# Unit 4

*Reviewing and sustaining a whole-school policy*

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Unit 4

# Reviewing and sustaining a whole-school policy

## Objectives

- To consider the need to raise standards in numeracy
- To review the school's existing practice in numeracy across the curriculum by:
  - comparing existing practice with a video of work in another school
  - checking the requirements of the National Curriculum
  - discussing how best to sustain the work already started

## Suggested use and organisation

- Whole-staff meeting in schools with established practice on numeracy across the curriculum.
- If your school has already done a significant amount of work on numeracy across the curriculum, units 1 and 2 can be replaced by this unit. You may then wish to include parts of units 3 and 5 to form a double session.
- Since schools will be at different stages in the development of their policy, the structure of this unit is flexible. You may need to read through the other units to choose any other sections that may be relevant to your school's needs.
- The unit includes the same video sequences as units 1 and 2. You should watch all the video sequences beforehand to decide whether any of the others would promote more relevant discussions for your school.
- Staff should sit around tables in departmental groups; where possible there should be a member of the mathematics department with each group.

## Resources

- OHTs 4.0–4.5
- Handouts 4.1–4.3 (one set per participant)
- Copies of your current whole-school numeracy policy
- *Framework for teaching mathematics: Years 7, 8 and 9* (one copy per group)
- *Numeracy across the curriculum objectives* (one copy per group)
- Video sequences 1 and 2 (or other sequence(s) if preferred)


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## Session outline — 75 minutes

| | | |
|---|---|---|
| **Introduction**<br>The importance of numeracy to pupils' future attainment | Talk, discussion | 5 minutes |
| **Defining numeracy**<br>The definition of numeracy; looking at the Framework for teaching mathematics (optional); introducing *Numeracy across the curriculum objectives* | Talk, discussion | 25 minutes |
| **Reviewing the existing whole-school numeracy policy**<br>Comparing current school practice with a video case study | Talk, video, group discussion | 35 minutes |
| **Conclusion**<br>Deciding on the way forward in the development of the school's numeracy policy | Talk, group discussion | 10 minutes |

## Introduction — 5 minutes

Show **OHT 4.0** and outline the objectives of the session.

**OHT 4.0**

**Objectives**

- To consider the need to raise standards in numeracy
- To review the school's existing practice in numeracy across the curriculum by:
  - comparing existing practice with a video of work in another school
  - checking the requirements of the National Curriculum
  - discussing how best to sustain the work already started

Distribute copies of **handout 4.1** which lists quotes from *Does numeracy matter? Evidence from the National Child Development Study on the impact of poor numeracy on adult life* (Basic Skills Agency, 1997).

Allow participants time to read the handout, then ask them:

- What is your reaction to the information?
- Is the information what you expected?

Point out that numeracy is recognised as a key skill that is important for the employment opportunities of pupils at all levels of attainment.

Emphasise that the evidence shows that poor numeracy skills are a greater impediment to life chances than poor literacy skills and that by ensuring all members of staff support the drive to raise standards of numeracy we will be improving the career prospects of our pupils. Many pupils have a negative image of mathematics that we need to dispel.


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## Defining numeracy 25 minutes

Depending on when the school's numeracy policy was produced it may be necessary to introduce the definitions of numeracy taken from the *Framework for teaching mathematics: Years 7, 8 and 9*.

Distribute copies of **handout 4.2** (also included on **OHTs 4.1–4.3**), 'A definition of numeracy', and ask teachers to read through it. Point out the range of mathematics covered by the definition, stressing that it is not restricted to arithmetic.

**OHT 4.1**

### A definition of numeracy 1

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

**OHT 4.2**

### A definition of numeracy 2

By Year 9, pupils should:

- 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


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**OHT 4.3**

### A definition of numeracy 3

By Year 9, pupils should:

- 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

Allow participants, working in departmental groups, about 10 minutes to consider the definition, using **OHT 4.4** to guide their discussion.

**OHT 4.4**

### Discussion points

- Discuss the definition of numeracy and compare it, where possible, with that used in our whole-school numeracy policy
- How should our policy be updated to incorporate any differences?

Note any key points and agree when and how the school policy will be modified.

You may at this point like to introduce teachers to the *Framework for teaching mathematics: Years 7, 8 and 9*.

Mention briefly the purposes of each section of the Framework. Explain that some pupils will be working ahead and some behind the teaching programmes for their chronological age.

The most relevant cross-curricular objectives of the Framework have been gathered together in the leaflet *Numeracy across the curriculum objectives*. Allow a few minutes for participants to track progression in handling data. Ask them:

- How does this compare with your expectations?
- Is there any mismatch?

Unit 9 uses the *Numeracy across the curriculum objectives* to bring the mathematical expectations of departments into line with those in the Framework for teaching mathematics.


