Alcester Academy

TO BE THE BEST THAT WE CAN BE

Numeracy across the Curriculum Policy

Review Cycle	2 Years- Summer Term
Review By	Leadership Team, Qu of Ed/HR Sub-Committee
Contents	Introduction & Contextual Information; Raising Standards; Consistency of Practice; Our Areas of Collaboration; Appendices

Introduction & Contextual Information

The purpose of this policy:

- to develop, maintain and improve standards in numeracy across the academy.
- to ensure consistency of practice including methods, vocabulary, notation, etc.
- to indicate areas for collaboration between subjects especially science and other STEM departments.
- to assist the transfer of pupils' knowledge, skills and understanding between subjects.
- to maintain or boost pupils' basic numeracy skills through context questioning including basic operations, time, and money calculations.

Context:

Along with literacy, numeracy needs to be at the forefront of every pupils learning. The messages sent around the academy need to be positive, consistent and in line with methods derived from the Mathematics Department.

A current definition of numeracy:

Numeracy is a proficiency which is developed mainly in mathematics but also in other subjects. It is more than an ability to do basic arithmetic. It involves developing confidence and competence with numbers and measures. It requires understanding of the number system, a 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 in which data are gathered by counting and measuring, and presented in graphs, diagrams, charts and tables.

(Framework for Teaching Mathematics – Years 7 to 9 – DfES)

Aims:
For effective numeracy, pupils should:
- Understand mental strategies and use them to successfully break down questions.
- Write legibly, putting mental strategies onto paper.
- Ensure all scales/graphs/charts are fully checked before starting the questions.
- Apply the skills of mental/written/graph work to other subjects.
- To boost confidence in Mathematics with pupils developing a growth mindset towards the subject.
- To support the memory and retention of key numeracy skills.
- Have a developing mathematics vocabulary which can be applied to real life contexts and scenarios.

1.   Raising Standards

1.1 The 'Numeracy Community':

A community of dedicated and inspirational 'Numeracy Leaders' has been developed. The Numeracy Leaders are available to provide mentoring and support to other pupils, contribute to resources and guide their peers to develop more fluent numeracy skills. Numeracy Leaders are also available to support numeracy skills across subjects and highlight key crossover topics (where applicable). Peer to peer mentoring ensures the promotion of positive attitudes towards numeracy and mathematics whole school.

1.2 Roles and Responsibilities:

1.2a All teachers and in-class support staff across the curriculum:

Contribute to pupils' development of numeracy, owing to the fact that mathematical skills are integral to many lessons around the academy.

1.2b Numeracy Coordinator:

- Supports departments in the embedding of strategies to support the growth of numeracy development.
- Manages the implementation of new numeracy initiatives alongside ensuring current numeracy provision is maintained and effective in its aims (including oversight of the UK MT Maths Challenge).
- Manages the Pupil Numeracy Leaders and supports in helping them carry out their roles and responsibilities effectively whole school.
- Chairs (alongside the Literacy Coordinator) and runs the Working Action Group for Literacy and Numeracy with the aim to share numeracy strategies across all subjects.
- Delivers CPD throughout the academic year to ensure up to date strategies and initiatives are shared.
- Supports other teachers within the Academy with the delivery of numeracy aspects of their course.

1.2c The Mathematics Department:

Provides pupils with initial knowledge. Acts as a support unit for those teachers who identify their own numeracy needs and seek to improve these in order to promote high levels of numeracy and interdisciplinary links to the students they teach effectively.

1.2d Pupil Numeracy Leaders:

Pupils who have the confidence and high-level numeracy skills to demonstrate and train others with, are given the opportunity to excel and to lead in this area. They are identified by the mathematics faculty from their work in the classroom and they are selected to ensure that the pupil community is represented. It is essential that numeracy leading is used to raise the aspirations and skills of pupils from all backgrounds.

Pupil Numeracy Leaders have a role in the subjects that they study across the curriculum. Typically, they might support their peers in terms of the specific numeracy skills that are required to complete a certain task, progress towards a certain level, or achieve a specific goal.

