

Maths Curriculum Policy

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**Introduction**

Mathematics is a tool for everyday life. It provides a framework for making sense of the world; is used to analyse and communicate information and ideas; and applied to solve both real-life and abstract problems. At Newbridge House lessons aim to develop pupils’ mathematical proficiency, problem solving skills and self-belief as learners.

**Aims**

It is our aim to develop:

* a positive attitude towards mathematics
* competence and confidence in mathematical knowledge, concepts and skills with a particular focus on functional numeracy skills
* an ability to solve problems, to reason, to think logically and to work systematically and accurately
* initiative and an ability to work both independently and in cooperation with others
* an ability to use and apply mathematics across the curriculum and in real life (see Appendix I for examples of use and application of maths)

In years 9, 10 and 11 it is our aim to accredit learning where possible through entry level certificates or GCSE as appropriate. Additionally, AIM award components may be delivered where they support qualifications driven by other subjects.

The mathematics curriculum aims to support pupil’s literacy skills and spiritual, moral, social and cultural development, actively promote British and anti-discriminatory values and provide opportunities for careers education, information, advice and guidance.

**Planning**

***Scheme of work***

Our school scheme of work is a working document. It is based on the Key Stage 3 curriculum guidance produced by the DfE and NCETM (with some minor modifications to reflect our context) which reflects the current National Curriculum. The Key Stage 4 curriculum follows on from the Key Stage 3 program and covers the GCSE specification. It gives a broad curriculum framework for each year group and unit by unit learning outcomes at different attainment levels.

It is important to note that many of the Centre’s pupils have difficulties with specific areas of the curriculum and individual intervention may be used to address these, meaning these pupils follow a modified version of the scheme of work. This is in line with the National Curriculum for Maths’ aim that ‘[t]hose who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on’.

For similar reasons pupils are not rigidly taught along a predetermined scheme of work ‘pathway’. A particular pupil may, for example, be able to meet ‘working towards grade 3’ in one area, but ‘working towards grade 5’ in another, depending on both their strengths and the extent to which they have missed out on prior learning in some areas. Where pupils fall between two levels teachers may select some objectives from both pathways, or first teach the lower level pathway more quickly, before choosing elements of the higher level pathway to extend the learning. However, also in line with the aims of the National Curriculum for maths which states that ‘pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content’ pupils will only work on a curriculum plan above their year group (e.g. Year 9 planning in Year 8) in exceptional circumstances.

Pupils frequently arrive part way through a year / course. This presents particular challenges as they will then not necessarily have covered the same topics as others in the group, and may be missing the prior knowledge needed to access a future unit. In general, new pupils join the scheme the existing class has been following, but special attention is given to any intervention / modifications of the scheme that they may need. Initial assessment informs these modifications (see below).

***Breadth of Study***

The scheme of work aims to ensure that pupils have the chance to study topics across all attainment targets. Teachers also aim to give pupils opportunities for:

* practical activities and mathematical games
* problem solving
* individual, group and whole class discussions and activities
* open and closed tasks
* a range of methods of calculating eg. mental, pencil and paper and using a calculator
* using ICT as a mathematical tool

Where pupils attend Newbridge House on a part-time basis then they may have fewer maths lessons each week than their peers who attend full-time. In this case it is not possible for them to cover every aspect of the curriculum at Newbridge House. The part-time pupils will usually follow the same scheme of work as the full-time pupils but will only cover certain aspects of each unit. Efforts are made to strike a balance between breadth and depth in this case. Where basic skills that are pre-requisites for further work are being studied then achieving a minimum standard across the objectives for that unit will be prioritised; in other units one strand may be taught in more depth to give pupils the opportunities to work at a higher level.

***Equal Opportunities***

As per the school’s Equality policy the mathematics scheme of work aims to build on students’ starting points and is differentiated appropriately to ensure the inclusion of:

* boys and girls
* students learning English as an additional language
* students from minority ethnic groups, including Gypsies and Travellers
* students who are gifted and talented
* students who are pregnant or who have recently given birth
* students who are undergoing gender reassignment
* students with special educational needs
* students with a disability
* students who are looked after by the Local Authority
* students who at a risk of disaffection and exclusion
* lesbian, gay or questioning young people
* students who are the subject of child protection plans

***Short term planning***

There is no prescribed format for recording short-term planning. In making their short-term plans staff differentiate learning outcomes and consider teaching strategies, assessment, starters, activities and plenaries. They think about the learning outcomes for pupils following the scheme of work and for those for whom a modified version is necessary.

