

Numeracy across the curriculum:

key messages

This leaflet is for teachers of all subjects who have missed the initial whole-school training on numeracy across the curriculum. It summarises the main points and is best used as part of a departmental meeting.

Promoting improved standards of numeracy is an integral part of the Key Stage 3 National Strategy. In 2001–02 schools with Key Stage 3 pupils were expected to plan and run whole-school training focused on fostering cooperation and establishing collaboration between subject departments. This was intended as the start of continuing developments, so there is likely to be ongoing work in your school.

Each school received an extensive pack of materials, including ideas for training sessions, a video and a framework of objectives for numeracy across the curriculum. The pack is available from DfES Publications (tel. 0845 6022260, quoting the reference DfES 0697/2001). Printed materials can be found at www.standards.dfes.gov.uk/keystage3

Priority areas for development

In strengthening numeracy across the curriculum, the three priorities are:

- to improve accuracy, particularly in calculation, measurement and graphical work;
- to improve interpretation and presentation of graphs, charts and diagrams;
- to improve reasoning and problem solving.

Key messages for schools

- Numeracy across the curriculum is a long-term development for all departments, not just a one-off school training day.
- Schools should have evaluated their stage of development, selected the most appropriate units for successful initial training, and planned how the outcomes will be taken forward.
- Successful developments and implementation require senior management support and involvement if there is to be a sustained impact.
- Many schools have found that establishing a steering or development group for numeracy across the curriculum helps to maintain momentum.

Key messages for teachers

- Though developing numeracy may seem more relevant in some subjects than others, all teachers can play a part in supporting pupils' numeracy skills. Examples of the way you can help are outlined below.
- Just as with literacy across the curriculum, pupils appreciate consistency of approach and benefit from links being made across the curriculum.
- Improving pupils' numeracy skills will have benefits for their learning in other subjects. Pupils should be better able to describe, explain and justify their thinking, be more confident in using numbers in context and in handling data, and be more accurate in their graphical skills and in the use of measurements.

A definition of numeracy

By Year 9, 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 efficiently 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 appropriate to the context.

Video sequences

Video sequence 1

A group of pupils from John Masefield School, Ledbury, discuss their use of mathematics in other subjects, using a web diagram to show links. This is an interesting activity to try in other schools. Many pupils do not see the links between mathematics and other subjects.

- *Are there any surprises?*
- *Do pupils' perceptions agree with your own?*

Video sequence 2

In this sequence staff at John Masefield School, Ledbury, outline their approach to developing a whole-school approach to numeracy across the curriculum.

- *What aspects of work done in Ledbury could be developed in your school?*
- *Are there any other activities that might help to raise standards of numeracy across your school?*

Video sequence 3

Three video case studies illustrate how other subjects can support mathematics and the development of mathematical ideas. The first is a geography field trip and follow-up work from Sandbach School in Cheshire, and the second and third are a history lesson and an ICT lesson from John Masefield School in Ledbury.

- *To what extent do you already use mathematics in your own lessons?*
- *Do you teach mathematical skills as they arise or expect the pupils to have those skills already?*

Pupils benefit if you can make explicit connections in their learning.

Working in departments

In the *Numeracy across the curriculum* file a number of units provide valuable starting points for discussion in your department.

Unit 3 Mathematics through other subjects

This unit provides some useful starting points for discussion on mathematics and art and design, design and technology, geography, history, ICT, languages, music, physical education, PSHE, religious education and citizenship, science and special educational needs.

Unit 5 The Framework for teaching mathematics and the approach to calculation

This unit is particularly useful for teachers of subjects that make use of calculation skills. The *Framework for teaching mathematics: Years 7, 8 and 9* (ref: DfES 0020/2001) details a clear progression in calculation skills. The main messages are:

- Being able to calculate mentally lies at the heart of much mathematics.
- Pupils should be encouraged to approach a calculation by first asking themselves what is the most appropriate method: mental, written or using a calculator.

Unit 6 Using calculators in Key Stage 3

This unit emphasises that consistent approaches to using a calculator will help to reinforce the skills needed:

- deciding if using a calculator is the most appropriate method;
- estimating the answer first and generating the correct key sequences;
- interpreting results appropriately and checking the reasonableness of the answer.

Unit 7 Handling data in Key Stage 3

This unit emphasises the importance of:

- teaching handling data in the context of real statistical enquiries;
- developing pupils' skills in interpreting data and relating it to the original problem or question posed;
- being aware of common difficulties pupils experience in data handling work.

Sustaining the momentum

Ofsted's evaluation of the Key Stage 3 Strategy has highlighted that school training on numeracy across the curriculum stimulates productive discussion. The real challenge is seeing numeracy across the curriculum as a long-term development, not just a one-off training day. It is only by sustaining the momentum that you will see the benefits in terms of pupils' improved standards.