Numeracy Policy

Formally adopted by the LGB	20th November 2024
Chair of Governors:-	Steph Day
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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.
(Framework for Teaching Mathematics – Years 7 to 9 – DfES)

Aims at Hobart Academy

The teaching of numeracy is the responsibility of all staff. At Hobart Academy we are committed to helping develop numerate students that are equipped to navigate the numerical demands of the modern world. We recognise that numeracy is not merely a skill but an important tool that will promote achievement and success for our students, regardless of what path they choose to take in life.

To support this all teachers should, when appropriate, provide students with the opportunity to:

- Handle number and measurement competently; mentally, orally and in writing.
- Use calculators accurately and appropriately.
- Interpret and use numerical and statistical data represented in a variety of forms.
- To support the maths department when their teaching staff are asked to: Encourage students to show and explain methods, rather than provide the answer only. Use estimation as a method for checking answers whether answers are sensible and appropriate in the given context, highlight the importance of making mistakes and acting upon feedback to enhance the learning process

Responsibilities (i)

Teachers of mathematics should:

- Strive to keep up to date with the mathematical techniques required in other subjects and provide assistance or advice to other departments to ensure that a correct and consistent approach is used;
- Be aware of the potential differences in experiences, of numeracy, for our students across age and abilities groups
- Use opportunities in lessons to draw upon the interests of students, link mathematics to real life applications and make references to maths in the wider world.
- Reflect, discuss and develop the current Scheme of Work (SoW) to ensure that the order in which skills are taught supports the development of subsequent skills and knowledge.
- Through discussion with other departments, attempt to ensure that students have the appropriate numeracy skills by the time they are required in other subjects.
- Strive to develop a positive attitude, in our students, regarding mathematics and resist negative mind sets that students may have around their ability to progress in maths.

Responsibilities (ii)

All teachers should:

- Ensure that they are familiar with the correct mathematical language, notation an techniques that may relate to their own subject and use these accordingly.
- Promote correct use of mathematical vocabulary and, if needed, highlight any clashes of definition with tier 2 vocabulary.
- Embrace imbedding numeracy in their lesson planning and in conversations with students.
- Rather than force numeracy into lessons, be alert to situations where use of numeracy will enrich the learning experiences for their students.
- Display and promote a positive attitude towards numeracy
- Aim to maintain their knowledge and skills to a level where they feel confident to apply mathematical skills within their lessons. Liaise with the mathematics department if necessary.
- Appreciate the importance of numeracy in a students' overall development.

Cross Curricular Opportunities:

The mathematics department will deliver the knowledge and skills specified in the National Curriculum as well as use reasoning and problem solving to deepen students' understanding. Where appropriate they will make references to the applications of Mathematics in other subject areas and where possible give contexts to topics. The transfer of skills is something that students find difficult; this is why it is imperative that mathematics is taught consistently and in line with the calculations policy throughout school, all teachers should be taking advantage of opportunities to demonstrate and develop the students' use of numeracy.

Subject	Opportunities
Art	Transformations of shapes, tessellations, scale drawing, geometric shapes in art, 2D and 3D modelling, positive and negatives, measures and angles
Drama	Mental arithmetic, spatial understanding, data analysis and timings
English	Identifying information within texts, recall of line numbered quotes
Geography	Measures, coordinates, scales, converting units, graphs and statistics
History	Timeline dates, interpreting statistics and graphs
ICT	Formulae, percentage calculations, databases, flowcharts and graphs
MFL	Money, time, numerical signs and information and number construction

Music	Counting, rhythm, scales, intervals, patterns and time signatures
P.E.	Units, measuring and recording, speed/distance/time calculations, limits of accuracy and angles
P.S.H.E	Money and finance, statistics and percentage calculations
R.E.	Dates and the calendar, graphs, charts and statistics
Science	Use of formulae, rearranging formulae, graphs, interpolation and extrapolation from data, rates of change, standard form calculation
Technology	Measures, conversions, ratio and proportion, costing, constructions, plans and elevations, graphs and percentage calculations

Use of calculators

Students are expected to bring their own scientific calculators to lessons, in accordance with the equipment policy. When working on any task, requiring numeracy skills, students should:

- Consider mental methods as a first resort
- Have sufficient understanding of the task to decide on the most appropriate method
- Have the knowledge to use the calculator correctly and efficiently
- Be aware of how to interpret a calculator display, for example when dealing with money, fractions or decimals
- Consider whether their answer is reasonable within the context of their work

Literacy and vocabulary

The development of literacy is important in helping our students develop a secure understanding of mathematics. A fluent understanding of vocabulary will help our students to become better problem solvers and communicators, it will aid their understanding of more complex mathematical ideas and give them the tools to understand and apply mathematics academically and in the wider world.

