

„Ex Sola Virtute Honor“



Assumption Grammar School

Numeracy Policy

November 2011

The Concept of Numeracy

[Numeracy is] on one hand ... an understanding of the scientific approach to the study of phenomena – observation, hypothesis, experiment, verification. On the other hand ... to think quantitatively, to realise how far our problems are problems of degree even when they appear as problems of kind. Statistical ignorance and statistical fallacies are quite as widespread and quite as dangerous as the logical fallacies which come under the heading of illiteracy. How ever able a boy may be ... if his numeracy has fallen short at the usual fifth form level, he is in danger of relapsing into innumeracy.

[Crowther Report, 1959]

We would wish the word 'numerate' to imply the possession of two attributes. The first of these is 'at-homeness' with numbers and an ability to make use of mathematical skills which enables an individual to cope with the practical mathematical demands of his everyday life. The second is an ability to have some appreciation and understanding of information which is presented in mathematical terms, for instance in graphs, charts or tables or by reference to percentage increase or decrease. Taken together, these imply that a numerate person should be expected to be able to appreciate and understand some of the ways in which mathematics can be used as a means of communication. Our concern is that those who set out to make pupils 'numerate' should pay attention to the wider aspects of numeracy and not be content merely to develop the skills of computation.

[Mathematics Counts (Cockroft Report), 1982]

Numeracy is the confidence and competence to apply mathematical skills in routine and unfamiliar contexts. It involves having the mathematical skills necessary to be a full contributor to society and the economy, including those central to personal financial literacy, and having the disposition to think mathematically in everyday situations, including those arising in future employment. It involves the development of an understanding of key mathematical concepts and inter-connectedness, the systematic development of reasoning and problem-solving skills, the proficient and appropriate use of methods and procedures (formal and informal, mental and written), and active participation in the exploration of mathematical ideas and models.

[DENI: A Strategy for Raising Achievement in Literacy and Numeracy – Consultation Document, 2008]

Numeracy is the ability to apply appropriate mathematical skills and knowledge in familiar and unfamiliar contexts and in a range of settings throughout life, including the workplace.

[DENI: Count, Read: Succeed, 2011]

Rationale for the Numeracy Policy

The need for schools to promote numeracy skills is clearly outlined in the Department of Education's school improvement plan, Every School a Good School, and this need is reiterated in detail in the Department's 2011 strategy for literacy and numeracy, Count, Read: Succeed. In achieving the primary aim of the curriculum at Assumption Grammar School of empowering our pupils to achieve the very best of which they are capable, we commit ourselves to developing pupils' skill in numeracy to the very highest standard. Whilst the need for sound numeracy skills for education and employment cannot be understated, it is recognised that proficiency in numeracy can enhance a pupil's general cognitive processing capabilities, including logical and deductive reasoning, as well as her capacity for the appreciation of aesthetic order.

Aim of the Numeracy Policy

The principal aim of the Numeracy Policy is to facilitate the development of sound functional numeracy skills in every pupil by ensuring she can confidently apply appropriate mathematical knowledge and understanding in a range of contexts. We will meet this aim by:

1. creating a shared accountability for raising and maintaining standards of numeracy appropriately across the curriculum;
2. enabling the teachers of mathematics to take a leading role in making informed assessments of pupils' numeracy levels and supporting them in doing so;
3. making full use of external and internal data, including SIMS information, GL Assessments and CAT Scores for accurate benchmarking and measurement of levels of numeracy;
4. ensuring that the Senior Leadership Team and Heads of Department expect, and set, the highest possible standards in numeracy both within the curriculum and beyond it.

Formal assessment of numeracy will be carried out in the Mathematics department and will be incorporated in assessment of mathematics. A non-exhaustive list of numeracy skills which a year 8 pupil would normally have, and which are confirmed during Year 8, are given in Appendix A. The main skills developed in the Junior School are listed in Appendix B.