Numeracy leaders are identified by pin badges and displays to raise their profile whole school- all teachers are aware of which leaders they have in each of their classes as highlighted on their class context sheets and pupils are aware of whom, amongst their peers, the leaders are.

Numeracy Leaders are the lead team for conducting primary school visits across our local primary schools. Typically, they are available to deliver targeted skill-based numeracy sessions to local primary school pupils and support with the delivery of numeracy skills at the Alcester Academy Numeracy and Literacy Day for Year 6 pupils in the Summer Term.

Numeracy Leaders take ownership of the planning and delivery of House competitions whole school.

The Mathematics Department are at the heart of numeracy across the curriculum and are keen for their skills to be shared across the academy. Numeracy skills are taught explicitly in Years 7 and 8, with schemes of work and resources being based around the practice of these skills. This continues throughout the GCSE years.

1.3 Additional Resources:

1.3a SEND

Pupils identified as SEND are supported very closely with their numeracy needs. They have learning support assistants in their lessons and one to one support is in place for pupils who are struggling with numeracy, which is built into their pupil profiles (where applicable). The results of this have proved very positive in terms of preparing pupils for the demands of GCSE. The mathematics department work closely with the SEND action group and Numeracy Coordinator to implement key strategies to support SEND pupils.

1.3b Most Able

The Numeracy Leaders that have recently been introduced are generally 'Most Able' in Mathematics. By the mentoring of other pupils, their own learning is being stretched to its fullest capacity. Through this mentoring opportunity, pupils have to develop different methods that are accessible to others and therefore getting a richer and deeper understanding of the subject.

The focus of numeracy across the curriculum is based around the effective transfer of skills across subjects and enables pupils to set their own challenges and to progress towards a better understanding at a faster rate. The most able pupils take part in the UKMT junior and intermediate mathematics challenge each year for a chance to enhance their higher problem-solving skills in line with the new GCSE framework.

At the Academy most able pupils are offered and actively encouraged to pursue Further Mathematics and Statistics as additional qualifications. GCSE Further Mathematics bridges the gap between GCSE and A Level Mathematics, thus raising pupil aspirations to empower pupils to continue Mathematics post-16.

2. Consistency of Practice

2.1 Assessing numeracy across the curriculum:

All departments have completed a numeracy audit which is regularly reviewed by the Numeracy Coordinator. The findings from these audits dictate the training needed for the Numeracy Leaders.

Teachers are aware of the numeracy policy and to use appropriate strategies for addressing numeracy in their subject areas. When an opportunity arises in lessons, numeracy leaders can be used to help other pupils and even support the teachers in some scenarios.

Assessment of teachers' use of numeracy in lessons is conducted through departmental self-evaluation and sharing good practice. This good practice and further monitoring of numeracy is identified through lesson observations, learning walks, sharing resources and learning looks.

2.2 Teachers of mathematics should:

2.2a 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.

2.2b Provide information to other subject teachers on appropriate expectations of students and difficulties likely to be experienced in various age and ability groups.

2.2c 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.

2.2d Seek opportunities to use topics and examination questions from other subjects in mathematics lessons.

Teachers of subjects other than mathematics should:

2.3a Ensure that they are familiar with correct mathematical language, notation, conventions and techniques, relating to their own subject, and encourage pupils to use these correctly.

2.3b Be aware of appropriate expectations of pupils and difficulties that might be experienced with numeracy skills.

2.3c Provide information for mathematics teachers on the stage at which specific numeracy skills will be required for particular groups.

2.3d Provide resources for mathematics teachers to enable them to use examples of applications of numeracy relating to other subjects in mathematics lessons.

2.3e Plan for Pupil Numeracy Leads to support their peers in lessons as and when the opportunity arises.