Students are encouraged in their development to use the correct mathematical terms when discussing or writing.

Tier 1, 2 and 3 vocabulary is highlighted and definitions made explicit to students during lessons, examples and non-examples are provided where appropriate.

Word etymology can be used to aid students in their understanding of vocabulary and its roots, this can also make terms more memorable and increase the richness of the mathematics.

Discuss words that may have different meanings away from mathematics (tier 2).

Explicitly teach the meanings of command words, such as solve, factorise, and evaluate to ensure that students carry out the appropriate procedures when completing formal tasks like exams.

A list of mathematical terms required by the National Curriculum can be found in appendix 2 of the DfE guidance for teaching mathematics document.

Assessment and feedback

The Mathematics department at Hobart teaches using a spiral model for the National Curriculum, this enables us to revisit topic areas repeatedly. Each iteration of the spiral enables the department to reinforce prior learning and increase the depth and complexity of each topic. Teachers are continuously monitoring and assessing students to gauge their understanding which in turn supports subsequent lesson planning. Teachers have autonomy to employ a range of strategies to best meet the needs of their learners but some commonly used approaches are:

- Short diagnostic quizzes which occur prior to a unit of work
- Retrieval activities and quizzes used to either activate prior knowledge in advance of a lesson or to judge the recall of skills covered in the previous week/term/year.
- Use of mini-whiteboards to assess whole class understanding
- Use of strategic cold call questioning
- Self and peer assessed quizzes midway through a unit of work
- Homework tasks that contain a combination of topics from the previous week/term/year
- Homework tasks that repeat similar styles of question to allow students to act upon feedback provided in lessons
- Use of DNA feedback for either an end of term assessment, a piece of homework or a piece of classwork.
- End of term assessment that assess 3 sections: retrieval knowledge, recently covered knowledge and applied knowledge.

Appendix: commonly used calculation strategies

Multiplication

Grid multiplication

27 x 56 =

	20	7	x
			50
			6

27 x 56 =

	20	7	x
	1000	350	50
	120	42	6

27 x 56 = 1512

	1	0	0	0
		3	5	0
		1	2	0
+			4	2
	1	5	1	2
		1		

Multiplication

Napier multiplication

94 x 32 =

	9	4	x
			3
			2

94 x 32 =

	9	4	x
	2 7	1 2	3
	1 8	0 8	2

94 x 32 = 3008

	9	4	x
	2 7	1 2	3
	1 8	0 8	2
	3	**0**	**0** **8**
	1	1	

Notes

The grid method relies on students being confident with multiplication of numbers that are multiples of 10, for example 20 x 60 = 1200

The Napier method requires students to have a secure knowledge of multiplication facts up to 9 x 9.

The Napier method can also be adapted for decimal calculations.

Division

Short division – no remainder

795 ÷ 5 =

$$5 \overline{)\,7\ 9\ 5}$$

795 ÷ 5 =

$$\begin{array}{r} \quad 1 \\ 5 \overline{)\,7\ {}^{2}9\ \ 5} \end{array}$$

795 ÷ 5 = 159

$$\begin{array}{r} \quad 1\ \ 5\ \ 9 \\ 5 \overline{)\,7\ {}^{2}9\ {}^{4}5} \end{array}$$

Short division – With a remainder

523 ÷ 4 =

$$4 \overline{)\,5\ 2\ 3}$$

523 ÷ 4 =

$$\begin{array}{r} \quad 1\ \ 3\ \ 0 \\ 4 \overline{)\,5\ {}^{1}2\ \ 3\ {}^{3}} \end{array}$$

523 ÷ 4 = 130.75

$$\begin{array}{r} \quad 1\ \ 3\ \ 0.7\ \ 5 \\ 4 \overline{)\,5\ {}^{1}2\ \ 3.{}^{3}0\ {}^{2}0} \end{array}$$

Notes
Students get confused with the use of the remainder either adding it to the number in the next column or not using it in subsequent calculations.

