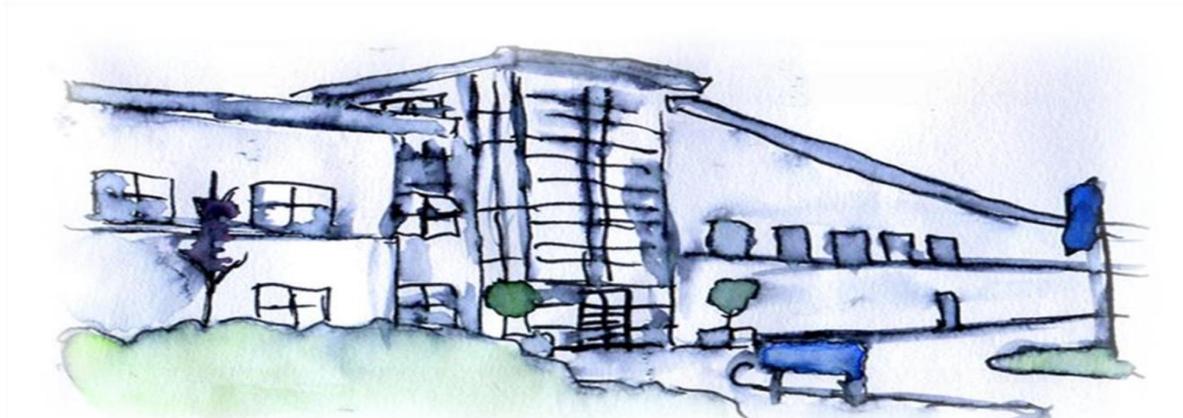


Fazakerley High School



Numeracy Policy 2016



Our Mission Statement:

Fazakerley High School is committed to raising the standards of numeracy of all of its students, so that they develop the ability to use numeracy skills effectively in all areas of the curriculum and the skills necessary to cope confidently with the demands of further education, employment and adult life.

Introduction

The purposes of our whole-school numeracy policy:

- to develop, maintain and improve standards in numeracy across the school;
- to ensure consistency of practice including methods, vocabulary, notation, etc.;
- to indicate areas for collaboration between subjects;
- to assist the transfer of pupils' knowledge, skills and understanding between subjects.

Action:

In order to accomplish the above goals an action plan will be implemented across the school. Each department will have a 'Numeracy representative' who will be responsible for helping to implement some small yet highly beneficial strategies into their department's day-to-day teaching.

FHS Actions	Impact	Evidence
<i>Each department to assign a member of staff to be a 'Numeracy Representative'.</i>	Collaboration between departments will mean there is a raised awareness of how Numeracy can be improved across the curriculum.	List of 'Numeracy Representatives' provided
<i>Numeracy audit to be completed by each department to identify mathematical crossover.</i>	The audit will encourage members of every department to reflect on what areas of Numeracy are used in their subject and what subject knowledge the pupils will need in order to maximise their progress	A completed Numeracy audit from every department and feedback from Numeracy co-ordinator.
<i>Staff to be given basic Numeracy guidelines / made aware of common misconceptions and errors</i>	Making staff aware of common mistakes will allow them to consider these during their lessons and to plan accordingly (where appropriate – The topics needed will vary per department)	Staff provided with information and given time in departmental meetings to review it.
<i>Numeracy specific display to be situated in each classroom.</i>	Staff in each department will be asked to create a display based on the Numeracy audit they completed. The display will help pupils with key areas of Numeracy when they present themselves which will help avoid common errors in other subject areas.	One display should be created by each department and displayed in each classroom
<i>Numeracy slides to be displayed during form time.</i>	A Numeracy slide to be displayed during form time to help pupils with key areas of Numeracy, outline common misconceptions and challenge pupil thinking.	Slides to be built in to form periods over a period of time. 1 slide per week for all form classes.

