



COMPASS INTERNATIONAL SCHOOL DOHA

A NORD ANGLIA EDUCATION SCHOOL

At Compass International School, Doha, we aim to deliver high quality learning opportunities for all children. To enable pupils to aspire and achieve, the school has updated the calculation policy in order for class teachers to deliver a school wide approach to learning and enable a smooth transition from year to year.

The aim is to provide a variety of methods that are acceptable to use in order to achieve a deeper understanding of number and the ability to apply their knowledge to real life situations.

At Compass International School, Doha, we:

- ❖ encourage the children to make an estimate before calculating an answer;
- ❖ give the children the opportunity to decide whether a calculation could be done in their head or whether they need a written method;
- ❖ ask the children to check that their answer is sensible by using their knowledge of number;
- ❖ encourage children to move through the written stages of calculation when it is appropriate for them, not necessarily at the same time;
- ❖ encourage children to explain their methods fully and know the values of the numbers they are manipulating.



NORD
ANGLIA
EDUCATION

Key Vocabulary

Beginning

+, add, more, and
Make, sum, total
Altogether
Score
Double
One more, two more, ten more...
More than, less than
How many more to make...?
How many more is... than...?
-, take (away), leave
How many are left/left over?
How many have gone?
One less, two less... ten less...
How many fewer is... than...?
Difference between
Is the same as
Units
Double
Half

Year 1

Plus, minus
Double, near double
How much more is...?
How much less is...?
Half, halve
=, equals, sign
Number bonds, number line
Inverse
Subtract, minus
Odd, even, count in twos, threes, fives Count in tens (forwards from/backwards from)
How many times?
Lots of, groups of
Once, twice, three times, five times ...
x, times, multiply, multiply by, repeated addition
Array
Row
Column
Share equally
Group in pairs, threes, tens...
Equal groups of
÷, divide, divided by

Year 2

Addition
One hundred more, one hundred less
Multiple of
Four times, ten times...
Times as (big, long, wide and so on)
one each, two each, three each...
÷, divide, divided by, divided into, left, left over

Year 3

Column addition and subtraction
Tenths, hundredths, thousandths
Multiplication
Product
Division
Remainder

Year 4

Increase
Decrease
Divisible by
Factor
Derive

Year 5

Composite, prime, square and cubed numbers
Integer

Year 6

Common multiple
Common factor
Lowest common denominator
Order of operations
Using a calculator
Calculator, display, key, enter, clear, sign,
constant, recurring, memory, operation

Addition

Beginning Addition: Relevant vocabulary - *greater, more, add, plus*. Beginning stages of addition - Count reliably with numbers from one to twenty saying which number is one more than a given number. Using quantities and objects children add two single digit numbers or count forward to find the answer.

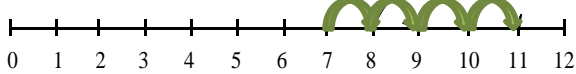
Adding two groups of objects

$3 + 2 = 5$



Adding on a printed number lines

$7 + 4 = 11$



Recording by drawing jumps on prepared lines or by constructing own lines

Adding on a hundred square

$14 + 5 = 19$

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

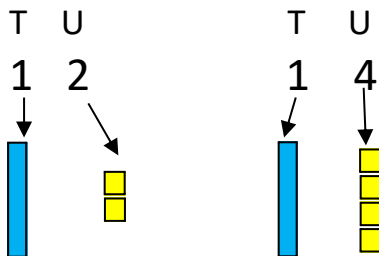
$14 + 10 = 24$

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

$14 + 11 = 25$

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

Partition into tens and units



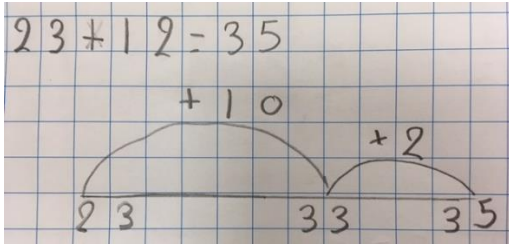
$12 + 14 =$

10	+	10	=	20
2	+	4	=	6
20	+	6	=	26

refine to partitioning the second number only:

