WEST LAKES ACADEMY

NUMERACY POLICY

DOCUMENT CONTROL

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West Lakes Academy Staff

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NUMERACY

Numeracy is a proficiency that involves confidence and competence with numbers, measures and data. It requires an understanding of the number system, a repertoire of computational skillsand an inclination and ability to solve number problems in a variety of contexts. Numeracy alsodemands practical understanding of the ways in which information is gathered by counting andmeasuring, and is presented in graphs, diagrams, charts, and tables.

Mathematical skills can be consolidated and enhanced when students have opportunities to apply and develop them across the curriculum. Poor numeracy skills hold back students' progress and can lower their self-esteem. To improve these skills is a matter for the Academy as a whole. Each department should identify the contribution it can make towards numeracy and other mathematical skills in their curriculum area so that students become confident at using and applying mathematics in a range of contexts.

The West Lakes Academy policy is that:

Numeracy is a key skill within students' learning and all students are entitled to quality experiences in this area.

The development of numeracy is the responsibility of all staff and the approaches in the Academy should be as consistent as possible across the curriculum.

Curriculum areas will endeavour to ensure that materials presented to students will match theircapability both in subject content and in numerical demands. They will liaise with the Maths department and relevant key stage coordinators when appropriate in order to support their teaching of the numeracy aspect.

All teachers should consider students' ability to cope with the numerical demands of everyday lifeand provide opportunities for students in the following areas:

- Estimation and rounding
- Number and number processes
- Fractions, decimals and percentages
- Substitution and formulae
- Money
- Time
- Measurement
- Data and analysis

Ideas of chance and uncertaintyCurriculum areas should aim:

- To include **key words** and specific referencing that will **support numeracy and learning** in in their area
- **Use the support tools** that will be available throughout the school in different formats
- **Identify cross curricular links** within our whole school curriculum plan
- **Numeracy planning drop-in sessions** have and will be available upon request Furthermore, the shared area will be used to promote and share helpful resources and tools.

Form tutors will take the opportunity to **promote and extend numeracy skills** by:

- utilising the different competitions planned by the Maths department

- promoting and encouraging students to become peer mentors for our numeracy groups
- ensuring good attendance at our tutor time numeracy groups

CROSS-CURRICULAR GUIDANCE

This document should provide information and guidelines to help produce consistency acrossthe curriculum - it is not intended to be a prescription for teaching although some advice is given.

Approaches

- It is recognised that not all students in a teaching group will have the same numerical skillsand where unsure of an appropriate 'numerical level' teachers will consult with the Maths Department.

- All teachers will discourage students from writing down answers only and encourage students to show their numerical working out within the main body of their work.

- All teachers will encourage the use of estimation particularly for checking whether an answer is sensible within context.

- All teachers will encourage students to write mathematically correct statements.

- It is recognised that there are often several ways in which to complete calculations; students will be encouraged to develop their own correct mathematical reasoning where appropriate rather than be taught 'set' ways.

- Wherever possible students will be allowed and encouraged to 'vocalise' their maths by explaining the processes - a necessary step towards full understanding for many students.

- All students should be helped to understand the methods they are using or being taught - students gain more and are likely to remember much more easily if they understand ratherthan are merely repeating by rote.

Calculators

In order to improve numeracy skills, it is essential that students should be encouraged to usenon-calculator methods when appropriate. Departments should ensure students have access to calculators when they are necessary.

The Maths Department use Casio fx-83GTX & fx-85GTX scientific calculators. Maths teachers also have calculator emulators which project an electronic copy of the calculator for use on the interactive boards.

It is recognised that where calculators are to be used their correct use may have to be taught. Teachers should also encourage students to estimate answers before using the calculators to improve number ‘sense’.

Methods and Presentation

Where a student is gaining success with a particular method it is important that s/he is not confused or forced to use another method. This does not disallow the possibility of introducingalternatives in order to improve understanding or as part of a lesson

deliberately designed to investigate alternative methods, provided students can manage this without confusion.

Working Out

In all arithmetic, the importance of place value and neat column keeping should be stressed.In a line of workings an "equals" sign should only appear once.

