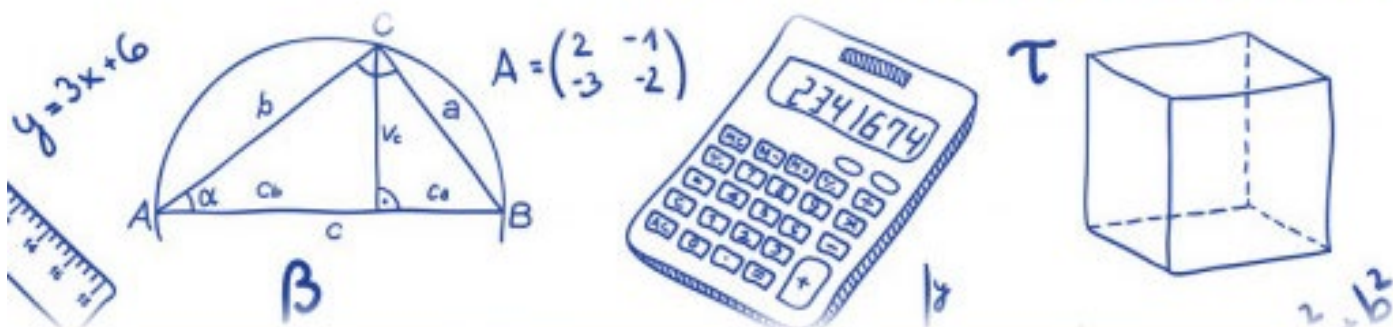




EWA Mathematics



Empower | Respect | Aspire

Numeracy across the Curriculum

Definition

Numeracy is a proficiency which involves confidence and competence with numbers and measures. It is more than an ability to do basic arithmetic and requires an understanding of the number system, repertoire of mathematical techniques and an inclination and ability to solve quantitative or spatial problems in a range of contexts. Numeracy also demands understanding of the ways data is gathered and presented.

Aims of the strategy

EWA is committed to raising the standards of numeracy of all 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. The Academy will promote numeracy throughout the curriculum in a consistent and efficient manner by:

- Raise standards of numeracy by enhancing the quality of learning and teaching
- Implement appropriate procedures for the monitoring and evaluation of the delivery of numeracy throughout the school
- Provide staff training where necessary and raise the profile of numeracy within the school.

Characteristics of a numerate student

- Confident and competent at performing calculations involving number
- Can use a range of techniques to carry out computations mentally and on paper
- Knows and understands the properties of number
- Can explain methods and justify reasoning & conclusions, using correct mathematical terms
- Can use calculators and other ICT resources appropriately and effectively to solve mathematical problems, and select from the display the number of figures appropriate to the context of the calculation
- Can recognise and use mathematical skills and techniques in a variety of contexts.

Numeracy Intervention

Targeted intervention will be used after gap analysis to support pupils to catch up with their peers as quickly and effectively as possible in order to maximise access to the secondary curriculum. Teachers across the curriculum will be kept informed about which pupils are participating in Numeracy intervention. Teachers will be familiar with the content Numeracy intervention to ensure they can provide links into their subject area and give pupils opportunities to practice their skills. Intervention in year 10 and 11 will be focused on revision techniques within a numeracy context.

Equal opportunities

All children should have equal access to the curriculum, irrespective of particular circumstances such as race, background, gender and capability. In the daily Mathematics lesson we support children in a variety of ways.

Consistency of Practice

Teachers of mathematics should:

- Be aware of the mathematical techniques used in other subjects and provide assistance and advice to other departments, so that a correct and consistent approach is used in all subjects.
- Provide information to other subject teachers on appropriate expectations of students and difficulties likely to be experienced in various age and ability groups.
- Through liaison with other teachers, attempt to ensure that students have appropriate numeracy skills by the time they are needed for work in other subject areas.
- Seek opportunities to use topics and examination questions from other subjects in mathematics lessons

Teachers of subjects other than mathematics should:

- Ensure that they are familiar with correct mathematical language, notation, conventions and techniques, relating to their own subject, and encourage students to use these correctly.
- Be aware of appropriate expectations of students and difficulties that might be experienced with numeracy skills.
- Provide information for mathematics teachers on the stage at which specific numeracy skills will be required for particular groups.
- Provide resources for mathematics teachers to enable them to use examples of applications of numeracy relating to other subjects in mathematics lessons

Evaluation of The EWA Numeracy Strategy

The Numeracy strategy will be monitored and reviewed through:

- The Whole School and Departmental Development Plans
- Lesson observations
- Sampling of pupils' work
- Encouraging departments to share good practice by exemplifying pupils' work
- Scrutiny of departments schemes of learning
- Discussion with students, staff, parents and governors
- Reviewing planning
- Analysing assessment data

Transfer of Skills

"It is vital that as the skills are taught, the applications are mentioned and as the applications are taught the skills are revisited."

The transfer of skills is something that many pupils find difficult. It is essential to start from the basis that pupils realise it is the same skill that is being used; sometimes approaches in subjects differ so much that those basic connections are not made.

Subject areas are more aware of the underlying maths skills and approaches that go with the applications that they use. Some mathematical opportunities across the curriculum are listed below.