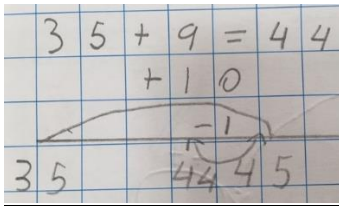
$$\begin{aligned}
 12 + 14 &= 12 + 10 + 4 \\
 &= 22 + 4 \\
 &= 26
 \end{aligned}$$

Adding on a blank number line (counting in multiples)



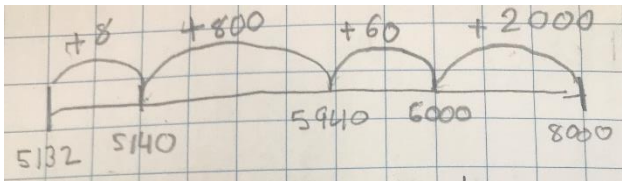
Adding on and counting back for near tens (compensating)

Add 9 or 11 by adding 10 and adjusting by 1



Partitioning on a number line

$5132 + 2868 = 8000$



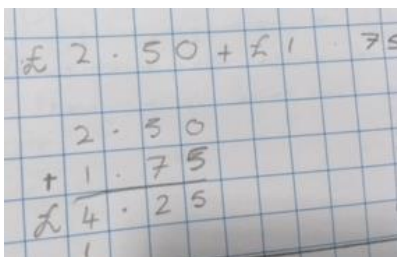
Compact column method (numbers carried underneath)

$38 + 93 = 131$

	T	U
	3	8
+	9	3
	1	3
		1

$8 + 3 = 11$, so we carry the 1 (10).

Adding using decimals in the context of money (compact column)



Compact column for adding 3 digit and two digit numbers

	3	5	8	
+		7	3	
	4	3	1	

Extend to numbers with at least four digits.

	3	5	8	7
+		6	7	5
	4	2	6	2

Extend to decimals (same number of decimal places).

Partition into hundreds, tens, ones and decimal fractions and recombine

Either partition both numbers and recombine or partition the second number only e.g.

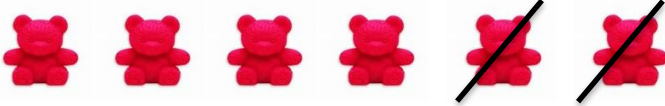
3	5	.	8	+	7	.	3			
3	5	+	7	=	4	2				
0	.	8	+	0	.	3	=	1	.	1
4	2	+	1	.	1	=	4	3	.	1

Subtraction

Beginning Subtraction: Relevant vocabulary - *fewer, less than, difference, taking away*. Beginning stages of subtraction - Count reliably with numbers from one to twenty saying which number is one less than a given number. Using quantities and objects children subtract two single digit numbers or count back to find the answer.

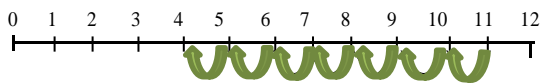
Subtracting with objects

$$6 - 2 = 4$$

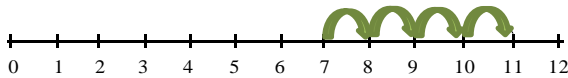


Number lines (numbered)

11 - 7 (counting back)



The difference between 7 and 11 (counting up)



Recording by drawing jumps on prepared lines, extended to constructing own lines.

Hundred square

$14 - 3 = 11$

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

$14 - 10 = 4$

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

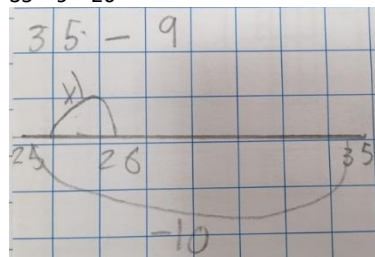
$14 - 11 = 3$

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

Subtracting and adding on for near tens (compensating)

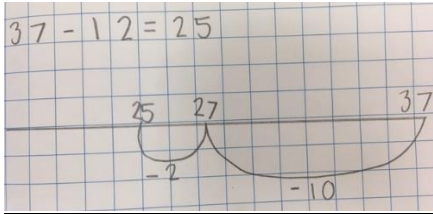
Subtract 9 or 11 by subtracting 10 and adjusting by 1.