This is poor practice: £3.50 x 0.85 = 2.975 + 3.50 = 6.475 = £6.48

This is good practice: £3.50 x 0.85 = 2.975
2.98 + 3.50 = £6.48

Within Maths lessons students are encouraged to work down a page not across.

Language

When referring to decimals say "three point one four" rather than "three point fourteen".

Read numbers out in full, so say three thousand four hundred rather than three, four, zero, zero.

It is important to use the correct mathematical terminology and students must be aware that the mathematical definition is not always the same as the meaning used in written and spoken English, for example “term”. A more detailed example is below:

Students should use the correct terminology for the type of average being used, i.e. mean, median or mode, rather than “average”.

Mean	Total of values of sample ÷ sample size.
[The term average is commonly used when referring to the mean]	
Median	Middle value of sample when the sample values are arranged in ordersize.
Mode	Sample values which occur most frequently.

Checking

Encourage students to check divisions by multiplication and subtractions by adding (usinginverse operations).

Rough Conversions between Metric and Imperial

In the Maths Department we use the following conversions:

1 inch ≈ 2.5 cm	1 yard ≈ 1 m	1 kg ≈ 2.2 lbs
2 pints ≈ 1 litre	1 mile ≈ 1.6 km	1 oz ≈ 25 g

Students should be expected to record the units they are using when answering a question.

Standard Form

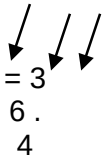
Students need to be aware of how their calculators express standard form (or scientific form) and what it means.

E.g. on some calculators $5 \div 200 = 2.5\text{x}10^{-2}$

It should be noted that it is equivalent to 0.025

Multiples of ten

When multiplying by ten do not teach the 'rule' add a nought or move the decimal point along one but rather explain that the numbers move one place to the left relative to the decimal place.So 3.64 x 10



= 36.4

Time

Students should never record 3hrs and 30 mins as 3.30hrs but as 3.5hrs.

[When working with time it is possible to use the degrees/mins/secs key on many calculators.]

Equations

The terms "cross-multiply" and “swap sides – swap signs” can lead to misunderstandings, as part of any explanation of how to solve equations and so should be avoided.

To teach solution of linear equations we use the 'balancing method'

Balance Method

$3x - 7 = 5$ (add 7 to both sides)
$3x - 7 + 7 = 5 + 7$
$3x = 12$ (divide both sides by 3)
$3x \div 3 = 12 \div 3$
$x = 4$

Guidelines for Constructing/Using Graphs and Charts

Students should be encouraged to:

- use a sharp pencil.
- label both axes and give a title
- use independent variable on *x*-axis, and dependent variable on the *y*-axis, e.g.: if graphing temperature of a cooling liquid, time should go on the *x*-axis and temperature on the *y*-axis. [The temperature of the liquid is dependent on the time of the reading.]
- label lines not spaces, unless a bar-chart with discrete data
- use equally spaced intervals
- use convenient scales
- mark points by a small cross not a dot
- draw graphs on squared or graph paper
- to draw graphs of a sensible size

Students should be exposed to bar charts, pie charts, pictograms, frequency polygons, scatter graphs and line graphs. Histograms and cumulative frequency are only tackled by higher tier students.

Students need to be taught when each type of graph is appropriate. (This is very important as students will generally produce the type of graph they last met without much thought to appropriateness.)

Bar-Charts the bars should be of equal width and equally spacedthe bars should not touch for discrete data
frequency should be on the **y** (vertical) axis.

Discrete Data

Data is described as discrete if specific values only can be used (data can be counted), e.g. shoe size is discrete assizes such as 4.8 and 5.77 cannot exist.

Continuous Data

Data is described as continuous if all values can exist (data is measured), e.g. height and weight are continuousdata as potentially any value could be measured.

Pie Charts

Sectors should be labelled (e.g. Car, Blue….) or there should be a key.

Histograms

Do not use the term histogram unless the bar widths are unequal and relative frequency is plotted along the y axis. Students need to appreciate the connection between the area and the frequency.

Scaling

If axes do not start from zero, a break represented by a zig-zag line should be shown on the axis.