NUMERACY POLICY

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Rationale

Sandwich Technology School is committed to developing numeracy skills across all key stages.

Being numerate means having the confidence and skill to use numbers and mathematical approaches in all aspects of life – at school, in practical everyday activities at home and beyond and as citizens understanding the world about us.

Numeracy complements literacy and is sometimes called 'mathematical literacy'. Both skills are needed in order to function fully in modern life.

Being numerate means being able to reason with numbers and other mathematical concepts and to apply these in a range of contexts and to solve a variety of problems. Being numerate is as much about thinking and reasoning logically as about "doing sums".

It means being able to:

- interpret data, charts and diagrams;
- process information;
- solve problems;
- check answers;
- understand and explain solutions;
- make decisions based on logical thinking and reasoning.

Purpose

Numerate students should:

- have a sense of the size of a number and where it fits into the number system;
- know by heart number facts such as number bonds, multiplication tables, doubles and halves, basic fractions and decimal and percentage equivalents;
- use what they know by heart to figure out answers mentally;
- calculate accurately and efficiently, both mentally and with pencil and paper, drawing on a range of calculation strategies;
- recognise when it is appropriate to use a calculator and be able to do so effectively;
- 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 them where necessary;
- suggest suitable units for measuring and make sensible estimates of measurements;
- explain and make predictions from the numbers in graphs, diagrams, charts and tables.

This can be split in to the five main areas of numeracy:

Numbers and the number system

- Counting.
- Properties of numbers and number sequences, including negative numbers.
- Place value and ordering, including reading and writing numbers.
- Estimating and rounding.
- Fractions, decimals and percentages and their equivalents; ratio and proportion.

Calculations

- Understanding number operations and relationships.
- Rapid mental recall of number facts.
- Mental calculation, including strategies for deriving new facts from known facts.
- Pencil and paper methods.
- Using a calculator.
- Checking that results of calculations are reasonable.

Solving problems

- Making decisions: deciding which operation and method of calculation to use.
- Mentally, mentally with jottings, using formal pencil and paper algorithms or using a calculator.
- Reasoning about numbers or shapes and making general statements about them.
- Solving problems involving numbers in context: real life, money, measures.

Measures, shape and space

- Measures, including choosing units and reading scales.
- Properties of 2D and 3D shapes, position, direction and movement.

Handling Data

- Collecting, presenting and interpreting numerical data.

Implementation (Roles and Responsibilities)

Numeracy within mathematics

One Key Stage 3 mathematics lesson per fortnight will focus on numeracy skills. This is likely to test students' mental arithmetic skills as well as act as a reminder of numeracy skills they have already covered and need to have at the front of their minds.

In Key Stage 4, students need to prepare for the GCSE non-calculator paper. Wherever possible, students are encouraged to work without a calculator and to practise their mental arithmetic. Students in most classes are also tested once per fortnight on their mental arithmetic skills.

Whole school numeracy

All subject areas and all teachers take some responsibility for the development of students' numeracy skills. In some subjects, students are regularly required to use their numeracy skills, while, in some subjects, numeracy skills are needed less frequently.

Wherever possible, teachers should identify the numeracy focus of the lesson in their schemes of work. In developing 'Numeracy across the Curriculum', the Maths Department will assist departments to develop resources and consistent teaching methods.

Examples of opportunities for numeracy in other subjects

English

This is not a subject where numeracy is required on a regular basis. However, there is some scope for mental calculations by posing questions/tasks such as:

- "How many pages have we read today?"
- "How many pages are in this chapter?"
- "Work out the average sentence length/word length of a piece of writing."
- "Work out the number of lines in a poem by multiplying the number of lines per verse by the number of verses."
- "Check whether or not this poem scans by counting the syllables."

Other examples include:

- The use of Roman numerals in plays.
- Reading numbers correctly and rounding numbers to an appropriate degree of accuracy for reporting purposes.

Modern Foreign Languages

- Counting.
- Simple mental arithmetic to reinforce knowledge of numbers and number bonds.
- Time: telling the time, units of time, 12 and 24 hour clock systems, time zones.
- Fractions.
- Currency conversion.
- Costing.
- Length and weight conversions.

Sciences

- Counting, measuring, estimating and approximating.
- Negative numbers (temperature).
- Tables, graphs and charts.
- Averages (the mean).
- Fractions, decimals and percentages.
- Calculations
- Units of length, capacity and weight.
- Speed and density.
- Reading scales.
- Ratio.
- Formulae – rearranging and substitution.
- Use of standard form.

ICT

- Collecting and presenting data.
- Graphs, tables and charts.
- Introduction to mathematical software.
- Formulae in spreadsheets.

History

- Number lines.
- How many years since…?
- How many years between …?
- Production and interpretation of line and bar graphs.
- Interpretation of various types of statistics, including birth and death rates.

Geography

- Temperature (negative numbers).
- Measuring.
- Maps – scale and ratio.
- Coordinates, angles and compass directions.
- Time zones.
- Area.
- Graphs, tables, charts.

Design & Technology

- Measuring.
- Units of length.
- Scale drawing (ratio).
- Costing materials.
- Using 2D and 3D representations.

Physical Education

- Measuring.
- Time.
- Ordering decimals (times/distances).
- Estimating distance, time, weight.
- Grouping, e.g. 28 in a class = groups of 4 x 7.

Art

- Patterns.
- Symmetry.
- Shapes.
- Proportion Measuring.
- Angles.
- Enlargement, rotation and reflection.

Business Studies

- Calculations.
- Percentages.
- Averages (mean).
- Estimation and approximation.
- Reading and interpreting data.
- Graphs.
- Profit and loss.
- Costing.
- Conversions.
- Place value in whole numbers.
- Spreadsheet formulae.

Roles and Responsibilities

- Senior Leaders: lead and give a high profile to numeracy.
- Mathematics Department: provides students with the knowledge, skills and understanding that they need to reason with numbers and other mathematical concepts and to apply these in a range of contexts and to solve a variety of problems.
- Teachers across the curriculum: identify the numeracy focus of their lessons within schemes of work and draw on the expertise of the Maths Department to develop resources and consistent teaching methods.
- Parents: encourage their children to use the range of strategies they have learnt to improve their levels of numeracy and buy a calculator for their child.
- Students: take increasing responsibility for recognising their own numeracy needs and making improvements and bring a calculator to school every day.

Links to other policies/documents

- Assessment and Reporting Policy
- Literacy Policy
- Teaching and Learning Policy