$35 - 9 = 26$



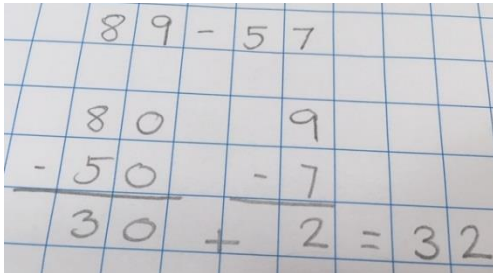
Partitioning the second number

$$\begin{aligned} 37 - 12 &= 37 - 10 - 2 \\ &= 27 - 2 \\ &= 25 \end{aligned}$$



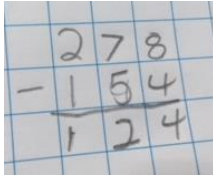
Partitioned column method

$$89 - 57 = 32$$



Compact column method

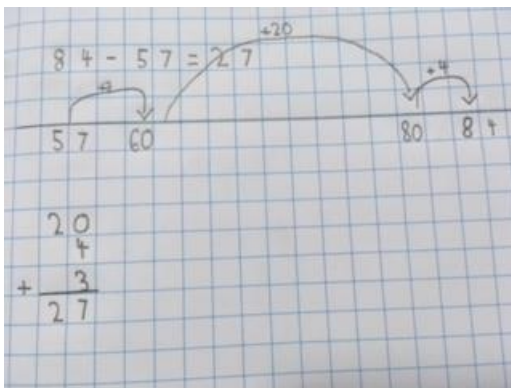
3 digit subtract 3 digit, not exchanging.



Using similar methods, children will:

- be able to subtract numbers with different numbers of digits;
- begin to find the difference between two three-digit sums of money;
- know that decimal points should line up under each other.

Complementary addition

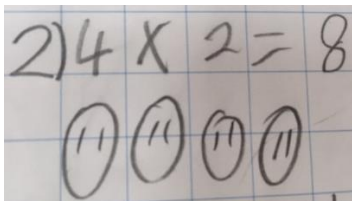


Jump to the near 10
Add the tens
Add the remainder

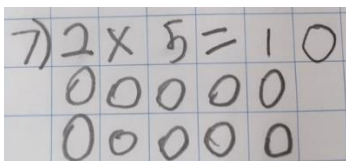
Multiplication

Beginning Multiplication: In the early Stages of multiplication children will use objects to solve problems including doubling.

Pictorial representations



Arrays

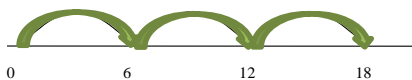


Repeated addition with number lines

$$2 \times 4 = 2 + 2 + 2 + 2$$

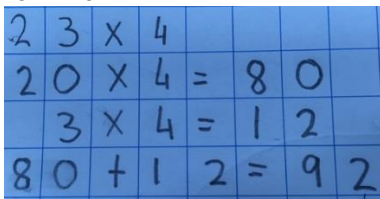


$$6 \times 3 \text{ (3 jumps of 6)}$$



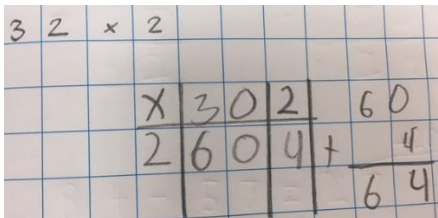
Partitioning

$$23 \times 4 = 92$$



Grid method (2 digit x 1 digit):

$$32 \times 2 = 64$$



Grid method (2 digit x 2 digit)

