



Saint GREGORY'S
Bath

Numeracy Policy

Title:	Numeracy Policy	
Prepared By:	Mari Davies, Head of Mathematics	23/01/2024
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23.01.24	Policy reviewed and updated by Head of Mathematics

In Christ we Flourish

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Statement of intent

St Gregory's, Bath, is committed to raising the standards of numeracy of all of its students. It is intended that they develop the ability to use numeracy skills effectively in all areas of the curriculum as well as the skills necessary to cope confidently with the demands of further education, employment and adult life.

Through the teaching of mathematics, the school aims to:

- Encourage all students to engage in the maths curriculum.
- Promote enjoyment of learning through a combination of practical activity, exploration and discussion.
- Promote confident engagement and competence with numbers and the number system.
- Develop the ability to solve problems through decision-making and reasoning in a range of contexts.
- Develop a practical understanding of the ways in which information is gathered and presented.
- Explore features of shape and space and develop measuring skills in a range of contexts.
- Understand the importance of mathematics in everyday life.
- Achieve a functional level of numeracy.

The purposes of our whole-school numeracy policy are:

- to develop, maintain and improve standards of numeracy across the school.
- to improve consistency of practice including methods, vocabulary and notation.
- to help identify areas for collaboration between different subject areas.
- to assist with the transfer of students' knowledge, skills and understanding between subjects.

1. Background

1.1 This policy has due regard to statutory guidance, including, but not limited to, the following:

- DfE (2023) 'Keeping children safe in education'
- DfE (2013) 'Mathematics programmes of study: key stage 3'
- DfE (2014) 'Mathematics programmes of study: key stage 4'

1.2 What is numeracy?

Numeracy is an individual's capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgements and to use and engage with mathematics in ways that meet the needs of that individual's life as a constructive, concerned and reflective citizen. Being numerate means that people are able to use mathematics to make decisions in their day-to-day adult life and work. Without a reasonable level of numeracy people may not be able to manage their money through to pay-day, plan journeys or understand interest rates, medical information or promotional offers.

Being numerate may vary from person to person according to their age, interests, responsibilities or jobs and numeracy can be broken down into three levels:-

2. Essential, e.g. managing money, telling the time, using measure.
3. Important, e.g. calculating interest, planning a journey, converting measure.
4. Specific numeracy that is required to fulfil a role or job.

1.3 Why is developing numeracy important?

The skills for life survey showed that numeracy skills in England declined in the eight years from 2003. One in four economically active adults are functionally innumerate. Every year more than 300,000 sixteen year olds conclude their GCSE Maths course unable to function properly in either their work or personal lives.

Poor numeracy is a major, long-standing problem in education, business and indeed society.

Many commentators, as well as those affected, have argued that it has been neglected as a national issue for far too long.

According to a 2011 Skills for Life survey, almost 17 million adults in the UK have numeracy skills below those needed for the lowest grade at GCSE. The results from this survey are based on a sample of 7,000 adults aged between 16 and 65 normally resident in England. The low levels of numeracy were just as evident in the 16-25 year old cohort as in any other subgroup – and these are the learners who have gone through secondary school during the last ten years.

5. Roles and responsibilities

5.1. Overall responsibility for numeracy throughout the school lies with the Numeracy Co-ordinator and the Head of Mathematics.

5.2. The Numeracy Co-ordinator is responsible for:

- Co-ordinating a termly focus and providing resources for all classrooms.
- Producing and updating resources for key words and phrases.

- Co-ordinate numeracy ambassadors within each faculty.
- Provide resources for PSHE sessions, including sixth form enrichment sessions based on personal finance.
- Providing support for staff where necessary.
- Encouraging staff to provide effective learning opportunities for students.
- Helping to develop colleagues' expertise in the subject.
- Communicating developments in the subject to all teaching staff.
- Advising on the contribution of numeracy to other curriculum areas, including cross-curricular and extra-curricular activities.

5.3. The Numeracy Co-ordinator will also be responsible for overseeing the implementation and review of this Numeracy Policy, in collaboration with the Headteacher and Governing Body.

5.4. Numeracy ambassadors are responsible for:

- Acting in accordance with and promoting this policy.
- Identifying some areas of numeracy within their subjects and informing the Numeracy Co-ordinator and provide information on the stage at which specific numeracy skills will be required for particular groups.
- 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.
- Communicating with the Numeracy Co-ordinator to develop strategies for improving identified areas of numeracy within their subjects.
- Co-ordinating and informing other teachers within their subject.
- Imbedding some areas of numeracy within their subject's Scheme of Work.
- Be aware of appropriate expectations of students and difficulties that might be experienced with numeracy skills.
- Provide resources for mathematics teachers to enable them to use examples of applications of numeracy relating to other subjects in mathematics lessons.
- Encourage those who lack confidence in maths to either ask for support, or at a minimum, not to use phrases which normalise the acceptability of poor numeracy.

5.5. All teachers will:

- Have the highest expectations of the students and ensure that the numerical content is of a high standard.
- Discourage students from writing down answers only and encourage students to show their working out within the main body of their work.
- Encourage the use of estimation, particularly for checking work.
- Encourage students to write mathematically correct statements.
- Recognise that there may be more than one method and students will be encouraged to develop their own correct methods, where appropriate.
- Allow and encourage students to 'vocalise' their maths - a necessary step towards full understanding for many students.
- Help students to understand the methods they are using or being taught – students gain more and are likely to remember much more easily if they understand rather than are merely repeating by rote.
- Encourage students to use non-calculator methods, whenever possible.
- Encourage students to use the correct language.
- If problems with numeracy are identified then the Mathematics department will work with teachers and students to strength understanding.

