



Numeracy Guide 2014 to 2015

Version 1.0

This numeracy guide is for pupils, parents and teachers. It has been written to help facilitate consistent mathematical methods when teaching or supporting children's mathematics in the classroom or at home.

Please check our website <http://www.stantonbury.org.uk/wp/> to make sure you have the most up to date version. Sections on algebra, shape and data handling will be added in due course. Please email nick.rabson@stantonbury.org.uk should you have any topics or ideas you would like to be considered for the next version.

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What is numeracy?

Numeracy is a life skill. Being numerate goes beyond simply 'doing sums'; it means having the confidence and competence to use numbers and think mathematically in everyday life...

<http://www.nationalnumeracy.org.uk/what-is-numeracy/index.html>

Having a good level of numeracy is essential if children are to make the best of all the opportunities available to them, both whilst at school and in their future lives. At Stantonbury Campus we are committed to ensuring all children leave us with a love of mathematics and the confidence to embrace any mathematical task they may face in the future.

We believe there are 3 essential factors needed in order for a child to become fully numerate:

1. The belief that they can be, and are good at maths.
2. The belief that maths is relevant for their everyday life.
3. Excellent teaching. Teaching that recognises and meets the needs of every pupil.

These points cannot be achieved without consistent support and encouragement from both home and school.

Number

Addition

Preferred method - Column addition

$$693 + 45 = ?$$

$$\begin{array}{r} \downarrow \\ 693 \\ + 45 \\ \hline 738 \\ \overset{1}{\leftarrow} \text{carry over} \end{array}$$

Subtraction

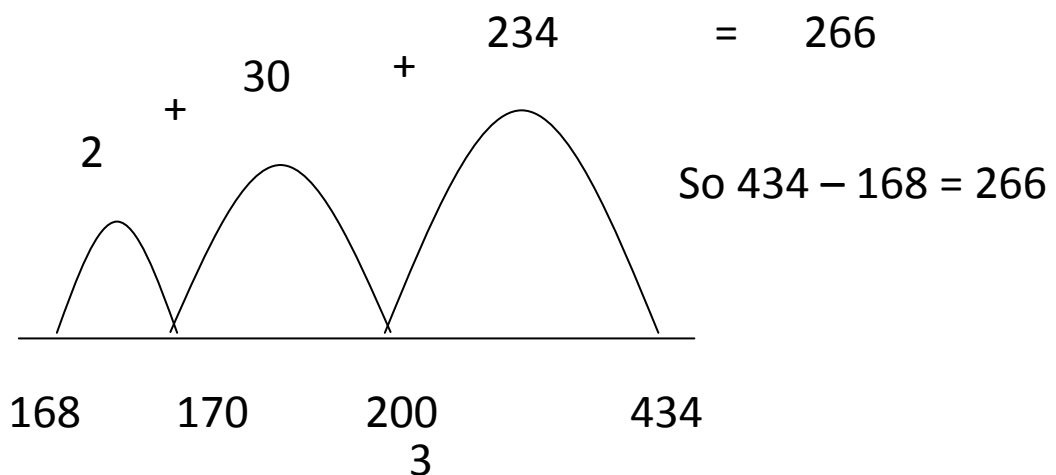
Method 1 (Preferred) - Column subtraction

$$93 - 78 = ?$$

$$\begin{array}{r} {}^8 9 \quad {}^1 3 \\ - 78 \\ \hline 15 \end{array}$$

Method 2 - Number line subtraction

$$434 - 168 = ?$$



Multiplication

Preferred Method (column or traditional method)

$$78 \times 6 = ?$$

$$\begin{array}{r} 78 \\ \times 6 \\ \hline 468 \\ \hline \end{array} \leftarrow \begin{array}{l} \text{carry over} \\ \text{4} \quad \text{4} \end{array}$$

Solution: $78 \times 6 = 468$

The Grid Method (no longer taught in secondary school but many children have been taught this method at primary school)

$$49 \times 23 = ?$$

\times	40	9	total
20	20×40 800	20×9 180	$800 + 180$ 980
3	3×40 120	3×9 27	$800 + 180$ 147
			1127

Solution: $49 \times 23 = 1127$

Division

Preferred Method (Bus Stop)

$$42 \div 3 = ?$$

$$3 \overline{) 42} \begin{array}{r} 14 \\ \underline{42} \\ 0 \end{array}$$

Solution: $42 \div 3 = 14$

Larger Divisors

$$1984 \div 16 = ?$$

$$16 \overline{) 1984} \begin{array}{r} 124 \\ \underline{16} \\ 38 \\ \underline{32} \\ 64 \\ \underline{64} \\ 0 \end{array}$$

Solution: $1984 \div 16 = 124$

Chunking (not taught in secondary school but has been taught in primary)