Addition

Column addition

429 + 615 =

$$\begin{array}{r} 4\ 2\ 9 \\ +\ 6\ 1\ 5 \\ \hline \end{array}$$

429 + 615 =

$$\begin{array}{r} 4\ 2\ 9 \\ +\ 6\ 1\ 5 \\ \hline \quad\quad 4 \\ \quad 1\ \ \ \end{array}$$

429 + 615 = 1044

$$\begin{array}{r} 4\ 2\ 9 \\ +\ 6\ 1\ 5 \\ \hline 1\ 0\ 4\ 4 \\ 1\ \ \ 1\ \ \end{array}$$

Notes
Students forget to carry numbers over or do not do this correctly.

Subtraction

Column subtraction

827 – 351 =

$$\begin{array}{r} 8\ 2\ 7 \\ -\ 3\ 5\ 1 \\ \hline \end{array}$$

827 – 351 =

$$\begin{array}{r} 8\ 2\ 7 \\ -\ 3\ 5\ 1 \\ \hline 6 \end{array}$$

827 – 351 = 476

$$\begin{array}{r} {}^{7}\not{8}\ {}^{1}2\ 7 \\ -\ 3\ 5\ 1 \\ \hline 4\ 7\ 6 \end{array}$$

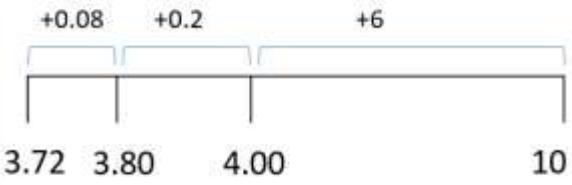
Notes
Students always take the smaller number away from the larger number regardless of the calculation.

Subtraction

Number line

10 – 3.72 =

10 – 3.72 = 6.28



Notes
Students may count the starting position as "one jump" along the number line

Percentages

Calculate a percentage of an amount (non calculator)

Calculate 16% of £240	Calculate 16% of £240	Calculate 16% of £240
100% = 240	100% = 240 10% = 24 (240 ÷ 10) 5% = 12 (24 ÷ 2) 1% = 2.4 (24 ÷ 10)	10% + 5% + 1% = 16% 24 + 12 + 2.4 = 38.4

Calculate a percentage of an amount (using a calculator)

Calculate 38% of £570	Calculate 38% of £570	Calculate 38% of £570
$38\% = \frac{38}{100} = 0.38$	0.38 x 570	0.38 x 570 = £216.60

Convert a fraction to a percentage (non calculator)

17 'out of' 25	17 'out of' 25	17 'out of' 25
$\frac{17}{25}$	$\frac{17}{25} \overset{\times 4}{=} \frac{68}{100}$	$\frac{17}{25} = \frac{68}{100} = 68\%$

Convert a fraction to a percentage (using a calculator)

35 'out of' 54	35 'out of' 54	35 'out of' 54
$\frac{35}{54}$	$\frac{35}{54}$ x 100	$\frac{35}{54}$ x 100 = 64.814 ≈ 64.8%

Calculating a percentage change (method 1)

1640 changes to 1950	1640 changes to 1950	1640 changes to 1950
$\frac{1950}{1640}$	$\frac{1950}{1640} \times 100$	$\frac{1950}{1640} \times 100 = 118.9$
		$\approx 18.9\%$ increase

Calculating a percentage change (method 2)

4320 changes to 3560	1640 changes to 1950	1640 changes to 1950
4320 – 3560 = 760 decrease	$\frac{760}{4320} \times 100$	$\frac{760}{4320} \times 100 = 17.593$
		$\approx 17.6\%$ decrease

Notes
It is important that the starting value is used as the denominator of the fraction in both techniques