6. Suggested numeracy topics to identify:

Numbers

Understand and use place value for decimals, measures and integers of any size.

Order positive and negative integers, decimals and fractions; using the number line as a model for ordering the real numbers and use the symbols $=$, \neq , $<$, $>$, \leq , \geq .

Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property.

Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.

Use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals.

Recognise and use relationships between operations, including inverse operations.

Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4 and 5, and distinguish between exact representations of roots and their decimal approximations.

Interpret and compare numbers in standard form $A \times 10^n$ $1 \leq A < 10$, where 'n' is a positive or negative integer or zero.

Work interchangeably with terminating decimals and their corresponding fractions, e.g. 3.5 and $\frac{7}{2}$ or 0.375 and $\frac{3}{8}$.

Define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages and work with percentages greater than 100%.

Interpret fractions and percentages as operators.

Use standard units of mass, length, time, money and other measures, including with decimal quantities.

Round numbers and measures to an appropriate degree of accuracy (for example, to a number of decimal places or significant figures).

Use approximation through rounding to estimate answers and calculate possible resulting errors expressed, using inequality notation $a < x \leq b$.

Use a calculator and other technologies to calculate results accurately and then interpret them appropriately.

Appreciate the infinite nature of the sets of integers, real and rational numbers.

Algebra

Use and interpret algebraic notation, including the following:

ab in place of $a \times b$

$3y$ in place of $y + y + y$ and $3 \times y$

a^2 in place of $a \times a$, a^3 in place of $a \times a \times a$; a^2b in place of $a \times a \times b$

$\frac{a}{b}$ in place of $a \div b$

Coefficients written as fractions rather than as decimals

Brackets

Substitute numerical values into formulae and expressions, including scientific formulae.

Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors.

Simplify and manipulate algebraic expressions to maintain equivalence by:

Collecting like terms.

Multiplying a single term over a bracket.

Taking out common factors.

Expanding products of two or more binomials.

Understand and use standard mathematical formulae and rearrange formulae to change the subject.

Model situations or procedures by translating them into algebraic expressions or formulae and by using graphs.

Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement).

Work with coordinates in all four quadrants.

Recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane.

Interpret mathematical relationships, both algebraically and graphically.

Reduce a given linear equation in two variables to the standard form $y = mx + c$, as well as calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically.

Use linear and quadratic graphs to estimate values of y for given values of x , and vice versa, and to find approximate solutions of simultaneous linear equations.

Find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs.

Generate terms of a sequence from either a term-to-term or a position-to-term rule.

Recognise arithmetic sequences and find the n th term.

Recognise geometric sequences and appreciate other sequences that arise.

Ratio, proportion and rates of change

Change freely between related standard units (for example, time, length, area, volume/capacity, mass).

Use scale factors, scale diagrams and maps.

Express one quantity as a fraction of another, where the fraction is less than one and greater than one.

Use ratio notation, including reduction to its simplest form.

Divide a given quantity into two parts in a given part:part or part:whole ratio and express the division of a quantity into two parts as a ratio.

Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction.

Relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions.

Solve problems involving percentage changes, including percentage increase, decrease and original value problems, and simple interest in financial mathematics.

Solve problems involving direct and inverse proportion, including graphical and algebraic representations.

Use compound units such as speed, unit pricing and density to solve problems.

Geometry and Measures

Derive and apply formulae to calculate and solve problems involving perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders). Calculate and solve problems involving perimeters of 2D shapes (including circles), areas of circles and composite shapes.

Draw and measure line segments and angles in geometric figures, including interpreting scale drawings.

Describe, sketch and draw using conventional terms and notations, including points, lines, parallel lines, perpendicular lines, right angles, regular polygons and other polygons that are reflectively and rotationally symmetric.

Derive and illustrate properties of triangles, quadrilaterals, circles and other plane figures (for example, equal lengths and angles) using appropriate language and technologies.

Use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles.

Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3D.

Probability

Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, and equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale.

Understand that the probabilities of all possible outcomes sum to one.

Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams.

Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.

Statistics

Describe, interpret and compare observed distributions of a single variable through appropriate graphical representation, involving discrete, continuous and grouped data, and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers).

Construct and interpret appropriate tables, charts and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data.

Describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.

7. Possible numeracy activities for consideration in other subjects

7.1. English

Mathematical terminology is used, where appropriate.

Maths-based texts are sometimes used in English lessons and in guided reading sessions.

Comparison of two data sets on word and sentence length.

7.2. Science

Students' data collection and analytical skills are further developed through the conduction of physical experiments, using units of measurement, calculating averages and interpreting results.

Students record their findings using charts, tables and graphs.

7.3. Humanities

Data analysis, pattern seeking and problem-solving skills are developed through the teaching of geography.

Students' understanding of time and measurements of time are developed through discussions of historical events.

7.4. ICT

Students are encouraged to use calculators and other electronic devices, gaining confidence throughout their school experience.

ICT will be used to enhance students' maths skills through the use of online resources and the creation of spreadsheets and charts.

ICT will be used to record findings, using text, data and tables.

7.5. MFL

Use of basic graphs and surveys to practice foreign language vocabulary and reinforce interpretation of data.

Use dates, sequences and counting in other languages.

7.6. Music

Use fractions, sequences and patterns.

7.7. Art

Use of symmetry in paintings.

Use of ratios for mixing paint.

Three dimensional and scale drawings.

Use of ratios in paintings

7.8. Food Technology

Using ratio and proportion with recipes to scale up or down quantities.

Use of measurements in recipes.

8. Monitoring and review

8.1. This policy will be reviewed annually by the Numeracy Co-ordinator and the Headteacher.

8.2. Any changes made to this policy will be communicated to all members of staff.