

ANGUS COUNCIL
EDUCATION COMMITTEE

22 JANUARY 2002

STANDARDS AND QUALITY IN PRIMARY SCHOOLS: MATHEMATICS 1998-2001

REPORT BY THE DIRECTOR OF EDUCATION

ABSTRACT

The purpose of this report is to seek the Education Committee's approval of proposals to take forward in Angus Primary Schools the recommendations made by HM Inspectors in the Mathematics Standards and Quality Report.

1 RECOMMENDATIONS

1.1 It is recommended that the Education Committee:

- (a) notes the terms of this report
- (b) notes and approves the proposals for action outlined in the attached report which take account of priority developments already in place in the Angus Education Service.

2 BACKGROUND

2.1 "Standards and Quality in Primary Schools: Mathematics 1998-2001" was published by HM Inspectors of Schools in May 2001. The report recognises that there are strengths in many aspects of Mathematics in primary schools. However, in keeping with practice in similar reports in other curriculum areas, the report identified areas of weaknesses and recommended courses of action to be addressed by schools and education authorities in remedying those weaknesses.

2.2 The recommendations related to the need to:

- improve problem-solving and enquiry programmes
- increase pupils' ability to solve problems and report their findings
- increase the pace of pupils' progress from P4-P7
- provide greater challenge for higher attaining pupils
- extend the opportunities for pupils to use ICT in Mathematics
- make more effective use of assessment information to plan pupils' next steps in learning

2.3 The attached report and action plan demonstrate the considerable commitment already made in Angus to address the recommendations listed in 2.2. Section 4 of the report describes a wide range of initiatives designed to improve the learning and teaching of Mathematics in Angus Primary Schools. Commitments made to date have taken account of self-evaluation activities carried out in the context of school planning procedures as well as of inspection reports on the performance of Angus Primary Schools.

2.4 The action plan proposals outlined in section 5 of the attached report will build on the considerable range of current development work described in section 4. It should be noted that developments in relation to specific programmes of study for the learning and teaching of Mathematics will be supported by the strong commitment to collaborative working within Angus school clusters. That commitment is a positive feature and key strength of curriculum development work within the Authority.

3 CONCLUSION

3.1 The Education Committee is asked to approve the action plan proposals in section 5 of the attached report and to note that these are likely to enhance the existing responses which the Authority and its schools are making to the recommendations for improvement in relation to Mathematics education made by HM Inspectors.

4 FINANCIAL IMPLICATIONS

Any costs arising from the attached action plan proposals will be contained within the Department's Revenue Budget.

5 HUMAN RIGHTS IMPLICATIONS

There are no human rights implications arising directly from this report.

6 CONSULTATION

The Chief Executive, the Director of Law and Administration and the Director of Finance have been consulted in the preparation of this report.

BACKGROUND PAPERS

No background papers, as defined by Section 50D of the Local Government (Scotland) Act 1973 (other than any containing confidential or exempt information) were relied on to any material extent in preparing the above report.

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ANGUS COUNCIL – EDUCATION DEPARTMENT

Standards and Quality in Primary Schools: Mathematics 1998 – 2001

Background

- 1.1 Standards and Quality in Primary Schools: Mathematics 1998-2001 was published by HMIE in May 2001. This report was the first in a series of Standards and Quality reports dealing with aspects of the curriculum in the primary school.
- 1.2 The evidence for the analyses, conclusions and recommendations was obtained from evaluations based on published performance indicators deployed by HMIE in 474 inspections of primary schools from January 1998 to the end of January 2001. The report incorporates evidence from around 3000 Mathematics lessons.
- 1.3 During this period of time mathematics in primary schools were influenced by the following initiatives:
 - The Early Intervention Programme (launched in June 1997)
 - Raising Standards: Setting Targets (introduced in 1998)
 - The introduction of Mental Mathematics questions to national tests (August 1999).
- 1.4 The report identifies a number of key strengths in mathematics education but also identifies significant weaknesses in problem solving and enquiry, pace of pupils' progress from P4 to P7, the level of challenge for higher attaining pupils, the opportunities for pupils to use ICT in mathematics and the use of assessment information to plan pupils' next steps in learning.
- 1.5 Identified strengths and development needs have been referred to under the following headings:
 - The Curriculum
 - Standards of Attainment
 - Quality of Learning and Teaching
 - Resources
 - Management and Quality Assurance.
- 1.6 The report follows on from "Standards and Quality in Scottish schools 1995 to 1998 (HMI Audit Unit, 1999) and "Improving Mathematics Education 5-14 (HMI, 1997).

2 Summary of the Report's Findings

The Curriculum

2.1 The key strengths of Mathematics in primary schools included:

- well balanced programmes covering the four key aspects of mathematics;
- regular emphasis on oral and mental mathematics;
- good standards of attainment at P1 to P4;
- well motivated pupils in almost all classes;
- good direct teaching, with increasing evidence of interactive approaches;
- very good supplies of resources.

2.2 The main areas requiring improvement were:

- problem-solving and enquiry programmes;
- pupils' ability to solve problems and report their findings;
- the pace of pupils' progress from P4 to P7;
- the level of challenge for higher attaining pupils;
- the opportunities for pupils to use ICT in mathematics; and
- the use of assessment information to plan pupils' next steps in learning.