BASIC NUMERACY GUIDELINES

Whole school subject knowledge

There is a wealth of information and detailed tutorials for many Numeracy topics at: <http://www.mathsgenie.co.uk/grade2.html> . [Note: This site is designed to provide tutorials, example exam style questions AND detailed solutions for anything up to A-level maths]. It is important that staff from all departments ensure they are confident with any Numeracy skills that are necessary for their subject (these will be identified in the departmental audit).

Calculators

Some pupils are over-dependent on the use of calculators for simple calculations. Wherever possible pupils should be encouraged to use mental or pencil and paper methods. It is, however, necessary to give consideration to the ability of the pupil and the objectives of the task in hand. In order to complete a task successfully it may be necessary for pupils to use a calculator for what you perceive to be a relatively simple calculation. This should be allowed if progress within the subject area is to be made. Before completing the calculation pupils should be encouraged to make an estimate of the answer. Having completed the calculation on the calculator they should consider whether the answer is reasonable in the context of the question.

Mental Calculations

Most pupils should be able to carry out the following processes mentally though the speed with which they do it will vary considerably.

- recall addition and subtraction facts up to 20
- recall multiplication and division facts for tables up to 10 x 10.

Pupils should be encouraged to carry out other calculations mentally using a variety of strategies but there will be significant differences in their ability to do so. It is helpful if teachers discuss with pupils how they have made a calculation. Any method which produces the correct answer is acceptable.

eg $53 + 19 = 53 + 20 - 1$

$$284 - 56 = 284 - 60 + 4$$

$$32 \times 8 = 32 \times 2 \times 2 \times 2$$

$$76 \div 4 = (76 \div 2) \div 2$$

Written Calculations

Pupils often use the ' = ' sign incorrectly. When doing a series of operations they sometimes write mathematical sentences which are untrue.

eg $5 \times 4 = 20 + 3 = 23 - 8 = 15$ *since 5×4 DOES NOT = 15

It is important that all teachers encourage pupils to write such calculations correctly.

eg $5 \times 4 = 20$
 $20 + 3 = 23$
 $23 - 8 = \underline{15}$ ✓

Pencil & Paper Calculations

Addition/Subtraction

The most commonly accepted method for these calculations is COLUMN method.
TUTORIALS HERE: <http://www.mathsgenie.co.uk/addition-and-subtraction.html>

EG:

ADDITION

$$\begin{array}{r} 19 \\ + 17 \\ \hline 36 \end{array}$$

SUBTRACTION

$$\begin{array}{r} 2 \cancel{3} 4 \\ - 15 \\ \hline 19 \end{array}$$

Multiplication

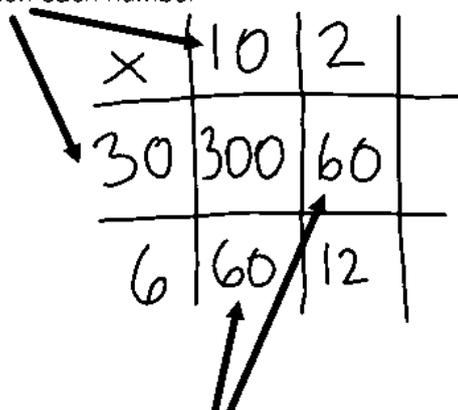
The current best practice for Multiplication is GRID method, however the syllabus is ever changing and we will be encouraging pupils to use formal LONG MULTIPLICATION methods in the future. Both methods are acceptable yet in future exams a mistake in grid method may yield no marks at all (a correct answer using grid method will obtain full marks). TUTORIALS HERE: <http://www.mathsgenie.co.uk/multiplication-and-division.html>

EG:

GRID METHOD

$$12 \times 36 = 432$$

Partition each number



2) Calculate each multiplication

3) Then find the sum of all the products.

EG:

LONG MULTIPLICATION

$$\begin{array}{r} 34 \\ \times 56 \\ \hline 204 \\ 1700 \\ \hline 1904 \end{array} \checkmark$$

Division

We currently use 'BUS-STOP' method (short division) however further changes in the syllabus are encouraging the use of formal LONG DIVISION methods. Both are detailed below...

