers

- below 10
- then crossing over (bridging) 10

$$3 + 5$$

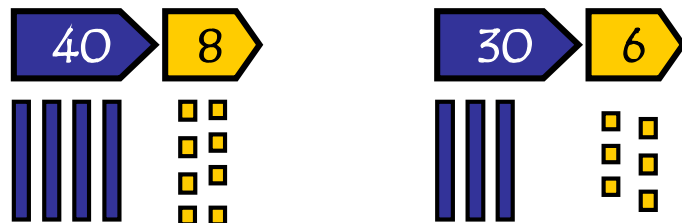
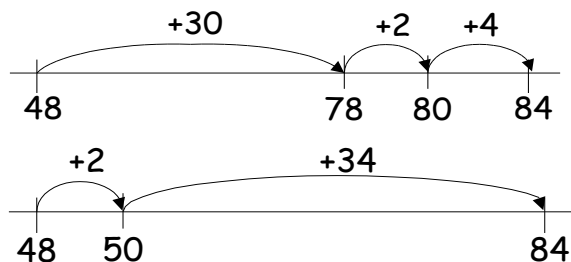


$$8 + 7 = 15$$



BIGGEST number first

- Add two two-digit numbers
- without crossing (bridging) the tens boundary
 - the crossing over (bridging) the tens boundary



$$40 + 30 + 8 + 6$$

$$40 + 30 = 70$$

$$8 + 6 = 14$$

$$70 + 14 = 84$$

Expanded Method
(A stepping stone to the column method)

$$48 + 36$$

48

$$+ 36$$

T U

$$40 + 8$$

$$30 + 6$$

$$80 + 4$$

10

Column Method

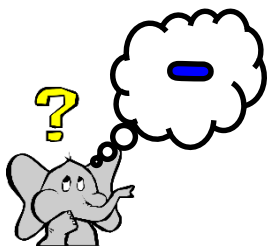
THINK!
Is the answer sensible?

48

$$+ 36$$

84

1



Subtraction

HEADS first!
Estimate.
Don't move
on until you
understand.

Go back if
you need to.

Know subtraction
facts for numbers
up to 10 and 20

Number Bonds

$$10 - 1 = 9$$

$$10 - 9 = 1$$

$$10 - 2 = 8$$

$$10 - 8 = 2$$

$$10 - 3 = 7$$

$$10 - 7 = 3$$

$$10 - 4 = 6$$

$$10 - 6 = 4$$

$$10 - 5 = 5$$

Find the difference
between numbers



The difference is?



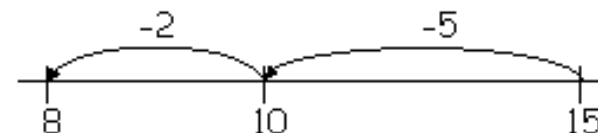
The difference
between 11
and 14 is 3.
 $14 - 11 = 3$
 $11 + \square = 14$

Subtract single digit numbers

- below 10
- then crossing through (bridging)

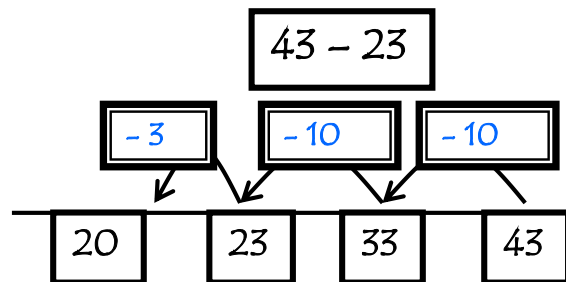


$$15 - 7 = 8$$



Biggest number FIRST

- Subtracting two-digit numbers
- without crossing (bridging) the tens boundary
 - then crossing through (bridging) the tens boundary



$$43 - 27 = 16$$



$$43 - 20 = 23$$

$$23 - 7 = 16$$

Expanded Method
(A stepping stone to the column method)

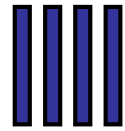

$$43 - 27 = 16$$



to subtract 7 units
we need to exchange
a ten for ten units

.....→



T	U
	
- 2	7

$$\begin{array}{r} 30 \quad \cancel{40} + 10 + 3 \\ - 20 + 7 \\ \hline 10 + 6 \end{array}$$

Column Method

$$\begin{array}{r} 3 \quad \cancel{4} \quad 13 \\ - 27 \\ \hline 16 \end{array}$$

HEADS first!

Estimate.
Don't move
on until you
understand.

Go back if
you need to.



Multiplication

Do you know your
times-tables
to 10×10 ?
Learn them they're
really useful!