3. Our Areas of Collaboration and Transfer of Skills

3.1
The Mathematics team will deliver the National Curriculum knowledge, skills and understanding through the Numeracy Strategy Framework using direct interactive teaching, with a focus predominantly on "The Learning Pathway". They will make references to the applications of Mathematics in other subject areas and give contexts to many topics. Other curriculum teams will build on this knowledge and help pupils to apply them in a variety of situations. Liaison between curriculum areas is vital to pupils being confident with this transfer of skills and the Mathematics team (and Pupil Numeracy Leads) willingly offers support to achieve this.

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.

3.2
We are in the process of making interdisciplinary links with all subject areas; in particular we are focusing on:

ART

- Symmetry
- Use of paint mixing as a ratio context
- Proportion and use of scale
- Rotation
- Reflection
- Distortion and use of angles
- Tessellation

ENGLISH

Comparison of 2 data sets on word and sentence length, visual representations of emotions and behaviour throughout a story, structuring written pieces using flow charts etc.

- Understanding subject-specific vocabulary
- Reading presented problems.
- Comprehension of the structure of questions formulated.

FOOD TECHNOLOGY

- Reading scales/ Conversions
- Proportion
- Ratios (Recipes)
- Percentages

GEOGRAPHY

- Numbers for measurement- temperatures, percentages, distances, river flows.
- Numbers as coordinates- grid references and latitude/longitude.
- Comparative data- ratios such as population density or GNP.
- Contextual numeric data- to give a sense of scale and importance e.g. rainfall totals, value of trade, population numbers.
- Visual quantitative data- tables, charts, graphs, choropleth, maps, isolines.
- Data for solving problems/ undertaking enquiries- decision making activities, fieldwork data, statistical techniques.

HISTORY

- Timelines
- Sequencing events
- Charts and graphs.

ICT

- Representing data; considered use of graphs and the use of spreadsheets.
- Problem solving tasks
- Practicing of number skills
- Exploring patterns and relationships

MFL

- Dates, sequences and counting in other languages
- Use of basic graphs and surveys to practice foreign language vocabulary and reinforce interpretation of data.
- Telling time digital/analog

MUSIC/ PERFORMING ARTS

- Addition of fractions, timings of notes and half beats.

- Pupils use and develop numeracy as they learn in music when they use calculation, estimation and measurement knowledge and skills to collect and make sense of information.
- Speech, chants and songs using musical concepts such as counting beats and rhythm patterns. Rhythm in music links to patterns and algebra, whole numbers, multiplication and division in mathematics.
- Musical concepts such as duration (beat, rhythm, metre, tempo), dynamics, structure and own symbol systems (graphic notation) explore the division of beats using graphic and stick notation, dynamic symbols, identifying and mapping formal musical structure.
- Formal symbols (notation), more complex musical concepts such as groupings, accents, metres, patterns and sequences. Play and recognise patterns in music such as a riff (or ostinato).
- Explore the difference in measurement between large and small-scale sized instruments and their tone colour or pitch/tone.
- Listen, respond, and arrange pieces using addition and subtraction of instruments explores musical texture and structure.

PHYSICAL EDUCATION

- Calculation
- Measurements – E.g. Height, weight, body mass index
- Speed
- Distance
- Capacity
- Chance and data
- Spatial reasoning
- Rankings and score keeping
- Percentages and statistics
- Biomechanics – E.g. Angles, forces
- Analysing performance data
- Identifying patterns

RELIGIOUS STUDIES

- Interpretation and comparison of data gathered from secondary sources (internet) on e.g. developing and developed world, displaying data systematically.
- Mapping- draw maps to an approximate scale
- Timelines to depict historical Religious data
- Numbers to read Bible or Quran References
- Time difference between
- BC (Before Christ) and AD (Anno Domini)
- Graphs of data related to Religious Studies topics
- Statistics to interpret information eg current trends in family life

- Percentage eg: of religions in the UK, abortions, marriages, divorces etc
- Tessellation in patterns at places of worship
- Symmetry eg: Khanda, Buddhist Wheel
- Money & Finance poverty, causes of debt etc
- Pattern - reoccurring religious festivals
- Shapes 2D and 3D

RESISTANT MATERIALS AND TEXTILES

- Measuring- pupils should use the metric and International System of Units (SI) system but also be aware that some materials and components retain the use of imperial units.
- Ratios, fractions and percentages.
- Surface area and volume.
- Presentation of data, diagrams, bar charts and histograms.
- Angular measures in degrees.
- Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects.
- Calculate areas of triangles and rectangles, surface areas and volumes of cubes

SCIENCE

1) Arithmetic and numerical computation

- Recognise and use expressions in decimal form.
- Recognise and use expressions in standard form.
- Use ratios, fractions and percentages.
- Make estimates of the results of simple calculations.

