The Skinners' School

Numeracy Policy

Policy Area:	Curriculum/Teaching/Learning
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LG Responsibility:	Roger Bee

Skinners' School

Numeracy Policy

Skinners' students are highly numerate. The purpose of this policy is not only to raise standards but also to ensure consistency and so ease the transfer of skills from one area of the curriculum to others with efficiency and confidence.

A definition of numeracy:

At Skinners', numeracy is a proficiency which is developed not only 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 is gathered by counting and measuring and presented in graphs, diagrams, charts and tables.

Improving levels of numeracy will provide:

- competence and confidence in mathematical knowledge, concepts and 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 communicate mathematics.
- an ability to use and apply mathematics across the curriculum and in real life situations.
- an understanding of mathematics through a process of enquiry and experiment.
- consistency of practice including methods, vocabulary, notation.
- ease the transfer of pupils' knowledge, skills and understanding between subjects.

Raising Standards

Numeracy is not only a way of improving results in Mathematics, but is also a mathematical and statistical skill which promotes student learning and progress in other areas of the curriculum.

Consistency of Practice

Teachers of Mathematics 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 of subjects other than Mathematics will:

Promote the importance of numeracy, particularly the importance of accurate use of statistics, data and scientific method in enquiry, specifically they:

- should be aware of appropriate expectations of students and difficulties that might be experienced with numeracy skills.
- they may provide information for Mathematics teachers on the stage at which specific numeracy skills will be required for particular groups.
- they may provide resources for Mathematics teachers to enable them to use examples of applications of numeracy relating to other subjects in Mathematics lessons.

Appendix 1

As some rules and conventions are subject specific, teachers of other subjects involving high levels of subject specific numeracy 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. For example:

1. All calculations should be done using this column setup:

2. For multistage problems each step should be on a separate line:
   a. Bad: 2 x3 = 6 x4 = 24 -9 = 15 /3 = 5
   b. Good: 2 x 3 = 6
      6 x 4 = 24

      24 – 9 = 15
      15/3 = **5**

3. Any calculations involving measurements should include units in the answers where appropriate – some quantities, such as refractive index do not have units.

4. In Maths, for multistage calculations no intermediary answers should be rounded if they will be used again in finding the final answer. This is not a requirement at GCSE or A-level science, although it is good practice.

5. If a final answer is rounded the degree of accuracy (in science this word should be **precision**) to which it has been rounded should be stated eg (2dp) or (3sf). In science it is a requirement that answers should be rounded to the same number of significant figures as the data provided in the question. So the answer 247 861 should be given as either 248 000 or as 250 000 depending on the given data or the instructions in the question. Answers in science should NEVER be given as fractions, multiples of π, square roots or with a dot indicating a recurring number, but always to 2 sf or 3 sf, otherwise marks are deducted in science exams.

6. Also, accuracy and precision are not the same thing. Measurements are **accurate** if they are close to the true value. They are **precise** if there is very little variation and have been measured to more sf.

So if the true value is 35, a student who has four data of 32, 34, 36 and 38 has been accurate (the mean is 35) but not precise. A student whose measurements are 32.0, 32.3, 32.5, 32.4 has been more precise but not as accurate since the mean is 32.3.
Data is **representative** when the sample accurately reflects the members of the entire population.
Evidence is **reliable** when results are similar when the evidence gathering is repeated.

7. When writing large numbers such as 1 million commas should not be used to separate groups of 3 numbers: 1,000,000 as commas represent a decimal point elsewhere in the world. A small space should be left between groups of 3 numbers: 1 000 000. Where appropriate, standard form or a suitable prefix should be used, eg 1×10^6 N or 1 MN.

8. When drawing a table of results the name of the quantity being measured, and its unit where appropriate should be shown in the table heading using a forward slash, eg Force/N, NOT with brackets - Force(N) is incorrect. Units should not be written next to every entry in the table.

9. All graphs should be drawn in pencil, have uniform scales, a title, labelled axis and where appropriate the independent variable on the x-axis. In science, titles are not a requirement as long as the axes have been properly labelled. For accuracy, the plotted points must cover at least half of the grid in both directions. A line of best fit should either be a smooth curve or a straight line drawn using a ruler.

10. All maps should show an appropriate scale or should be labelled ‘not to scale’.

Finally,

To promote numeracy skills outside of lessons Form Tutors and Heads of Year are encouraged to develop form time activities to allow students to engage in numeracy and especially mental maths. Older students following higher level Mathematics courses should also be encouraged to explore wider elements of numeracy through reading, for example publications such as Fermat’s Last Theorem and Stephen Hawking’s A Brief History of Time.