"Numeracy counts"

Bluecoat Academy

Numeracy booklet

believe

believe in yourself, in others, in God

Confidence with numbers is an essential part of any child's learning. Not only does it help them with day-to-day problem-solving and practical tasks but it also gives them the building blocks to acquire the later mathematical skills valued by the world of industry and higher education.

If a child feels confident at performing mental arithmetic and is also well practiced at using correct written methods to perform addition, subtraction, multiplication and division then they are more likely to go on to understand and master more complex mathematical ideas.

This booklet is intended for parents and pupils as a guide to the methods that are taught at Bluecoat Academy. We hope you find it useful and informative.

Should you have any queries relating to numeracy at Bluecoat Academy please contact your child's Mathematics teacher or the Head of Mathematics at your child's campus.

Addition

Mental calculations

A method that is encouraged when adding double and triple digit numbers is to use partitioning. This breaks numbers up by their place value e.g. into units, tens, hundreds etc.

Examples

45 + 37

= 40 + 5 + 30 + 7

= 40 + 30 + 5 + 7

= 70 + 12

= 82

127 + 215

= 100 + 20 + 7 + 200 + 10 + 5

= 100 + 200 + 20 + 10 + 7 + 5

= 300 + 30 + 12

= 342

Written Calculations

Pupils are taught to use the column method when adding. This involves arranging numbers in columns so that digits of the same place value are lined up. This method is used to add whole numbers and decimals.

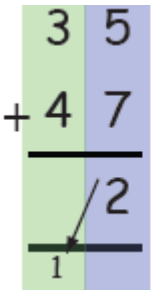
Examples

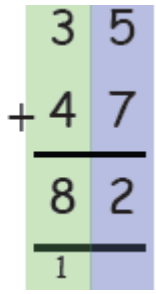
35 + 47

Always start at right hand column.

Adding the 5 and 7 gives 12, the 1 digit must be 'carried' into the column on the left.

Add the 3, 4 and carried 1 to give the result 8





The same method can be used to add decimals

e.g. ***5.64 + 7.91***

Numbers must be arranged carefully so that the decimal points line up (and the decimal point is put into the answer).

```
  5.64
+ 7.91
```

```
   5.64
+  7.91
-------
  13.55
   1 1
```

Subtraction

Mental calculations

Like addition partitioning can be used when trying to subtract mentally. When subtracting, usually only the second number is broken up by its place value e.g. into units, tens, hundreds etc.

Examples

65 - 37

= 65 – 30 – 7

= 35 – 7

= 28

246 - 152

= 246 – 100 – 50 – 2

= 146 – 50 – 2

= 96 – 2

= 94

Pupils sometimes feel more comfortable subtracting units first, then tens (then hundreds..)

Written Calculations

Pupils are taught to use the column method for subtracting. This involves arranging numbers in columns so that digits of the same place value are lined up. This method is used to subtract whole numbers and decimals.

Examples

45 – 21

(as with column addition numbers should be arranged so digits of the same place value are lined up, and always start with the right hand column)

45 - 21 should be set out like this.

Tens	Units
4	5
− 2	1

Subtract the units.

5 - 1 = 4

Tens	Units
4	5
− 2	1
	4

Subtract the tens.

4 - 2 = 2

Tens	Units
4	5
− 2	1
2	4

32 – 15

Subtract the units.

2 - 5 =

We can not do.

Tens	Units
3	2
− 1	5

Move 1 ten into the units column. Take off 1 ten in the tens column.

Tens	Units
2	1
~~3~~	2
− 1	5

Subtract the units.

12 - 5 = 7

Tens	Units
2	1
~~3~~	2
− 1	5
	7

Subtract the tens.

2 - 1 = 1

Tens	Units
2	1
~~3~~	2
− 1	5
1	7

This question involves 'borrowing' from the next column which pupils often find challenging.

Multiplication

Pupils should be able to recall their times tables up to 12 x 12 as this is essential in the methods used to multiply larger numbers.

To multiply 2 digit and 3 digit numbers pupils will be taught the 'grid method'.

Examples

23 x 7

	20	**3**
7	140	21

$140 + 21 = \underline{\mathbf{161}}$.

The 2 digit number is broken up into tens and units and arranged around the grid as shown.

