An Roinn Oideachais agus Scileanna

Department of Education and Skills

Subject Inspection of Mathematics
REPORT

Maryfield College
Drumcondra, Dublin 9
Roll number: 60840K

Date of inspection: 3 March 2011
REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN MATHEMATICS

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Maryfield College, Drumcondra. It presents the findings of an evaluation of the quality of teaching and learning in Mathematics and makes recommendations for the further development of the teaching of this subject in the school. The evaluation was conducted over two days during which the inspector visited classrooms and observed teaching and learning. The inspector interacted with students and teachers, examined students’ work, and had discussions with the teachers. The inspector reviewed school planning documentation and teachers’ written preparation. Following the evaluation visit, the inspector provided oral feedback on the outcomes of the evaluation to the principal, deputy principal and subject teachers. The board of management was given an opportunity to comment in writing on the findings and recommendations of the report; a response was not received from the board.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

Maryfield College has a current enrolment of 637 girls. Timetable allocation and arrangements for level choice in Mathematics are very good. Students are placed in mixed-ability class groups on entry into first year and are assigned to higher and ordinary level classes at the beginning of second year. Where students are separated into higher and ordinary level groups, mathematics lessons are concurrently timetabled; this arrangement is valuable in allowing students to change level where necessary.

The mathematics department comprises a team of eight teachers. In all year groups, except sixth year, there is good rotation of levels taught among the team. Due to the number of students wishing to try higher-level Leaving Certificate Mathematics there are usually two higher-level groups formed in fifth year and this reduces to one group in sixth year; the same teacher takes this group each year. In the interest of maintaining the expertise to teach this level within the school, it is recommended that the number of teachers delivering higher-level Leaving Certificate Mathematics to sixth years be increased.

The school strongly supports teacher continuing professional development (CPD). Teachers have attended Project Maths workshops in addition to participating in whole-school CPD events on topics such as teaching exceptionally able students. It was evident throughout the evaluation that teachers use the experience gained from engaging in CPD to inform their practice and to enhance learning for students.

Mathematics is well resourced in the school. The resources used in lessons include; 3-D solids, geometry equipment, quizzes and puzzles and probability sets. Information and communications technology (ICT) provision for Mathematics is also very good. A number of interactive whiteboards, ceiling-mounted data projects and personal computers with audio facility are available for teaching and learning in Mathematics. The school’s computer room can also be used
for mathematics lessons. Broadband internet access is available throughout the school. These facilities were observed to be used effectively and creatively in the evaluation. Furthermore, in keeping with very good practice students create resources such as clinometers to use in their study of Mathematics.

Appropriate procedures are in place for identifying students who have learning support needs in Mathematics. Support is provided through one-to-one and small group withdrawal. Teachers provide individual attention to students on an ongoing basis throughout lessons. Overall, good arrangements are made for students experiencing difficulty with Mathematics.

Very good opportunities are provided for students to engage in extracurricular mathematical activities. Students participate in the Irish Mathematics Teachers’ Association table quiz, the Team Maths Challenge, the PRISM competitions, and the Irish Junior Mathematics Competition. Maths Week and World Maths Day are celebrated each year with events such as participation in the Hamilton Walk, organised for students. There is a mathematics notice board in the school which is used to advertise events and to display interesting mathematical ideas and facts. Participation in extracurricular mathematical activities is very valuable in encouraging an interest in the subject and in providing challenge and reward for the better able student and is therefore very worthwhile.

**Planning and Preparation**

Formal planning time is organised at least four times per year as part of the school planning process. The members of the mathematics department work very well as a team and organise frequent informal meetings to plan for the subject. There is a department co-ordinator and an assistant co-ordinator as well as co-ordinators for different year groups and levels. This arrangement allows for the work to be divided amongst members. However, the overall co-ordinator has held this position for a long time and it is recommended that it be rotated amongst all members of the teaching team to ensure that the expertise necessary to co-ordinate the department is retained within the school.

The minutes of the mathematics department meetings indicate that very good strategic planning takes place. Each year the focus of planning for that year is decided and this guides the work of the department. This year’s focus, for example, was on becoming familiar with the new syllabus documents, examining the material provided by the Project Maths development team and using these to design programmes of work for first and fifth year groups. This focused approach has meant that excellent programmes of work have been developed from the syllabus documents and teaching and learning plans have been designed by the mathematics teachers in a style similar to those developed by the Project Maths team. This is exemplary planning practice.