**Assessment and Marking**

In line with the school’s Assessment, Recording and Reporting policy, assessment is used to provide:

* diagnostic information to inform future teaching and learning
* summative information for teachers and parents

Initial assessment is carried out via an assessment task in Key Stage 3 or a past paper at Key Stage 4 supplemented by teacher assessment of class work over the first two to three weeks. Teachers may use observation, question and answer, discussion with pupils, pupils’ written work and formal assessment (internally or externally set) results to inform their initial and ongoing assessment.

The marking of pupils’ work is carried out in line with the centre’s Marking Policy and aims to recognise what pupils have done well and give guidance on how to improve further.

**Cross-Curricular Issues**

Mathematics is used in many other subjects. The Numeracy Policy encourages staff to take advantage of the opportunities for developing numerical skills in all subjects.

**Literacy in Mathematics**

Teaching in mathematics aims to support the development of pupils’ literacy skills and will provide activities to develop reading, writing and speaking and listening skills (see Literacy policy). Examples of literacy outcomes that pupils could demonstrate in mathematics include:

***Oracy***

* Make clear and relevant contributions to discussion, questioning as appropriate.
* Listen carefully, ask pertinent questions and make suggestions in order to solve problems and test ideas.
* Use scaffolded templates to help structure responses using key mathematical words and language.

***Writing***

* Spell common words correctly.
* Spell most words correctly, including some complex polysyllabic words and unfamiliar words
* Spell correctly including ambitious or complex polysyllabic words.
* Use vocabulary precisely to clarify meaning.
* Draw on the conventions of ‘writing to explain’ to develop ideas to fit a specific task.

The maths scheme of work gives key (tier 3) vocabulary for each unit of work and also highlights relevant (tier 2) academic vocabulary that is most often used in this subject

**Spiritual, Moral, Social and Cultural Development in Mathematics**

There are many opportunities to cover spiritual, moral, social or cultural issues and develop anti-racist attitudes through maths. These include:

* Highlighting the importance of different cultures in the historical development of maths, such as the indo-arabic numerals; the source of the word ‘algebra’ from Arabic; why the ancient Egyptians could calculate area so well; the developments by Greek mathematicians (e.g. Pythagoras or Euclid); and the development of probability by Fermat and Pascal.
* Financial education, such as using percentage to calculate interest; using formulae to calculate net pay; using proportional reasoning to calculate ‘best value for money’; conversion between currencies using graphs; and calculating bills (e.g. cost of electricity based on daily charge and units consumed).
* The use of real-life data gives the opportunity to investigate a number of moral or social issues in statistics units. Software such as ‘Gapminder’ can be used to look for relationships between various developmental measures (GDP, literacy rates, life expectancy…) and to compare and contrast different countries / regions of the world. The same software can show change in data over time so can be related to world history. ‘Census at School’ is a source of data on pupils of different ages and from different countries around the world and can be used to learn sampling techniques or data processing (average / range) or data representation (bar charts, pie charts, histograms etc) techniques.
* Examining mathematical properties of decorations in religious buildings of different faiths.

***British Values***

The mathematics teachers aim to actively promote the fundamental British values of democracy, the rule of law, individual liberty, and mutual respect and tolerance of those with different faiths and beliefs.

Opportunities to do so include:

* Investigating the effect of different voting systems on election results.
* Group work where pupils see how others solve problems in different ways, promoting tolerance of varying views and opinions and mutual respect.
* Explore individual liberty bearing in mind legal restraints such as taxation levels.

***CEIAG***

In mathematics, the relevance and importance of the subject to future careers is made clear whenever possible by linking learning to real-life applications. Pupils are introduced to a variety of jobs in STEM industries through the means of real-world examples, career-specific lessons or projects or discussions about case studies.