The multiplications 7 x 20 and 7 x 3 are calculated in the grid. The results of these two multiplications are added to find the answer.

36 x 72

	30	**6**
70	2100	420
2	60	12

2100
420
60
+ 12
2592

A different sized grid is used here to multiply two 2 digit number.

Column addition is then used to add up the results of the multiplications.

The grid method can also be used for multiplications that involve decimals.

Example

1.7 x 4.1

There a few more steps here because of the decimals but the method that pupils are commonly taught is to:

1. Estimate the answer to the calculation i.e., 2 x 4 = 8
   (*so we expect the answer to the multiplication to be approximately 8)*

2. Remove the decimal points from the numbers, so we will now calculate 17 x 41 (using the grid method!)

	10	**7**
40	400	280
1	10	7

400
280
10
+ 7
697

3. The decimal point needs to put back into the answer. Remember we expected the answer to be approximately **8** the decimal point should be inserted between the digits 6 and 9 to get the answer **6.97**

i.e. 1.7 x 4.1 = 6.97

Division

Pupils should be able to recall their times tables up to 10 x 10 as this is essential to help them divide numbers. They are reminded that division is the inverse (opposite) of multiplication.

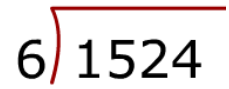
6 x 8 = 48 therefore 48 ÷ 6 = 8 and 48 ÷ 8 = 6

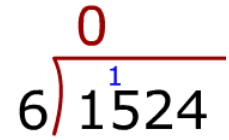
Regular reinforcement of the relationship between multiplication and division often helps to improve their ability and confidence.

The 'bus stop' method (short division) is used for written division.

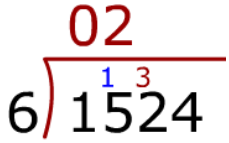
Example

1524 ÷ 6

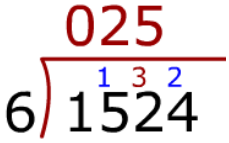




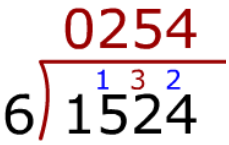
There are zero lots of 6 in the 1 – there is a remainder of 1



There are 2 lots of 6 in the 15 – there is a remainder of 3



There are 5 lots of 6 in the 32 – there is a reminder of 2



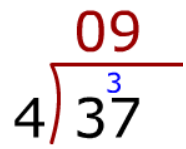
There are 4 lots of 6 in the 24 – there is a remainder of 0

The answer is 254

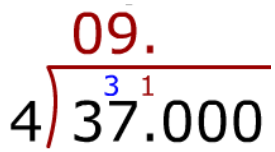
The bus stop method can be used when division involve decimals (in the questions or answer).

Example

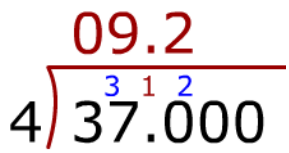
37 ÷ 4



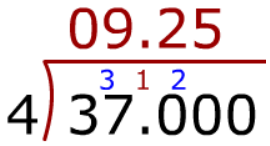
The calculation is started as before



There is still a remainder when the decimal point is reached. Add some zeros to the 37 so the calculation can be continued



Continue with the calculation as before



The answer is 9.25

Try for yourself!

Practice the methods described in the booklet to answer these questions; you can check your answers below.

a) 345 + 456	f) 256 – 125	k) 34 x 23	p) 237 ÷ 3
b) 135 + 79	g) 476 – 231	l) 56 x 17	q) 475 ÷ 5
c) 4.8 + 9.7	h) 378 – 85	m) 2.8 x 5.2	r) 1242 ÷ 6
d) 3.76 + 4.1	i) 1103 – 457	o) 6.7 x 1.2	s) 381 ÷ 6
e) 0.39 + 1.09	j) 231 – 76	p) 4.83 x 7	t) 56.7 ÷ 5

Answers

a) 801	f) 131	k) 782	p) 79
b) 214	g) 245	l) 952	q) 95
c) 14.5	h) 293	m) 14.56	r) 207
d) 7.86	i) 646	o) 8.04	s) 63.5
e) 1.48	j) 155	p) 33.81	t) 11.34