Unit 9

Next steps: departmental developments

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Objectives

- To ensure that each department's expectations for pupils' mathematics are in line with those in the *Framework for teaching mathematics: Years 7, 8 and 9*
- To explore opportunities for continued joint working

Suggested use and organisation

- All schools; whole-staff meeting and departmental time supported by the mathematics department.
- This session is most profitably considered *after* the whole-school INSET day and following on from other units, especially units 5, 6 and 7. Colleagues from other subjects can then use the knowledge they have gained to work with the mathematics department to ensure mathematical expectations are appropriately matched to the Framework.

Resources

- OHT 9.0
- Handouts 9.1–9.3 (one copy each; a final copy to be retained by the head of mathematics), and 1.4 or 4.3 (completed by each teacher)
- Copies of current departmental schemes of work and QCA guidance where appropriate; possibly illustrative examples from teaching materials
- Appendix 2, *Vocabulary checklist* (one copy per department)
- Appendix 3, *Mathematics glossary for teachers in Key Stages 1 to 4* (one copy per department)
- *Framework for teaching mathematics: Years 7, 8 and 9* (one copy per group)
- *Numeracy across the curriculum objectives* (at least one per department)

Session outline 75 minutes

Introduction Reviewing opportunities to use and apply mathematics in other subjects	Talk, discussion	10 minutes
Aligning mathematical expectations with those in the Framework Matching mathematics in departmental schemes of work to the progression in the Framework	Talk, group discussion	50 minutes (adjust time according to work required)
Conclusion Identifying future needs	Discussion	15 minutes

Introduction

10 minutes

Show **OHT 9.0** and outline the objectives of the session.

OHT 9.0

Objectives

- To ensure that each department's expectations for pupils' mathematics are in line with those in the *Framework for teaching mathematics: Years 7, 8 and 9*
- To explore opportunities for continued joint working

Remind colleagues that collaboration between mathematics and other subjects can have different purposes:

- collaboration can help to raise standards in all subjects;
- mathematics departments can support the work of other subjects;
- other subjects may provide a context for developing and consolidating mathematical skills and reasoning;
- such collaboration can help pupils to make connections.

In previous sessions teachers have started to identify where mathematics is used in their subject. A few examples are listed below:

- handling data includes the mathematical skills in greatest demand in other subjects, particularly in work involving systematic measurement in science and geography;
- ideas of probability, chance and risk feature in PSHE and science;
- understanding of large numbers and of fractions, decimals and percentages is required in PSHE, science and geography;
- ratios often describe scales on maps;
- mental calculation skills and the use of a calculator are required in a range of subjects including science, PSHE and technology;
- algebraic representation, including the use of graphs, is a feature of scientific subjects;
- ideas of enlargement, accurate construction and measurement appear in design technology and art;
- symmetry and pattern occur in art and science.

There is an advantage in the variety of contexts in which pupils develop and practise their mathematical skills. Certain elements need to be consistent in a school, for example vocabulary, notation, conventions, the use of calculators, labelling of graphs and charts.

All of these examples present opportunities to use and apply mathematics – supporting problem solving, mathematical communication and reasoning.

Aligning mathematical expectations with those in the Framework 50 minutes

Many teachers of other subjects are likely to expect certain mathematical concepts to have been taught by particular stages of each year. It is important that these expectations are realistic and in line with the Framework.

Departments now have an opportunity to look carefully at the mathematics elements of their schemes of work. The mathematics department can then examine the timings and appropriateness of mathematical expectations in other subjects in relation to the progression outlined in the Framework.

Pupils are often taught in a mixture of setted and mixed ability groups within a school. Teachers should consider the expectations of the majority of pupils within their groups but also be aware of support for lower attaining pupils.

Introduce the task. Ask departmental teams to look in their current schemes of work for links with mathematics, and to complete the mathematics checklists on **handouts 9.1–9.3**. Some of this information may have been noted on **handout 1.4** or **4.3**, 'Priorities for cross-curricular numeracy', during previous sessions.