$\times 5$

$$2 \times 5 = 10$$

$$6 \times 5 = 30$$

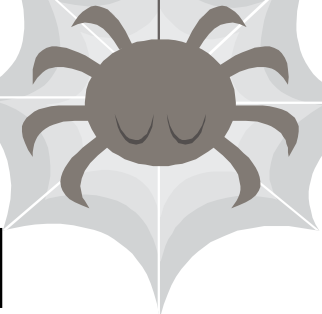
$$4 \times 5 = 20$$

$$3 \times 5 = 15$$

$$10 \times 5 = 50$$

$$8 \times 5 = 40$$

$$5 \times 5 = 25$$



$$2 + 2 + 2 + 2 = 8$$

$$4 \times 2 = 8$$

2 multiplied by 4

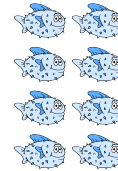
4 lots of 2

Know that
multiplication is
repeated
addition



$$2 + 2 + 2 + 2$$

Set out multiplication as an
array and show jumps on a
number line



$$2 \times 4$$



$$4 \times 2$$



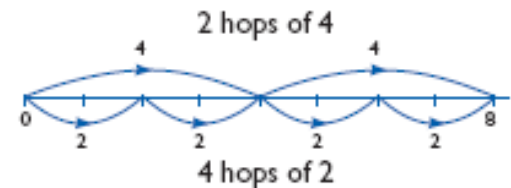
$$2 \times 4 = 8$$

$$4 \times 2 = 8$$



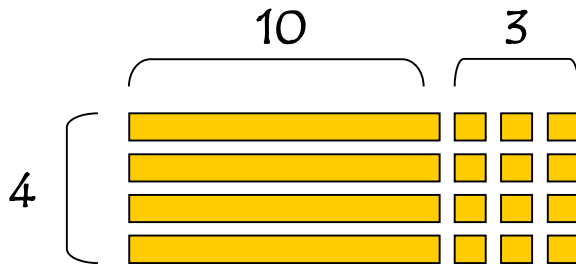
$$4 \times 2 = 8$$

$$2 \times 4 = 8$$



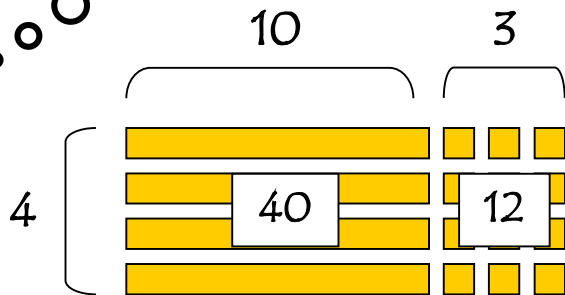
Use place value apparatus to support multiplication of $U \times TU$

$$4 \times 13$$



Use place value apparatus to support multiplication of $U \times TU$ alongside the grid method

$$4 \times 13$$

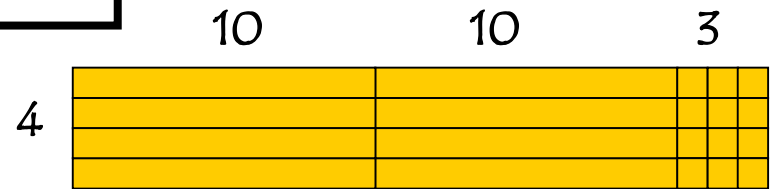


	10	3
4	40	12

$$40 + 12 = 52$$

Multiply $TU \times TU$ using the grid method

$$4 \times 23$$



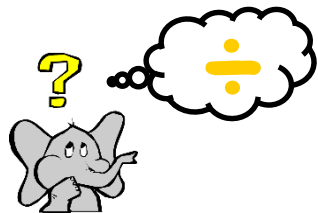
	10	10	3
4	40	40	12

	20	(2 x 10)	3
4	80		12

$$80 + 12 = 92$$

Long multiplication

$$\begin{array}{r} 56 \\ \times 27 \\ \hline 1120 \\ 392 \\ \hline 1512 \\ 1 \end{array} \quad \begin{array}{l} (56 \times 20) \\ (56 \times 7) \end{array}$$



Division

HEADS first!
Estimate.
Don't move
on until you
understand.

Go back if
you need to.

