



## NUMERACY ACROSS THE CURRICULUM POLICY

|   |            |
|---|------------|
| S | Successful |
| H | Happy      |
| A | Aspiring   |
| P | Purposeful |
| E | Exciting   |
| D | Diverse    |

### 1. Introduction

Marshfields School is committed to raising the standards of numeracy of all of its students; we want our students to be confident and capable in the use of numeracy to support their learning in all areas of the curriculum and to acquire the skills necessary to help achieve success in further education, employment and adult life.

Numeracy is a proficiency that 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. Numeracy 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, as presented in graphs and diagrams, charts and tables. (Framework for Teaching Mathematics DfES)

### 2. Standards of Numeracy

At Marshfields School we believe that improving numeracy standards is fundamental to raising student self-esteem, confidence and achievement we are committed to ensuring that students use the opportunities available in order to achieve beyond expectations. The school aims for all students to be able to:

- Have a sense of the size of a number and where it fits into the number system
- Be able to use strategies successfully to solve number related problems mentally
- Apply an appropriate method to help solve a problem, eg mental, oral and written methods
- Make sense of number problems and identify and use the required operations to solve them
- Restrict their reliance on using a calculator and use them only when it is appropriate to do so
- Develop their skills in estimation and approximation and have strategies for checking the reasonableness of their answers
- Be able to explain their methods and reasoning using consistent language and mathematical terminology
- Be able to make and use sensible estimates of a range of measures in everyday situations
- Be able to interpret, explain and make predictions from information given in graphs, charts and tables
- Improve their general problem solving skills

### **3. Strategies to Improve Numeracy Skills and ensure consistency**

The Numeracy skills of all pupils will be improved by:

- Ensuring staff are aware of the numeracy skills used within their subject – see *Appendix 1*
- Using an agreed consistent approach to the teaching of numeracy skills across the curriculum – see *Appendix 2*
- Increasing student awareness of the links between subjects by talking frequently about them, both in mathematics and in other lessons
- Developing a bank of numeracy resources for use in numeracy life skills
- Providing additional numeracy provision for targeted students during strategy time
- Ensuring that departments are developing cross-curricular numeracy activities (eg lesson starters, numeracy projects).
- Altering the numeracy life skills strategy time resources in response to an audit of numeracy skills across the curriculum
- Providing input on whole school training days where appropriate
- Providing prior attainment information on individual students' achievement in mathematics, which is shared on the Interim reports on Behaviorwatch.
- All teachers are aware of and aim to use correct mathematical terminology (see numeracy dictionary located in Room 4 maths classroom)
- Departments identify and set numeracy activities for homework within their schemes of learning
- Departments identify opportunities to incorporate mental and written calculations within their schemes of learning and liaise with the maths department regarding the appropriateness of the activity
- All subject teachers are aiming to become familiar with number facts and number techniques

To ensure a consistency of approach:

#### **Teachers of mathematics should;**

- 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
- Provide information to other subject teachers on appropriate expectations of students and difficulties likely to be experienced in various age and ability groups
- 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
- Seek opportunities to use topics and examination questions from other subjects in mathematics lessons

#### **Teachers of subjects other than mathematics should;**

- 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
- Be aware of appropriate expectations of students and difficulties that might be experienced with numeracy skills

#### 4. Framework for Monitoring and Evaluating the Numeracy Policy

- The SLT, in collaboration with the Lead Teacher of Mathematics, will monitor the impact of the numeracy policy on overall achievement in maths across the school. This will include information gathered from lesson observations, learning walks and work scrutiny
- The Headteacher will gather further information by interviewing students and sampling students' work. This will occur periodically during the school year
- The Numeracy Policy is reviewed annually by the school leadership team, in consultation with all teaching staff, and governors will be kept informed through the Governors' Curriculum Committee

This policy supports and is to be read in conjunction with the Equality Policy.

Presented to Full Gov May 18th 2017

Name.....

Position.....

Signature.....

**Appendix 1 – Developing Numeracy across the Curriculum**

Learners develop their number skills across the curriculum by using mathematical information, calculating and interpreting and presenting findings.