Explain that they need to identify and list which mathematics is used and when (to the nearest half-term). Emphasise that they need to be specific about the mathematics required – 'fractions' is too vague. The leaflet *Numeracy across the curriculum objectives* should help teachers to be more specific.

Then, **assisted by a member of the mathematics department**, they need to decide if the level of mathematics required is in line with that listed in the *Numeracy across the curriculum objectives*.

- When the mathematical needs of a subject follow on from its introduction in mathematics there is no concern.
- When the mathematical needs of a subject are within the same year there should be some negotiation between the subject and the mathematics department to ensure coherent coverage and appropriate timing.
- When the mathematical needs of a subject precede their introduction in mathematics, that subject will need to adjust its scheme of work to come in line with the Framework.

Take an example from a department and model the process.

Departments should make a start on this process and set a time-scale for its completion if all the work cannot be completed in the session.

Conclusion 15 minutes

Spend a few minutes as a group considering how the effect of any changes will be monitored and their effectiveness measured.

What further work does the department need to do to strengthen links with mathematics and improve standards for pupils?

These should be noted and fed back to the school's curriculum group.

Make sure that each department has a reference copy of:

- Appendix 2, *Vocabulary checklist*
- Appendix 3, *Mathematics glossary for teachers in Key Stages 1 to 4*

Remind everyone that establishing and maintaining a focus on numeracy across the curriculum is a long-term priority. It will take time to adjust and then reap the benefits of the work undertaken.

OHT 9.0

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Key Stage 3 *National Strategy*

Handout 9.1

Mathematics checklist: Year 7

Department:______________________________

Mathematical topics	Content and timing of areas of mathematics covered	Mismatch and rectification
Using and applying mathematics to solve problems Applying mathematics and solving problems		
Numbers and the number system Place value, ordering and rounding Integers, powers and roots Fractions, decimals, percentages, ratio and proportion		
Calculations Number operations and the relationships between them Mental methods and rapid recall of number facts Written/calculator methods Checking results		
Algebra Equations, formulae and identities Sequences, functions and graphs		
Shape, space and measures Geometrical reasoning: lines, angles and shapes Transformations Coordinates Constructions and loci Measures		
Handling data Specifying a problem, planning and collecting data Processing and representing data, using ICT as appropriate Interpreting and discussing results Probability		

Handout 9.2 # Mathematics checklist: Year 8

Department:______________________________

Mathematical topics	Content and timing of areas of mathematics covered	Mismatch and rectification
Using and applying mathematics to solve problems Applying mathematics and solving problems		
Numbers and the number system Place value, ordering and rounding Integers, powers and roots Fractions, decimals, percentages, ratio and proportion		
Calculations Number operations and the relationships between them Mental methods and rapid recall of number facts Written/calculator methods Checking results		
Algebra Equations, formulae and identities Sequences, functions and graphs		
Shape, space and measures Geometrical reasoning: lines, angles and shapes Transformations Coordinates Constructions and loci Measures		
Handling data Specifying a problem, planning and collecting data Processing and representing data, using ICT as appropriate Interpreting and discussing results Probability		

Handout 9.3 Mathematics checklist: Year 9

Department:______________________________

Mathematical topics	Content and timing of areas of mathematics covered	Mismatch and rectification
Using and applying mathematics to solve problems Applying mathematics and solving problems		
Numbers and the number system Place value, ordering and rounding Integers, powers and roots Fractions, decimals, percentages, ratio and proportion		
Calculations Number operations and the relationships between them Mental methods and rapid recall of number facts Written/calculator methods Checking results		
Algebra Equations, formulae and identities Sequences, functions and graphs		
Shape, space and measures Geometrical reasoning: lines, angles and shapes Transformations Coordinates Constructions and loci Measures		
Handling data Specifying a problem, planning and collecting data Processing and representing data, using ICT as appropriate Interpreting and discussing results Probability		