Numeracy Policy in Practice

At Assumption Grammar School we adopt a co-ordinated approach to the development of numeracy skills across the curriculum by adhering to the following general principles for the development of numeracy:

1. mathematical techniques are taught in Mathematics lessons before they are used in any other curriculum area;
2. teaching strategies employed across the curriculum promote the understanding of a technique as well as its application and not just the mechanical processes involved;
3. there is a uniformity of approach to mathematical content across all subjects;

4. when mathematical vocabulary is used, it is used accurately.
5. pupils are made explicitly aware of the transferability of the skill of numeracy wherever possible.

In liaison with the Head of Mathematics, heads of academic departments identify appropriate places within their schemes of work where a specific numeracy skill would either enhance or support the understanding of another concept, topic, issue, etc. Consensus is then reached as to the manner in which the skill is approached to ensure that pupils are being taught in a consistent manner.

In general, teachers in the Mathematics department will:

- 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 in departments other than Mathematics will:

- 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;
- provide information for mathematics teachers on the stage at which specific numeracy skills will be required for particular groups;
- provide resources for mathematics teachers to enable them to use examples of applications of numeracy relating to other subjects in mathematics lessons.

Use of Calculators

From Year 9 onwards, every pupil will need to have her own scientific calculator in Mathematics lessons and for homework. It is understood that the use of a calculator is often essential in advanced work but its appropriate use must be monitored by the teacher. In particular when setting tasks involving calculations, teachers must decide whether the use of a calculator is banned, ignored, allowed, encouraged or compulsory and must communicate this to pupils. In making this decision, teachers should ensure that pupils have sufficient understanding of the calculation to decide the most appropriate method: mental, pencil and paper or calculator.

Appendix A – Baseline Skills (Consolidated in Year 8)

The following skills are those which pupils will have had experience of developing throughout Primary School. They should:

- have a sense of the size of a number and where it fits in the number system;
- know number bonds by heart e.g. tables, doubles and halves;
- use what they know by heart to work out answers mentally;
- calculate accurately and efficiently using a variety of strategies, both written and mental;
- recognise when and when not to use a calculator; using it efficiently if needs be;
- make sense of number problems, including non-routine problems, and recognise the operations needed to solve them;
- explain their methods and reasoning using correct mathematical terms;
- judge whether their answers are reasonable, and have strategies for checking;
- suggest suitable units for measuring;
- make sensible estimates for measurements;
- explain and interpret graphs, diagrams, charts and tables;
- use the numbers in graphs, diagrams, charts and tables to predict.

Appendix B – Further Skills (Developed in the Junior School)

By the end of Year 10, pupils 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 their methods, reasoning and conclusions, using correct mathematical terms;
- judge the reasonableness of solutions and check them when necessary;
- give their results to a degree of accuracy appropriate to the context.

ROMAN SUDOKU

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		II		IX		VIII		
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Jesus' First Miracle

"On the third day after Jesus' baptism, there was a wedding in Cana of Galilee, and the mother of Jesus was there. Jesus and his disciples had also been invited to the wedding. When the wine gave out, the mother of Jesus said to him, 'They have no wine.' And Jesus said to her, 'Woman, what concern is that to you and to me? My hour has not yet come.' His mother said to the servants, 'Do whatever he tells you.' Now standing there were six stone water-jars for the Jewish rites of purification, each holding twenty or thirty gallons. Jesus said to them, 'Fill the jars with water.' And they filled them up to the brim. He said to them, 'Now draw some out, and take it to the chief steward.' So they took it. When the steward tasted the water that had become wine, and did not know where it came from (though the servants who had drawn the water knew), the steward called the bridegroom and said to him, 'Everyone serves the good wine first, and then the inferior wine after the guests have become drunk. But you have kept the good wine until now.' Jesus did this, the first of his signs, in Cana of Galilee, and revealed his glory; and his disciples believed in him."