EG:

Short division method

$$138 \div 6 \qquad \begin{array}{r} 023 \\ 6 \overline{)138} \end{array}$$

EG:

Formal LONG division method

$$\begin{array}{r} 065 \\ 12 \overline{)780} \\ \underline{72} \\ 60 \end{array}$$

Algebra – Common Misconceptions

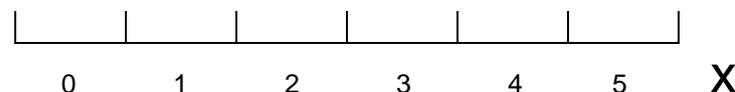
Plotting Points

When drawing a diagram on which points have to be plotted some pupils will need to be reminded that the numbers written **on the axes** must be on the lines not in the spaces.

eg



NOT



Axes

When drawing graphs to represent experimental data it is usual to use the horizontal axis for the variable which has a regular class interval.

eg In an experiment in which temperature is taken every 5 minutes the horizontal axis would be used for time and the vertical axis for temperature.

Having plotted points pupils can sometimes be confused as to whether or not they should join the points. If the results are from an experiment then a 'line of best fit' will usually be needed. Further details appear in the following section on Data Handling.

Data Handling – Common Misconceptions

It is important that graphs and diagrams are drawn on the appropriate paper:

- bar charts and line graphs on squared or graph paper.
- pie charts on plain paper.

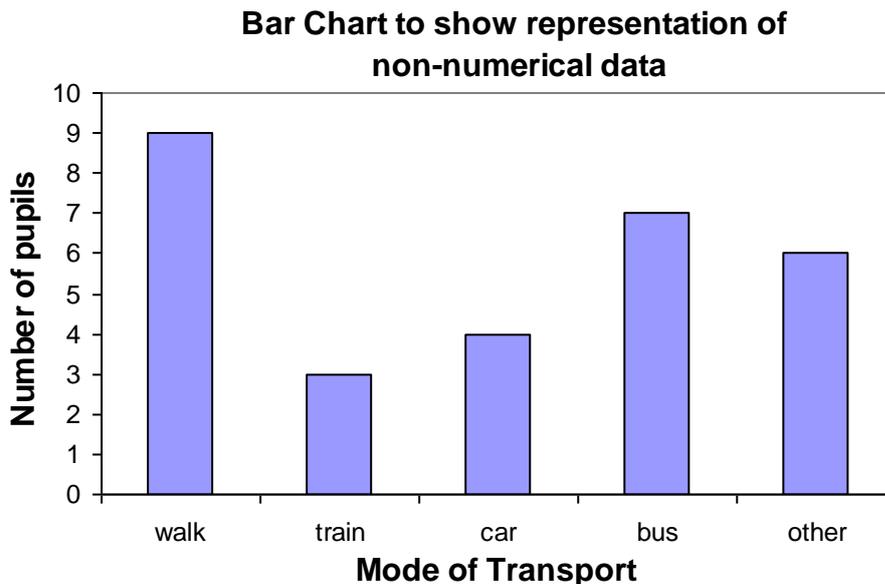
Bar Charts

These are the diagrams most frequently used in areas of the curriculum other than mathematics. The way in which the graph is drawn depends on the type of data to be processed.

Graphs should be drawn with **gaps between the bars** if the data categories are not numerical (colours, makes of car, names of pop star, etc). There should also be gaps if the data is numeric but can only take a particular value (shoe size, KS3 level, etc). In cases where there are gaps in the graph the horizontal axis will be labelled beneath the columns.

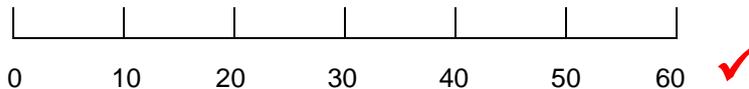
The labels on the vertical axis should be on the lines.

eg.



Where the data are continuous, eg. lengths, the horizontal scale should be like the scale used for a graph on which points are plotted.

eg



NOT