**Appendix I. Examples of real life applications of maths (light blue E3, dark blue L1, black L2)**

*Source: National standards for adult literacy and numeracy (QCA, 2000)*

**Citizen and community**

• matching the number on the front of a bus with the destination

• making and keeping appointments, *e.g. at the doctors, hospital, housing office*

• understanding opening hours, *e.g. for community organisations, council services, clinics*

• understanding public safety information, *e.g. parking restrictions, weight restrictions*

• reading bus and train timetables correctly

• planning a journey involving more than one stage in order to arrive at a given time

• understanding public health information, *e.g. safe levels of alcohol consumption or nutritional information*

• understanding council tax bands and charges

• understanding the relevance of information about local council and government expenditure

• understanding and interpreting data published by the local council and government, *e.g. on health, housing, crime, unemployment or schools*

• carrying out a survey and presenting information for a local campaign, *e.g. on street lighting or lower speed limits*

**Economic activity, including paid and unpaid work**

• understanding price labels on prepacked items

• checking the receipt and change when paying for goods

• comparing the price of goods of equivalent weight or capacity

• selecting sizes and prices from a table in a manufacturer’s catalogue

• using a simple map to find a location, *e.g. for an interview or delivery*

• weighing loose items that are sold by weight

• working out weekly pay from hourly rate, or monthly pay from annual salary

• checking pay and deductions on a payslip

• keeping records, *e.g. for timesheets or expenses*

• working out the price of goods in a sale

• comparing rates on mobile phones

• calculating down payments on goods given in percentages

• comparing products and services and working out ‘best buy’

• comparing costs of different methods of payment for goods and services, *e.g. cash, direct debit or monthly payments*

• comparing financial services offered by banks, building societies and brokers, *e.g. loans, credit facilities*

• understanding and interpreting data used in advertising

• working out the real cost of items when prices are given excluding VAT

**Domestic and everyday life**

• paying usual household bills, *e.g. electricity or gas bills*

• following cooking and storage instructions on packaged food

• mixing a baby’s bottle feed according to instructions

• selecting an item of furniture or appliance to fit into an available space

• checking household bills

• reading electricity or gas meter

• working out personal weight gain or loss over a period of time

• taking a child’s temperature

• following instructions to mix or dilute a household product

• adjusting a recipe to increase or decrease the number of servings

• making and fitting curtains or measuring and laying a carpet

• working out a personal or family budget

• working out how many tiles are needed to tile an area

• working out quantities required and the cost of materials for home decoration, *e.g. paint, wallpaper*

• understanding and using nutritional information on food packages, particularly for children, pregnant women and the elderly

**Leisure**

• understanding programme times in listings, *e.g. for television, radio, cinema*

• understanding prices on a menu in a restaurant, hotel or café

• estimating total cost before purchasing or ordering

• using a map to locate local amenities and services

• checking depth markings at a swimming pool

• estimating the amount of cash needed to cover the cost of a night out

• estimating the total cost of excursions, holidays or journeys

• estimating the equivalent price in sterling of goods and services when on holiday abroad

• following a personal fitness programme, *e.g. taking measurements and recording data*

• estimating distances using scales printed on road maps

• converting distances on road signs from kilometres to miles when travelling abroad

• drawing a map for others that shows how to find a location, *e.g. a cinema or restaurant*

• laying out templates on material to minimise wastage, *e.g. from diagrams, plans or patterns*

**Education and training**

• using a calculator to work out contextual problems using decimals

• planning use of time, *e.g. preparation or coursework*

• using measuring instruments that are essential for training, *e.g. weighing ingredients in catering*

• interpreting numerical data that is essential for training, *e.g. quantities in construction*

• using a calculator to calculate fractions or decimals

• keeping records of work planned or completed, *e.g. in a portfolio or logbook*

• using measuring instruments that are essential for training, *e.g. scales, spring balances*

• interpreting graphical data that is essential for training, *e.g. a temperature chart in healthcare*

• using a calculator to confirm or provide accurate solutions to an appropriate level of accuracy

• using measuring instruments that are essential for training, *e.g. a micrometer in engineering*

• interpreting numerical data that is specific to occupational sectors, *e.g. hospitality and catering*

**Using ICT in social roles**

• inputting numeric data into electronic systems, *e.g. dates, costs or quantities in spreadsheets*

• shopping for goods and services using the Internet

• using electronic banking facilities,inputting passwords and account details

• finding travel information and schedules on the Internet including using the 24-hour clock

• making bookings using the Internet, *e.g. for concert tickets or holidays*

• inputting numeric data in electronic systems, *e.g. hours in timesheets*

• using software to draw simple charts from data

• using a spreadsheet model to make and test predictions

• using software to draw charts and graphs from data

• formatting data and documents using different software packages, *e.g. row and column sizes, positioning images, setting margins*