Standards of Attainment

2.3 HMI found that overall attainment in mathematics was very good in 15% and good in 60% of schools. There was room for improvement in 25% of schools. To improve overall attainment schools needed to:

- raise expectations
- improve the pace of learning from P4 to P7. (Support for learning at these stages should be maintained to increase the proportion of pupils who attain at least level C before leaving primary school.)
- improve the level of challenge for abler pupils
- make more use of information in assessment planning.

2.4 Standards of attainment in coursework in information handling, number, money and measurement, shape, position and movement were good or very good in 90% of schools. Standards of coursework in problem-solving and enquiry were significantly weaker with only 55% of schools judged to be good or very good.

Quality of Learning and Teaching

2.5 The quality of learning was very good or good in almost all schools. The quality of teaching was very good or good in 95% of schools and fair in only 5% of schools.

2.6 Weaknesses in assessment included feedback, record keeping and the use of national tests. In particular there was a need to improve:

- the assessment of mental or problem-solving and enquiry skills
- the quality of feedback to pupils, including discussion of wrong answers
- the use of assessment evidence to identify next steps in pupils' learning
- the assessment evidence needed by teachers to decide when to confirm 5-14 levels of attainment in Mathematics
- the use of national tests to confirm teachers' judgement.

Resources

- 2.7 Almost all schools were well resourced for mathematics. The most common weaknesses in resources was the provision of ICT. Although schools were increasingly well stocked with computers they were not always accessible for mathematics.

Management and Quality Assurance

- 2.8 The most effective Head Teachers provided teachers with clear and effective policies, good quality programmes and a wide range of resources. In contrast, some Head Teachers over-relied on published mathematics schemes.
- 2.9 Some Head Teachers were effective in using a range of management strategies to create an ethos of achievement and improvement in mathematics to sustain the gains in attainment arising from Early Intervention throughout the school.
- 2.10 Self-evaluation in Mathematics was a weakness in many schools. Improvements were needed to involve teachers in reflecting on their teaching. In some schools promoted staff still did not use attainment data and samples of pupils' work to monitor pupil progress.

3 National Developments

- 3.1 Standards and Quality in Primary Schools : Mathematics 1998 – 2001, published May 2001.
- 3.2 Assessment of Achievement Programme, Sixth Survey of Mathematics 2000, distributed to local authorities September 2001. (Summary to schools June 2002).
- 3.3 HMI reports on schools increasingly feature the need to:
- Increase the pace and challenge of mathematics programme – particularly P4 – P7
 - Establish whole school approaches to problem solving.
- 3.3 SEED has issued a copy of the Peter Patilla mental mathematics video to all schools (see Angus Developments 4.9).
- 3.4 National Seminars (November/ December 2001) have been held to disseminate the results and recommendations of the two reports. (Standards and Quality in Primary Schools Mathematics 1998 – 2001; Assessment of Achievement Programme, Sixth Survey of Mathematics 2000).

4 Angus Developments

- 4.1 An exemplar Angus Programme of Study, based on 5 – 14 attainment targets for levels A – F, was issued to schools in 1999.
- 4.2 Individual schools and clusters of schools have customised and refined the Angus Programme for use in their own situation.
- 4.3 Mental mathematics has already been given particular emphasis. Courses on interactive mental mathematics, led by national experts in this field, have been included in the Council's Staff Development Programme over the past 3 sessions and these have been well attended by schools. This approach has also been a particular focus of the Early Intervention Support Team and interactive mental mathematics has been a feature of the in-service, advice and coaching in context that is provided to schools.

- 4.4 A Local Support Group has developed a programme of study for mental mathematics. This will be distributed to all schools in the spring term of session 2001 / 2002.
- 4.5 In-service training in problem solving was part of the Staff Development Programme for session 2001 / 2002.
- 4.6 A short-life working group of school staff and EDS members undertook a review of the Angus Council Programme of Study and linked the targets to resources within the Scottish Heinemann Mathematics Scheme.
- 4.7 An information pack for parents entitled 'Taking Off to Maths' on early years (pre-school – P2) mathematics has been developed. This will be distributed to parents in January 2002.
- 4.8 A guide to the nationally distributed Peter Patilla video on mental mathematics. has been provided for all schools by Angus Council.
- 4.9 Seven Angus delegates, with representatives from schools and E.D.S., attended the recent national seminar on Standards and Quality in Primary Mathematics.

5 Action Plan Proposals

- 5.1 A Local Support Group to be set up to develop a programme of study and guidance on a whole school approach to problem solving.

EDS April 2002/January 2003

- 5.2 Guidance and advice to be formulated on the use of ICT within mathematical contexts. This development work should have particular reference to programmes that can assist in shape, position and movement, graphs, databases and spreadsheets.

EDS/ICT Team January 2003

- 5.3 All schools to take account of national and local advice and ensure that they present a broad and balanced mathematics curriculum that presents sufficient pace and challenge to their pupils at all stages. Good practice highlighted in the Standards and Quality document to be used in school self-evaluation.

All Schools June 2003

- 5.4 Each cluster of schools to take steps to ensure that the mathematics programme of study covers levels A – F and offers consistency and continuity.

All Clusters June 2003

- 5.5 Each cluster of schools to ensure that relevant and appropriate information on each child's attainment and progress is shared and that this is effectively used to inform learning and teaching between P7 / S1.

All Clusters June 2003

- 5.6 A short-life Local Support Group should be established to undertake the development of teaching packs that will support schools in areas of mathematics that have been identified as weaknesses at a national level ie:

- Fractions, decimals, percentages at levels C,D & E.

EDS April – October 2002