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## Reviewing the existing whole-school numeracy policy

35 minutes

Begin this section by showing **video sequences 1 and 2**. These highlight the work done at one school to improve pupils' numeracy skills across the curriculum.

John Masefield School in Ledbury has developed a whole-school approach to numeracy across the curriculum and made it the main school priority for the year. Video sequence 1, which lasts about 5 minutes, shows a group of pupils from Years 8, 9 and 10 discussing where they felt they used mathematics in other subjects. Video sequence 2, lasting about 12 minutes, shows how the school manages its numeracy initiative.

The school's initiative has included:

- running a whole-school INSET day on numeracy;
- surveying pupils and staff about the mathematics in other subjects;
- setting up a staff numeracy committee to coordinate activities;
- choosing a mathematical topic for each term, as the focus of activities across the curriculum.

Now ask staff, working in departmental groups, to discuss what your school could learn from the video sequences.

If changes are suggested, you could spend some time discussing them now.

The rest of the section should be spent discussing aspects of your school's current policy. Some suitable questions are suggested on **OHT 4.5**. These could be discussed in the same groups, allocating a different question to each group. Alternatively, you may choose to concentrate on particular questions for all groups to cover.

**OHT 4.5**

**Our current numeracy policy**

- How can we judge or measure our success in numeracy across the curriculum?
- How can we continue to involve all staff (for example, new staff/NQTs)?
- How can we incorporate any future changes in the curriculum into our numeracy programme?
- How can we make best use of ICT to improve numeracy?
- How successful have we been so far in informing and involving parents/governors in improving numeracy?

Ask the members of the mathematics department attached to each group to take notes for any future action.


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## Conclusion 10 minutes

Suggest that, in the previous discussions, staff will have formed a view on what have been the successes in the school's numeracy policy and what further developments are needed.

Conclude the unit by asking participants to note any action points on **handout 4.3**, 'Priorities for cross-curricular numeracy'.


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**OHT 4.0**

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**OHT 4.1**

## A definition of numeracy 1

By Year 9, pupils should:

- have a sense of the size of a number and where it fits into the number system
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- 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

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**OHT 4.2**

## A definition of numeracy 2

By Year 9, pupils should:

- 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

**Key Stage 3** *National Strategy*


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**OHT 4.3**

## A definition of numeracy 3

By Year 9, pupils should:

- 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


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**OHT 4.4**

## Discussion points

- Discuss the definition of numeracy and compare it, where possible, with that used in our whole-school numeracy policy
- How should our policy be updated to incorporate any differences?

**Key Stage 3** *National Strategy*


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**OHT 4.5**

## Our current numeracy policy

- How can we judge or measure our success in numeracy across the curriculum?
- How can we continue to involve all staff (for example, new staff/NQTs)?
- How can we incorporate any future changes in the curriculum into our numeracy programme?
- How can we make best use of ICT to improve numeracy?
- How successful have we been so far in informing and involving parents/governors in improving numeracy?


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**Handout 4.1**

# Is numeracy a problem?

In 1997, the Basic Skills Agency published *Does numeracy matter?*; the following notes are taken from that report.

- Against expectation, the groups showing the lowest levels of full-time labour market participation among men and women were those with poor *numeracy* rather than poor literacy (p. 10).
- We see signs here of an unexpected significance attached to numeracy in holding onto jobs (p. 11).
- As we might expect, those people in the poor numeracy + poor literacy group were most likely to be found in manual occupations. [But] … they were followed closely, not [by those] with poor literacy + competent numeracy, but [by those] with competent literacy + poor numeracy (p. 13).
- The differences between the numeracy and literacy groups demonstrate again the importance of poor numeracy in restricting access to job opportunities – this time within work itself (p. 15).
- People without numeracy skills suffered worse disadvantage in employment than those with poor literacy skills alone. They left school early, frequently without qualifications, and had more difficulty in getting and maintaining full-time employment (p. 27).
- One feature of the modern labour market is the relentless decline in unskilled and partly skilled occupations. Our case studies showed that people with poor numeracy were in exactly these kinds of jobs. As the number of such occupations declines further, then the people in them face increasing risk of unemployment. To improve their opportunities to get the kinds of jobs that are available, their numeracy skills have to be enhanced. This makes the case for viewing numeracy as just as important a target for educational intervention … as literacy (p. 28).

Taken from *Does numeracy matter? Evidence from the National Child Development Study on the impact of poor numeracy on adult life* (Basic Skills Agency, 1997)


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**Handout 4.2**

# 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;
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- 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.

Taken from the *Framework for teaching mathematics: Years 7, 8 and 9,* section 1, page 9 (DfEE, 2001)


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**Handout 4.3**

# Priorities for cross-curricular numeracy

| | 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 |
|---|---|---|---|
| Year 7 | | | |
| Year 8 | | | |
| Year 9 | | | |
| Other points for action | | | |


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