We use the easy multiplication facts that we know and subtract. . .

$$42 \div 3$$

$$\begin{array}{r} 42 \\ - 30 \quad 3 \times 10 = 30 \\ \hline 12 \\ 12 \quad 3 \times 4 = 12 \\ \hline 0 \end{array}$$

$10 + 4 = 14$

Solution: $42 \div 3 = 14$

Larger Divisors

$$\begin{array}{r} 1984 \\ \underline{1600} \quad 16 \times 100 = 1600 \\ 384 \\ \underline{320} \quad 16 \times 10 = 160 \\ 64 \\ \underline{32} \quad 16 \times 2 = 32 \\ 32 \\ \underline{32} \quad 16 \times 2 = 32 \\ 0 \end{array}$$

$100 + 10 + 10 + 2 + 2 =$
124

Solution: $1984 \div 16 = 124$

Different people may decide to subtract different multiples of 16 at any stage, depending on their knowledge of the times tables.

BIDMAS

B rackets

I ndices

D ivide

M ultiply

A dd

S ubtract

Decimal Place Value

$$2.74 \times 100 = ?$$

The numbers move *not* the decimal point.

E.g.

H	T	U		10^{th}	100^{th}	1000^{th}	
		2	.	7	4	3	$\times 100$

$$\text{Solution: } 2.74 \times 100 = 274$$

Fractions

Fractions – Converting Mixed Fractions to Improper Fractions

$2\frac{1}{3}$ is 2 whole plus $\frac{1}{3}$ → 2 whole is $\frac{6}{3}$; 6 thirds plus one third is $\frac{7}{3}$

$$2\frac{1}{3} = \frac{7}{3}$$

Fractions – Adding and Subtracting

Convert both fractions to equivalent fractions with the same denominator and add

e.g. $\frac{1}{2} + \frac{2}{7} =$

$$\frac{7}{14} + \frac{4}{14} = \frac{11}{14}$$

Fractions – Mutiplying

Cross cancel where possible

e.g. $\frac{5}{6} \times \frac{4}{15} \rightarrow \frac{\overset{1}{\cancel{5}}}{\underset{3}{\cancel{6}}} \times \frac{\overset{2}{\cancel{4}}}{\underset{3}{\cancel{15}}} = \frac{2}{9}$

Percentages

Percentages of an Amount

Method 1 - Partitioning

Find 10% , 1% etc

e.g. 35% of 900

$$\begin{array}{rcl} 10\% \text{ of } 900 & = & 90 \\ 30\% \text{ of } 900 & = & 270 \quad (3 \times 90) \\ 5\% \text{ of } 900 & = & \underline{45} \quad (\frac{1}{2} \text{ of } 90) \\ 35\% \text{ of } 900 & = & 315 \quad (270 + 45) \end{array}$$

Method 2 – Decimal conversion

$$35\% \text{ of } 900 \rightarrow 0.35 \times 900 = \boxed{315}$$

Express one number as a percentage of another

e.g. Express 30 as a percentage of 150

$$\frac{30}{150} \times 100 = 20\%$$

Reverse Percentages

e.g. A price is reduced by 20% - the new price is £320. What was the original price?

$$\frac{320}{80} \times 100 = \text{£}400$$

Ratio and Proportion

-Writing ratios and simplifying

Find Common Factor and divide

E.g. 12 : 3 Common
 factor is 3
 4 : 1

Ratio and Proportion -Direct Proportion

e.g. 5 doughnuts cost £2.40, find the cost of 3 doughnuts.

Find the cost of 1 first.

1 doughnut	$2.40 \div 5$	=	£0.48
3 doughnuts	0.48×3	=	£1.44

Ratio and Proportion -Sharing in a given ratio

e.g. 40 oranges are shared between Bill and Sue in the ratio 5:3.

Bill	5	shares
Sue	3	shares
Total	<u>8</u>	shares

$$40 \div 8 = 5$$

Bill	5×5	=	25
Sue	3×5	=	<u>15</u>
CHECK	→		<u>40</u>

Recommended web sites

mymaths

A huge resource of lessons, tasks and games from KS3 level 3 to A Level

<http://www.mymaths.co.uk/>

Examsolutions.net

Past GCSE and A level papers and video lessons on all higher GCSE and A level lessons. A great resource for catching up on a missed lesson or reviewing work from class.

<http://www.examsolutions.net/index.php>

Mangahigh

Teaching through games

<https://www.mangahigh.com/en-gb/>

BBC Bitesize

Academically focused with tutorials, revision resources and games

<http://www.bbc.co.uk/education/subjects/z6pfb9q>

Maths-games.org

Learn maths whilst having fun

<http://www.maths-games.org/>