2) Handling data

- Use an appropriate number of significant figures.
- Find arithmetic means.
- Construct and interpret frequency tables and diagrams, bar charts and histograms.
- Understand the principles of sampling as applied to scientific data (biology questions only)
- Understand simple probability (biology questions only)
- Understand the terms mean, mode and median.
- Use a scatter diagram to identify a correlation between two variables (biology and physics questions only)
- Make order of magnitude calculations

3) Algebra

- Understand and use the symbols: =, <>, >, $\propto$, ~
- Change the subject of an equation
- Substitute numerical values into algebraic equations using appropriate units for physical quantities (chemistry and physics questions only)
- Solve simple algebraic equations (biology and physics questions only)

4) Graphs

- Translate information between graphical and numeric form.
- Understand that $y = mx + c$ represents a linear relationship.
- Plot two variables from experimental or other data.
- Determine the slope and intercept of a linear graph.
- Draw and use the slope of a tangent to a curve as a measure of rate of change (chemistry and physics questions only)
- Understand the physical significance of area between a curve and the x-axis and measure it by counting squares as appropriate (physics questions only)

5) Geometry and trigonometry

- Use angular measures in degrees (physics questions only)

- Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects (chemistry and physics questions only)
- Calculate areas of triangles and rectangles, surface areas and volumes of cubes.

Signed: _____   **Chair of Qu of Ed Sub**

Signed: _____   **Headteacher**
Mrs S Mellors

Date: _____

(Ratified by the Qu of Ed Sub on 8.7.25)

Appendices

1.1 Upon arrival to the academy these are the expected start points:

- Have a sense of the size of a number and where it fits in the number system.

- Know number bonds by heart e.g. tables, doubles and halves.

- Use what they know by heart to work out answers mentally.

- Calculate accurately & efficiently using a variety of strategies, both written & mental.

- Recognise when AND when not to use a calculator, using it efficiently if needs be.

- Make sense of number problems, including non-routine problems, and recognise the operations needed to solve them.

- Explain their methods and reasoning using correct mathematical terms.

- Judge whether their answers are reasonable and have strategies for checking.

- Suggest suitable units for measuring.

- Make sensible estimates for measurements.

- Explain and interpret graphs, diagrams, charts and tables.

- Use the numbers in graphs, diagrams, charts and tables to predict.

(Taken from DfE guidance)

Appendices

1.2 By the end of KS3 pupils should:

- Have a sense of the size of a number and where it fits into the number system.

- Recall mathematical facts confidently.

- Calculate accurately and efficiently, both mentally and with pencil and paper, drawing on a range of calculation strategies.

- Use proportional reasoning to simplify and solve problems.

- 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 a calculation.

- Use simple formulae and substitute numbers in them.

- Measure and estimate measurements, choosing suitable units and reading numbers correctly from a range of meters, dials, and scales.

- Calculate simple perimeters, areas, and volumes, recognising the degree of accuracy that can be achieved.

- Understand and use measures of time and speed, and rates such as £ per hour or miles per litre.

- Draw plane figures to given specifications and appreciate the concept of scale in geometrical drawings and maps.

- Understand the difference between the mean, median and mode and the purpose for which each is used.

- Collect data, discrete and continuous, and draw, interpret and predict from graphs, diagrams, charts, and tables.

- Have some understanding of the measurement of probability and risk.

- Explain their methods, reasoning, and conclusions, using correct mathematical terms.

- Judge the reasonableness of solutions and check them when necessary.

- Give their results to a degree of accuracy appropriate to the context.