Herne Bay High School's Numeracy Guidelines

Reviewed by	A. Golding	**Date of last review**	16/07/21	**Date of next review**	07.2022	**Date of ratification by Governors**	September 2021

Purpose of Guidelines

HBHS is committed to raising the standards of numeracy of all its students, so that they develop the ability to use numeracy skills effectively in all areas of the curriculum and the skills necessary to cope confidently with the demands of further education, employment and adult life.

Aims

The purposes of our whole school numeracy guidelines are:

1. To develop, maintain and improve standards in numeracy across the school.
2. To raise attainment in numeracy across the whole ability range.
3. To ensure consistency of practice including methods, vocabulary, notation, etc.
4. To indicate areas for collaboration between subjects and the responsibilities of teachers and support staff in the promotion and development of numeracy across the school.
5. To assist the transfer of pupils' knowledge, skills and understanding between subjects.
6. To ensure that students receive positive messages about numeracy when used across the curriculum.

Definition of Numeracy

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. For students to be truly numerate they should be able to appropriately select and apply numeracy skills in situations other than just mathematics lessons.

The national curriculum for mathematics aims to ensure that all pupils:

- Become **fluent** in the fundamentals of mathematics, including through varied and frequent practise with increasingly complex problems over time, so that pupils have conceptual understanding and can recall and apply their knowledge rapidly and accurately to problems.
- **Reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- Can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

A numerate student can:

- 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 and appropriate to the context.

The management of the strategy

The role of the Senior Leadership Team is to:

- Participate in the planning, implementation and evaluation of the school numeracy guidelines.
- Specify expectations to be made of all teachers.
- Support the development and implementation of the school numeracy guidelines.
- Support and encourage staff involved in the promoting numeracy within the school.

The role of the Head of Maths is to:

- Establish lines of communication and ensure there is constructive liaison between the mathematics teachers and teachers of other subjects.
- Establish lines of communication and ensure there is constructive liaison between the mathematics teachers and feeder primary schools.
- Facilitate amendments to the numeracy strategy in the light of evaluation and curriculum changes.

The role of the Maths teacher is to:

- Be aware of the mathematical techniques used in other subjects and aid 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 experiences 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 from other subjects in mathematics lessons.

The role of teachers other than mathematics is to:

- Ensure they are familiar with correct mathematical language, notation, conventions and techniques and encourage students to use these correctly in their subject so that students avoid the use of colloquial terms when describing the mathematical process, they are using to solve a problem.
- Be aware of appropriate expectations of students and difficulties that might be experienced with numeracy skills.
- Integrate, when appropriate, numeracy into their lessons in order to give the students opportunities to apply and practise their numeracy skills within contexts other than their maths lessons.

Mental Arithmetic Techniques

There is an acceptance that pupils can tackle the same questions with a variety of methods. These approaches rely on mixing skills, ideas and facts; this is done by pupils drawing on their personal preferences and the question. All departments should give every encouragement to pupils using mental techniques but must also ensure that they are guided towards efficient methods and do not attempt convoluted mental techniques when a written or calculator method is required.

Use of Calculators

The school expects all pupils to bring their own scientific calculator to lessons when required. In deciding when pupils use a calculator in lessons teachers and support staff should ensure that:

- Pupils have sufficient understanding of the calculation to decide the most appropriate method: mental, pencil and paper or calculator.
- Pupils have the technical skills required to use the basic facilities of a calculator constructively and efficiently, the order in which to use keys, how to enter numbers as money, measures, fractions, percentages, etc.
- Pupils understand the four mathematical operations and recognise which to use to solve a particular problem.
- When using a calculator, pupils are aware of the processes required and can say whether their answer is reasonable.
- Pupils can interpret the calculator display in context (e.g., 6.9 is £6.90 in money calculations).
- They help pupils, where necessary, to use the correct order of operations especially in multi-step calculations, such as (4.1 – 2.76) x (34.9 – 4.87).
- Pupils understand they must clearly show their workings out when using a calculator by writing each step they type into their calculation showing the process they have applied to gain a solution.

Vocabulary

The following are all important aspects of helping pupils with the technical vocabulary of mathematics and as such teachers and support staff should incorporate these techniques, when appropriate, within their students' learning experiences:

- Use a variety of words that have the same meaning e.g., add, sum, plus, total.
- Encourage pupils to be less dependent on simple words e.g., exposing them to the word multiply as a replacement for times.
- Discuss words that have different meanings in mathematics from everyday life e.g., take away, volume, product etc.
- Highlight word sources e.g., quad means 4, lateral means side so that pupils can use them to help remember meanings. This applies to both prefixes and suffixes to words.

Evaluation

The strategy will be monitored and reviewed through:

- The school and departmental development plans.
- Quality assurance systems including lesson observations and sampling pupils' work.
- Analysing assessment data.
- Discussion with students.

Information provided from the monitoring and review process will inform decision making about improvements and further developments.