|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Science</b>                          | <ul style="list-style-type: none"> <li>• Work quantitatively to estimate and measure using non-standard measures, recording the later with appropriate S.I. units</li> <li>• Classifying, counting, measuring, calculating, estimating, and recording in tables and graphs</li> <li>• Use tables, charts and graphs to record and present information</li> <li>• With increasing maturity they draw lines of best fit on line graphs</li> <li>• Use of some quantitative definitions and perform scientific calculations</li> </ul> |
| <b>English and Personal Development</b> | <ul style="list-style-type: none"> <li>• Develop skills in the application of number through activities which include number rhymes</li> <li>• Ordering events in time</li> <li>• Use measure</li> <li>• Gathering information in a variety of ways, including questionnaires</li> <li>• Accessing, selecting, recording and presenting data in a variety of formats</li> </ul>                                                                                                                                                     |
| <b>Geography</b>                        | <ul style="list-style-type: none"> <li>• Apply number skills in the classroom and in fieldwork to measure, gather and analyse data</li> <li>• Use mathematical information to understand direction, distances and scale</li> <li>• The study of maps includes the use of coordinates and ideas of angle, direction, position, scale and ratio</li> </ul>                                                                                                                                                                            |
| <b>History</b>                          | <ul style="list-style-type: none"> <li>• Develop numeracy skills through developing chronological awareness</li> <li>• Using conventions relating to time</li> <li>• Making use of data, eg census returns and statistics</li> </ul>                                                                                                                                                                                                                                                                                                |
| <b>Art</b>                              | <ul style="list-style-type: none"> <li>• Measurements are often needed in art and design and technology. Many patterns and constructions are based on spatial ideas and properties of shapes, including symmetry. Designs may need enlarging or reducing, introducing ideas of multiplication and ratio</li> <li>• Apply number skills such as measurement, estimates, scale, proportion, pattern and shapes to develop, inform and resource their creative activities</li> </ul>                                                   |
| <b>Physical Education</b>               | <ul style="list-style-type: none"> <li>• Develop number skills by using mathematical information and data</li> <li>• Use the language of position (including co-ordinates and compass points) and movement</li> <li>• Data handling and measure in athletic and adventurous activities</li> <li>• Measure and record performances, eg time, distance and height, and use of data to set targets and improve performance</li> </ul>                                                                                                  |
| <b>Performing Arts</b>                  | <ul style="list-style-type: none"> <li>• Sequences in rhythms, timing</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Design Technology – Food</b> | <ul style="list-style-type: none"> <li>• Use mathematical information and data, presented numerically and graphically</li> <li>• Research and develop ideas</li> <li>• Use number to measure and calculate sizes, fits and materials</li> <li>• When food is prepared a great deal of measurement occurs, including working out times and calculating cost</li> </ul>                                                                                                                                           |
| <b>Design Technology</b>        | <ul style="list-style-type: none"> <li>• Develop numbers for practical use.</li> <li>• Measuring, estimating</li> <li>• Selecting appropriate tools for the job.</li> </ul>                                                                                                                                                                                                                                                                                                                                     |
| <b>Computers</b>                | <ul style="list-style-type: none"> <li>• Using numbers to think about making things bigger (smaller e.g. in Minecraft)</li> <li>• Using numbers to manipulate spreadsheets. Further interpret numbers when working on directions (Beebots) and following a set of moves in various computer applications.</li> </ul>                                                                                                                                                                                            |
| <b>Religious Education</b>      | <ul style="list-style-type: none"> <li>• Develop skills in the application of number by using information such as ordering events in time</li> <li>• Measuring time through the calendars of various religions</li> <li>• Considering the significance of number with religions</li> <li>• Interpret results/data</li> <li>• Present findings from questionnaires, graphs and other forms of data in order to draw conclusions and ask further questions about issues relating to religion and world</li> </ul> |

## **Appendix 2 – Promoting Numeracy across the Curriculum**

### **Number and Calculation**

- When confronted with a calculation, students should give priority to mental arithmetic over written methods, and reach for a calculator only as a last resort. Even then, mental arithmetic should be used to find an approximate answer where possible.
- Teachers should be aware that students arrive at secondary school with a range of methods of calculation, not just the 'standard' written methods. All methods that are efficient and accurate are valid.
- Teachers should reinforce number bonds, multiplication tables, doubles and halves and useful mental arithmetic 'tricks'.
- Encourage looking for patterns rather than finding the right answer.
- Students should be encouraged to show their methods when doing calculations.
- Students should be encouraged to think about the accuracy required in all calculations.
- When calculators are used, teachers should ensure that students are using them constructively and efficiently; they know the order in which to use the keys and appropriate functions, they know how to use the memory and brackets, and can interpret the display correctly.
- Students should be encouraged to check answers by estimation, and to check if their answer makes sense, particularly if units and decimals are involved.
- Teachers should reinforce the idea of the equivalence of fractions, decimals and percentages, along with discussion about the everyday situations in which they are used.

### **Measurement**

- Estimation should be the first step to all measurement.
- Students should be encouraged to think about the accuracy required in all measurements.
- A clear link should be made between decimal notation and measurement.
- There should be opportunities for students to select the measuring equipment appropriate to the task and learn how to make accurate measurements.
- Students should be aware of appropriate units. Emphasis should be placed on the use of metric units, but students should be taught how to convert (approximately) between commonly used imperial units and metric units.

### **Handling Data**

- Students should be given the opportunities to explain and make predictions from graphs, diagrams, charts and tables.
- Students should be given the opportunities to collect data using forms, tables and questionnaires.
- Teachers should focus on making students effective in selecting a way to represent their data, justify their choice and evaluate its appropriateness.
- Students should be given the opportunity to develop their ICT skills through the use of spreadsheets, databases and other statistical packages.
- Teachers should ensure that students think carefully about how graphs are scaled.

### **Communicating Mathematically**

- Students should be given the opportunity to solve problems using mathematical skills and explain their reasoning both orally and in writing.
- Teachers should ensure that they highlight when a mathematical skill is being used.

- Teachers should encourage students to use the appropriate mathematical vocabulary. Using the language of mathematics reinforces both the mathematical concepts and proficiency in English.
- Class activities should be collaborative, involve problem solving, and help learners to develop reasoning skills. The best way to clarify one's own understanding of a concept is to explain it to someone else.
- Stress the possibility that there may be many ways to solve the same problem and that there is choice.