$73 \times 58 = 4234$

x	70	3	
50	3500	150	'3'650
8	560	24	+584
			✓ 4234

Grid method (3 digit x 2 digit)

$372 \times 24 = 8928$

x	300	70	2	
20	6000	1400	40	7440
4	1200	8		+1488
				8928

Grid method using decimals

$12.5 \times 3 = 37.5$

	12.5	x	3	=
x	10	20.5		
3	30	61.5	37.5	

Standard written method

$4382 \times 4 = 17528$

x	4382	
4		
16000	←	4 × 4000
1200	←	4 × 300
320	←	4 × 80
8	←	4 × 2
+	17528	✓

Standard written method using decimals

$12.5 \times 3 = 37.5$

	12.5
x	3
	37.5
	6
+	30
	37.5

Division

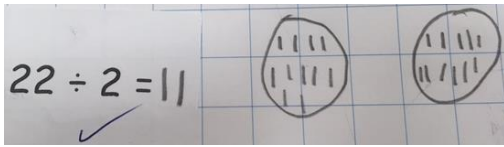
Beginning Division: In the early stages of division the children will use objects to solve problems including halving.

Sharing with objects

12 children get into teams of 4 to play a game. How many teams are there?



Pictorial representation

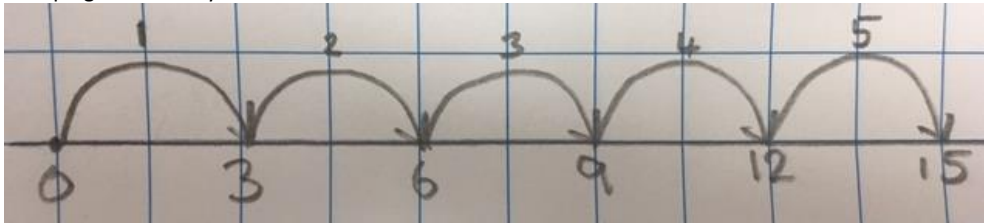


Understand division as sharing and grouping

$$15 \div 3 = 5$$

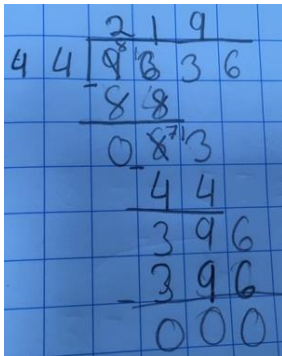
Sharing - 15 shared between 3.

Grouping - How many 3s make 15?



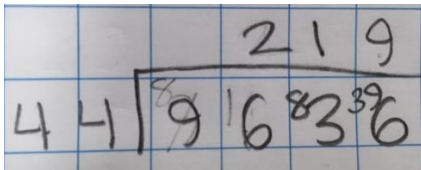
Long division

$$9636 \div 44 = 219$$



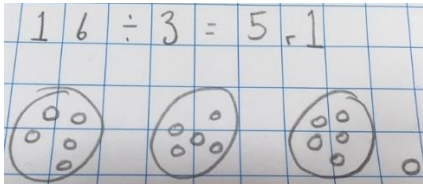
Short division

$$9636 \div 44 = 219$$



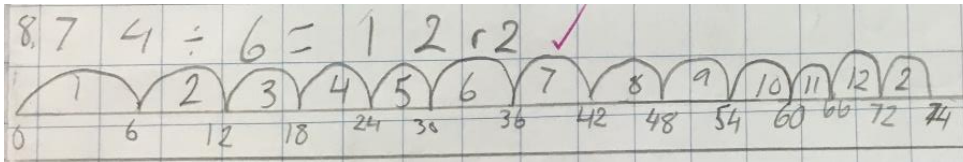
Remainders

$$16 \div 3 = 5 \text{ r}1$$



OR

$$874 \div 6 = 12 \text{ r}2$$



Remainders - quotients expressed as fractions or decimal fractions

$$61 \div 4 = 15.25$$