Do you know your
division facts?
Learn them they're
really useful!

$$\div 5$$

$$10 \div 5 = 2$$

$$30 \div 5 = 6$$

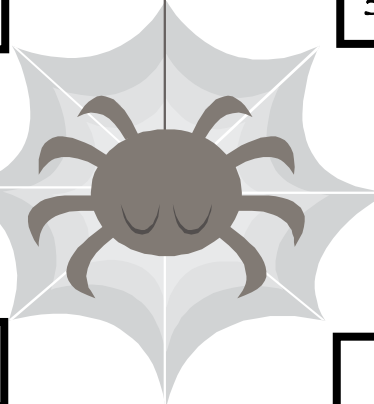
$$20 \div 5 = 4$$

$$15 \div 5 = 3$$

$$50 \div 5 = 10$$

$$40 \div 5 = 8$$

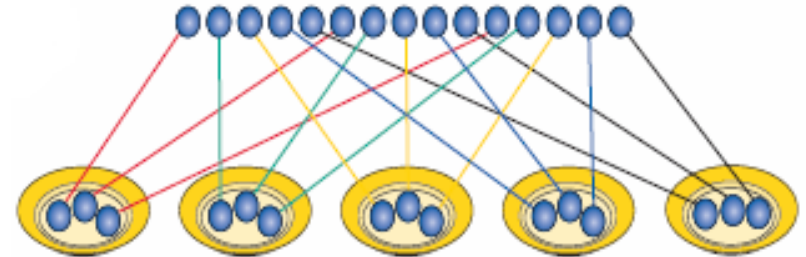
$$25 \div 5 = 5$$



Share things out equally
then begin to understand
remainders

$$15 \div 5 = 3$$

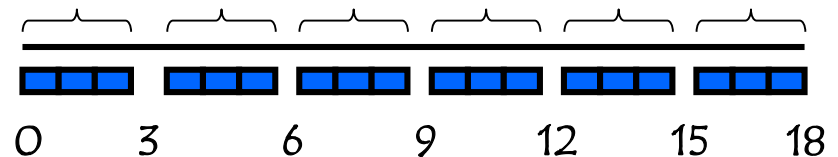
15 shared between 5



Group objects to divide them and
show this on a number line

18 divided into groups of 3

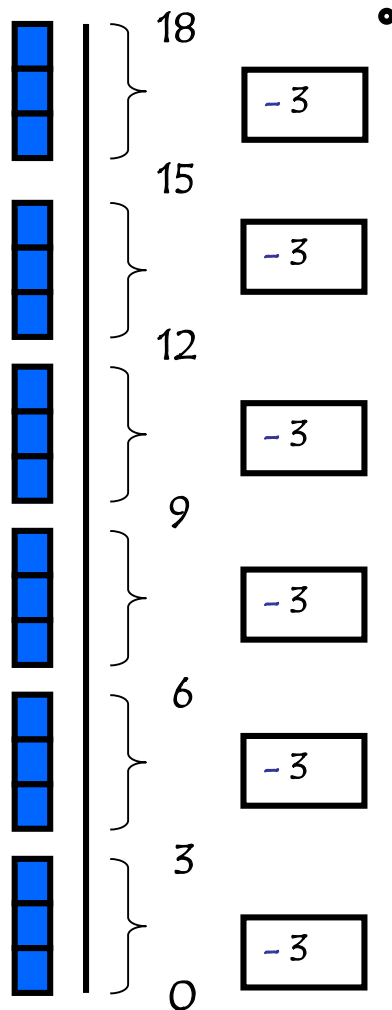
$$18 \div 3 = 6$$



$$18 \div 3 = 6$$

$$18 \div 6 = 3$$

Understand division
as repeated
subtraction



$$100 \div 7 = \underline{14} \text{ r } 2$$

$$\begin{array}{r} 100 \\ - 70 \quad (\underline{10} \times 7) \\ 30 \\ - 28 \quad (\underline{4} \times 7) \\ 2 \end{array}$$

Divide by chunking
- taking away
larger multiples

What facts do I
know about the
7 times-table?

Fact Box

$$1 \times 7 = 7$$

$$2 \times 7 = 14$$

$$5 \times 7 = 35$$

$$10 \times 7 = 70$$

$$20 \times 7 = 140$$

$$50 \times 7 = 350$$

$$100 \times 7 = 700$$

$$518 \div 7 = \underline{74}$$

$$\begin{array}{r} 518 \\ - 350 \quad (\underline{50} \times 7) \\ 168 \\ - 140 \quad (\underline{20} \times 7) \\ 28 \\ - 28 \quad (\underline{4} \times 7) \\ 0 \end{array}$$

Long division

$$560 \div 24$$

$$\begin{array}{r} 23 \text{ r } 8 \\ 24 \overline{) 560} \\ - 480 \\ \hline 80 \\ - 72 \\ \hline 8 \end{array}$$