NEW CHARTER ACADEMY

NUMERACY POLICY

1 Introduction

New Charter Academy is committed to raising the standards of Numeracy amongst 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.

The DCSF define Numeracy as:

> *"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 – yrs 7 to 9 – DCSF)

The Academy will adopt a whole-school approach to numeracy to:

a) develop, maintain and improve standards of numeracy across the Academy;
b) ensure consistency of practice including methods, vocabulary, notation, etc.;
c) indicate areas for collaboration between subjects;
d) assist the transfer of students' knowledge, skills and understanding between subjects.

2 Raising Standards

Raising Standards in Numeracy across the Academy cannot be solely judged in increased test percentages. There is a need to evaluate the students' ability to transfer mathematical skills into other subject areas and applying techniques to problem solving. A student's confidence in attempting this is initially as important as achieving the correct solution. Student interviews and work sampling will be the main processes for evaluating the success of our practice.

3 Responsibilities

3.1 Senior Management Team

The Senior Management Team has a commitment to the implementation and evaluation of this work. They are aware of the need to create time for liaison and sustain the cross curricular links forged between subject areas. The effectiveness of these links will reduce the replication of work by teachers and students.

3.2 **Numeracy Co-ordinator**

The Academy will have a Numeracy Co-ordinator who will be responsible for co-ordinating the whole-school approach to Numeracy. Pilot work in many schools has shown that a designated person with oversight of "Numeracy across the Curriculum" has led to effective practice and positive change.

3.3 **Teachers of Mathematics**

Teachers of mathematics should:

a) 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;

b) provide information to other subject teachers on appropriate expectations of students and difficulties likely to be experienced in various age and ability groups;

c) 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;

d) seek opportunities to use topics and examination questions from other subjects in mathematics lessons.

3.4 **Other Subject Teachers**

Teachers of subjects other than mathematics should:

a) 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;

b) be aware of appropriate expectations of students and difficulties that might be experienced with numeracy skills;

c) provide information for mathematics teachers on the stage at which specific numeracy skills will be required for particular groups;

d) provide resources for mathematics teachers to enable them to use examples of applications of numeracy relating to other subjects in mathematics lessons.

4 Numeracy Techniques and Practices

4.1 **Mental Arithmetic Techniques**

Staff will be trained on the variety of mental arithmetic techniques to be used by students.

Students should be taught and encouraged to carry out calculations mentally using a variety of methods appropriate to their age and ability.

All departments should give every encouragement to students using mental techniques but should also ensure that they are guided towards efficient methods and do not attempt convoluted mental techniques when a written or calculator method is more appropriate.

4.2 **Written Calculations**

Students must be encouraged to write numbers simply and clearly.

Staff will be trained on the variety of techniques to be used by students when undertaking written calculations.

Again, all departments should ensure that students are guided towards efficient methods and do not attempt convoluted written techniques.

4.3 **Whole school Policy on the use of calculators**

Students are permitted to use calculators but wherever possible, particularly for simple calculations, should be encouraged to use mental or written arithmetic techniques.

When using calculators students should be encouraged to make an estimate of the answer before completing the calculation.

The school expects all students to bring their own scientific calculator to lessons when required.

In deciding when students use a calculator in lessons staff should ensure that:

- a students first resort is mental methods;
- students have sufficient understanding of the calculation to decide the most appropriate method: mental, pencil and paper or calculator;
- students 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, etc.;
- students understand arithmetical operations and recognise which to use to solve a particular problem;
- when using a calculator, students are aware of the processes required and are able to say whether their answer is reasonable;
- students can interpret the calculator display in context (e.g. 5.3 is £5.30 in money calculations);
- students receive help where necessary, to use the correct order of operations, especially in multi-step calculations.

4.4 **Vocabulary**

Students should become confident in the meaning of words so that they can follow the instructions in a given question or interpret a mathematical problem. For example a student reading a question including the word perimeter should immediately recall what that is and start to think about the concept rather than struggling with the meaning of the word and losing confidence in his/her ability to answer the question.

The instant recall of vocabulary and meanings can be improved through flash card activities, reviewing key vocabulary at the start of a unit of work or recalling vocabulary from previous units of work.

The following techniques are also useful when helping students with the technical vocabulary of Mathematics:

- use of Word walls;
- using a variety of words that have the same meaning e.g. add, plus, sum;
- encouraging students to be less dependent on simple words and exposing them to more complex terms e.g. the word multiply as a replacement for times;
- discussion about words that have different meanings in Mathematics from everyday life e.g. take away, volume, product etc;
- highlighting word sources e.g. quad means 4, lateral means side, so that students can use them to help remember meanings. This applies to both prefixes and suffixes to words.

4.5 Measures

The use of measures is an area that can vary between subjects particularly between mathematics and technology lessons. Students will be taught how to convert measures and, perhaps most importantly, have a sense of the relative size and dimension of different of measures. Increasing student confidence and competence in the use of practical equipment such as rulers and protractors will also be a key objective.

5 Delivery and Transfer of Skills

The Mathematics team will deliver the National Curriculum knowledge, skills and understanding through the Numeracy Strategy Framework using direct interactive teaching, predominantly in “3 part” lessons. They will make references to the applications of Mathematics in other subject areas and give contexts to many topics. Other curriculum teams will build on this knowledge and help students to apply them in a variety of situations. Liaison between curriculum areas is vital to students being confident with this transfer of skills; the Mathematics team will provide support to achieve this.

The transfer of skills is something that many students find difficult. It is essential to start from the basis that students realise it is the same skill that is being used; sometimes approaches in subjects differ so much that those basic connections are not made.

The 3 part lesson will enable the Mathematics Department to cover work for other subject areas at appropriate times. This is often in the starter activity where key skills are rehearsed and sharpened so that students gain more from the forthcoming application in the other subjects. For example links will be made in the following subject areas:

ART	Symmetry; use of paint mixing as a ratio context
ENGLISH	comparison of 2 data sets on word and sentence length
FOOD TECHNOLOGY	recipes as a ratio context, reading scales
GEOGRAPHY	representing data, use of Spreadsheets
HISTORY	timelines, sequencing events
ICT	representing data; considered use of graphs not just pretty ones
MFL	Dates, sequences and counting in other languages; use of basic graphs and surveys to practise foreign language vocabulary and reinforce interpretation of data
MUSIC	addition of fractions
PHYSICAL EDUCATION	collection of real data for processing in Maths
RELIGIOUS EDUCATION	interpretation and comparison of data gathered from secondary sources (internet) on e.g. developing and developed world
SCIENCE	calculating with formulae, units of area and volume
TEXTILES	scale, practical equipment, proportion

6 Monitoring, Evaluation and Review

The Senior Management Team and the Numeracy Co-ordinator will be responsible for monitoring the implementation and effectiveness of the Numeracy Policy on an annual basis. The recommendations of the Senior Management Team will be submitted to the Board of Governors or one of its Committees for consideration and, where applicable, approval.