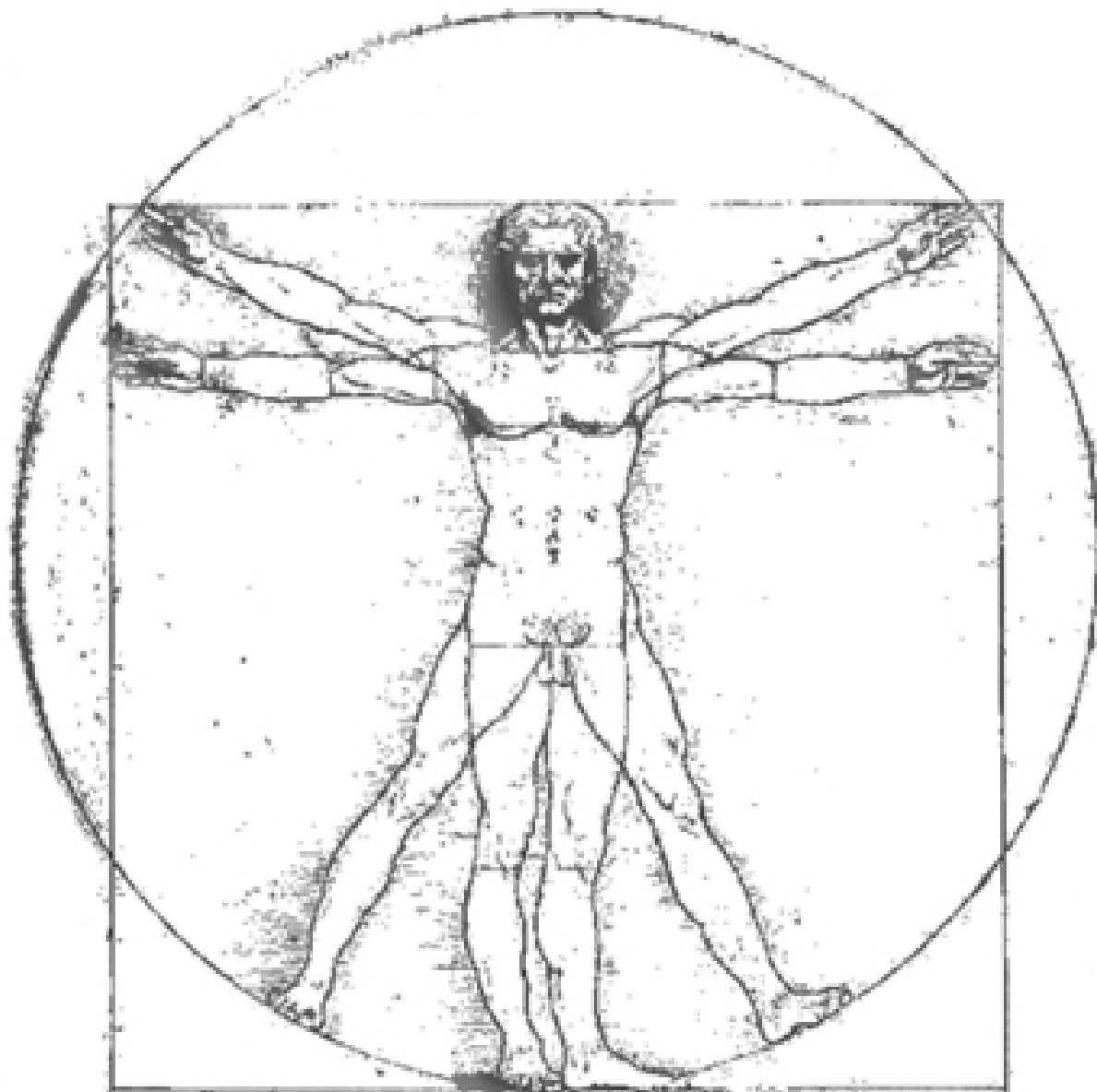
Mk 1: 9-11

Six stone jars holding 25 gallons of water each is 150 gallons of water.

1 gallon is approximately 4.5 litres, so 150 gallons is $150 \times 4.5 = 675$ litres.

A bottle of wine holds $\frac{3}{4}$ of a litre of wine so 675 litres is $675 \div \frac{3}{4} = 900$ bottles of wine.

VITRUVIAN MAN
Leonardo da Vinci, 1487



ESCHER TESSELLATIONS
Max Escher

