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# Numeracy Policy



## NUMERACY AT ARCHBISHOP ILSLEY CATHOLIC SCHOOL

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. Poor numeracy skills hold back learners' progress and can lower their self-esteem.

We must, as a whole school, be involved in improving these skills in order to develop each learner as a whole person.

By the end of KS3 learners 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 methods and justify reasoning and conclusions, using correct mathematical terms;
- Judge the reasonableness of solutions and check them when necessary;
- Give results to a degree of accuracy appropriate to the context.

Mathematics contributes to and draws from many subjects and aspects of the curriculum. Learners can be helped to appreciate the importance of Mathematics in their lives by making these links explicit. For example, if the Maths teachers know how Mathematics is applied in other subjects, and ask colleagues to provide examples of applications to use in mathematics lessons, they will be able to provide examples and contexts which learners know and understand.

At Archbishop Ilsey Catholic School each department completed a numeracy audit to help map numeracy across the curriculum. Please see attached. From the outcomes of this we have developed an agreed numeracy document, which explains the methods used to teach some of the most common numeracy topics. There was also the opportunity to raise queries or issues relating to the teaching of subject specific numeracy.

Many heads of department did this and these issues will be dealt with on a 1:1 basis.

For example, the approach to calculation should be the same in Science as in Mathematics. Staff need to understand:

- the use of mental and informal written methods, especially with lower attaining learners;
- the expectation that learners should add and subtract pairs of two-digit numbers mentally;
- how and when calculators should be used

Besides the approach to calculation, we have agreed across subject departments:

- The use of units;
- The Mathematical notation and terms to be used;
- Algebraic and other Mathematical techniques, such as how algebraic expressions are to be simplified or how equations are to be solved;
- How graphs are to be represented;
- How and when ICT resources such as graph plotters or graphical calculators will be used to support Mathematics.

Mathematical skills can be consolidated and enhanced when learners have opportunities to apply them across the curriculum. Some opportunities to link Mathematics to work in other subjects are as follows:

## English and literacy

The National Curriculum statement on language suggests three areas to include in all subject teaching:

- General accuracy in using language – spoken, written and read;
- Technical terms and concepts appropriate to the subject;
- Awareness of patterns of language.

In Mathematics, general accuracy in using language can be promoted through:

Interpreting questions posed orally or in writing; clarifying the precise meaning of words or Mathematical terms; discussing the essential ideas identified in the questions and interpreting them to identify the Mathematical content. Awareness of patterns of language can be developed by asking learners to explain, argue and present their conclusions to others, and by drawing their attention to the statements involved in mathematical reasoning and proof, such as *if...then*, *because*, *therefore*, *implies...* The technical terms and concepts used in mathematics will include the ideas of an *inverse*, of *equivalence*, *equality*, *proportionality*, *congruence*, *similarity*, *linearity*, and so on.

## Science

Almost every scientific investigation or experiment is likely to require one or more of the Mathematical skills of classifying, counting, measuring, calculating, estimating, and recording in tables and graphs. Learners will, for example, order numbers, including decimals, calculate means and percentages, use negative numbers when taking temperatures, decide whether it is more appropriate to use a line graph or bar chart, and plot, interpret and predict from graphs. They will explore rates of change in cooling curves and distance-time graphs, apply formulae and solve equations, for example, in problems on moments.

## Art, design and technology

Measurements are often needed in Art and in Design and Technology. Many patterns and constructions in our own and other cultures are based on spatial ideas and properties of shapes, including symmetry. Designs may need enlarging or reducing, introducing ideas of multiplication, scale and ratio. The preparation of food involves measurement, working out times and calculating cost, frequently extending into calculations involving ratio and proportion.

## Information and communication technology

In ICT lessons, learners 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.

## History and Geography

Discussing evidence in History or Geography may involve measurement, estimation and approximation skills, and making inferences. Learners 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 co-ordinates and ideas of angle, direction, position, scale and ratio.

## Physical Education and Music

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.

## Religious Education, PSHE and Citizenship

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 learners 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 learners will develop their financial capability and awareness of the applications of Mathematics in the workplace

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