Subject	
Arts	<ul style="list-style-type: none"> • Use standard measures to find length • Form repeating patterns (tessellations), making use of reflection, rotation and translation. • Use of paint mixing as a ratio context. • Many patterns and constructions in our own and other cultures are based on spatial ideas and properties of shapes, including symmetry. • Calculating the golden ratio in pictures/drawings (Mona Lisa) • Perspective and scale • Drawing in 3 dimensions

Subject	
Business Studies	<ul style="list-style-type: none"> • Estimation from spreadsheets • Use of mathematical vocabulary e.g. sum, profit • Sketching graphs to show change over time • Accurate graph drawing including labelling axes • Sampling and surveying in market research • Designing data collection sheets • Producing and interpreting averages and charts • Costings • Ratio • Formulae • Awareness of sensible answers – approximate calculation including percentages, fractions, multiplication, division etc.
Design Technology	<ul style="list-style-type: none"> • Use standard measures (metric and imperial) to find length, mass, time, force, temperature area or capacity. • Use mathematical symbols and notation, construct and interpret graphs and charts. • Use scale and ratio to produce drawings. • Using ruler, compass, protractor correctly • Using recipes as a ratio/proportion context • Estimation of quantities or of results of calculations • Sampling and surveying • Reading scales on equipment • Converting between units • Drawing in 2 dimension or 3 dimensions, including plans and elevations • Time planning including Gantt charts, timelines etc. • Pricing the cost of a meal/product
English	<ul style="list-style-type: none"> • Comparison of 2 data sets on word and sentence length. • Graph sketching i.e. tension throughout an act of a play • Use of fractions and percentages in persuasive writing including misleading graphs • Reading and writing numbers, identifying centuries • Coding, secret codes • Grouping/categorising ideas/words
Geography	<ul style="list-style-type: none"> • Use mathematical symbols and notation, construct and interpret graphs and charts. • Use grids to identify position (links to co-ordinates and grid references). • Use negative numbers to interpret below sea level. • Use standard measures (metric and imperial) to find length, mass, time, force, temperature area or capacity, especially distance and area. • Discussing evidence in history or geography may involve measurement, estimation and approximation skills, and making inferences. • Pupils will make statistical enquiries, for example, in analysing population data to explore and compare lifestyles; they will also use a wide range of measurements and rates of change. • The study of maps includes the use of coordinates and ideas of angle, direction, position, scale and ratio.
Global Education	<ul style="list-style-type: none"> • Use mathematical symbols and notation, construct and interpret graphs and charts. • Use standard measures (metric and imperial) to find length, mass, time, force, temperature area or capacity. • Use timelines and interpret negative numbers. • Consider infinity and the meaning of this conceptually • Reflect on logic and the process of constructing a sound argument • Belief and likelihood in religious education, or risk assessment in PSHE, relate well to work in mathematics. The discussion of moral and social issues is likely to lead to the use of primary and secondary data and the interpretation of graphs, charts and tables, helping pupils to make reasoned and informed decisions and to recognise biased data and misleading representations. By applying mathematics to problems set in financial and other real-life contexts, pupils will develop their financial capability and awareness of the applications of mathematics in the workplace.
History	<ul style="list-style-type: none"> • Use timelines and interpret negative numbers. (AD and BC) • Use fractions and percentages to express and compare proportions • Use scale to interpret maps and diagrams • Use mathematical symbols and notation, construct and interpret graphs and charts.

Subject	
ICT	<ul style="list-style-type: none"> • Use mathematical symbols and notation (sigma for sum), construct and interpret graphs and charts. • Use formulae to calculate and to interpret data in spreadsheets. • In ICT lessons, pupils will collect and classify data, enter them into data-handling software, produce graphs and tables, and interpret and explain their results. Their work in control will include the measurement of distance and angle. • Spreadsheet skills, used in modelling and simulations, rely on the numeric, algebraic and graphical skills involved in constructing formulae and generating sequences, functions and graphs.
MFL	<ul style="list-style-type: none"> • Use dates, sequences and counting in other languages • Use basic graphs and surveys to practise foreign language vocabulary and reinforce interpretation of data. • Use of and calculation with money • Conversion/exchange rates • Directions
Music	<ul style="list-style-type: none"> • Use addition of fractions in bar music • Use counting for beats • Use sound waves, frequency and oscillations • Use graph sketching to demonstrate change over time e.g. in dynamics over a piece
PE	<ul style="list-style-type: none"> • Use time, height and distance in measurements. • Telling the time, timekeeping • Reading from scales using measuring equipment • Calculation of speed, acceleration, deceleration and graphing of these over time during an action/event • Use fractions to identify time. • Design data collection sheets. • Collect and record real data, find the averages, compare and draw conclusions. • Sequencing results (decimals, lengths etc) • Scoring • Athletic activities use measurement of height, distance and time, and data-logging devices to quantify, explore, and improve performance. • Ideas of counting, time, symmetry, movement, position and direction are used extensively in music, dance, gymnastics, athletics and competitive games. E.g. angles, rotation, planes, axes
Science	<ul style="list-style-type: none"> • Use formulae to calculate work, power, mass, density • Rearrange formulae • Use graphs to represent data, interpretation of graphs • Estimating quantities or results of calculations • Use standard measures to find length, mass, time, force, temperature, area or capacity. • Hypothesise before an experiment, consider limitations to findings afterwards • Manipulate numerical data from their experiments and do calculations including averages. • Record results in tables – choose appropriate form and design data collection sheets • Use mathematical symbols and notation, construct and interpret graphs and charts. • Constructing graphs, extrapolating, recognising patterns • Take readings from scales.