A very good mathematics plan has been developed and contains all of the policy documents relevant to the subject in addition to programmes of work for each year group and level. The programmes of work for the year groups not yet involved with Project Maths are comprehensive and in keeping with good practice are set out in terms of student learning outcomes.

Teachers team teach mathematics lessons by putting two class groups together for particular topics, where appropriate; this is a very valuable approach. In the past teachers shared expertise through observing each other’s lessons. It is recommended that consideration be given to reintroducing this valuable practice in order to share the very good approaches and strategies observed in the evaluation.
The transition year (TY) plan contains a good combination of syllabus and non-syllabus material. Topics include; statistical surveys, algebra, geometry investigations and probability. In addition students complete a civil engineering project and a project on prisms and nets. The resulting projects are displayed on the walls of classrooms. In keeping with very good practice the topics taught in TY change from year-to-year, for example, in the past a module of Applied Mathematics was covered in TY. The design of the TY programme for Mathematics in the school offers a valuable opportunity for students to engage with the subject on an enjoyable level and to appreciate the relevance of Mathematics in everyday life.

TEACHING AND LEARNING

Seven lessons were observed in the evaluation and in all cases the quality of teaching and learning was very high. Teachers used a wide range of methodologies and activities to engage students; these included investigation and discovery, pair work, and discussion. In all cases teacher explanations were clear and conceptual. ICT was used, where appropriate, to illustrate concepts and to enhance learning. The spirit of Project Maths was evident in all lessons including those that did not involve Project Maths material; this is evidence of the mathematics department’s commitment to embracing the recommended approach.

Teachers used a variety of questioning strategies to support learners in investigating and discovering the concepts taught. Students were encouraged to justify answers, explain their reasoning, draw conclusions and anticipate results. This was particularly evident in the lessons on geometry observed. Through working through the exercises chosen students were able to uncover the core concepts for themselves. Teachers facilitated the thorough exploration of ideas by asking open questions and providing the minimum of assistance. The quality of student contributions demonstrated that very good understanding was being achieved.

The ICT materials and worksheets used in lessons were very well designed to support learners. The PowerPoint presentation demonstrating the construction of the bisector of an angle and the in-centre of a circle prepared for one lesson contributed significantly to the clarity of teacher explanations. In another lesson a video clip of the movie ‘Ants’ was shown to illustrate the uses of complex numbers. Worksheet questions where carefully chosen to facilitate the logical development of concepts; using the Maclaurin series to expand an expression which resulted in a Binomial series provides a good example. Through using these materials students were able to link learning to real life and prior learning and this contributed to the depth of understanding achieved.

There was good practice in relation to differentiation of learning. The strategies used included; the provision of individual attention to any student experiencing difficulty, the provision of additional work to better able students, and the inclusion of activities that allowed students to work at their own pace. The individual needs of students were addressed well and this contributed to the high levels of stimulation and interest in lesson content observed.

Overall, it was evident that high quality learning was taking place. Students engaged and participated well in lessons and it was clear that they have developed the skills to work independently and to think for themselves. Teachers demonstrated high expectations of student achievement and in keeping with good practice only provided support where necessary; this encouraged students to take responsibility for their own learning. It was evident that students enjoy Mathematics and have a positive attitude to learning. Students preparing for the certificate
examinations work on examination papers at home in addition to their nightly homework; this is evidence of their levels of motivation and their commitment to reaching their potential.

In all cases the standard of student behaviour was exemplary. Classroom atmosphere was conducive to developing student confidence with the subject and in all cases the quality of relationships between the students and the teachers was excellent. There was a very strong sense of warmth and care in all of the classrooms visited. Students responded well to the affirmation and praise frequently supplied by their teachers. It was clear that students and teachers work very well together as a team.

ASSessment

Overall, there is good practice in relation to assessment. Formal examinations, with reports sent home, are held at Christmas and in May. Students preparing for the certificate examinations sit ‘mock’ examinations early in the second term. Class tests are given at the end of each topic covered. Common examinations are set for each year group and level which is good. In order to become familiar with the Project Maths marking schemes, where the emphasis is on students’ ability to demonstrate understanding, the mathematics department is using these schemes in the correction of in-house examinations which is excellent practice.

Teachers effectively assess learning on an ongoing basis through observation and oral questioning. In one case students were provided with acetate sheets on which to write answers; these were held up for the teacher to see. This allowed the teacher to quickly and comprehensively assess learning and it is suggested that this very good form of assessment be extended to other class groups.

Homework is given regularly and usually corrected as part of the following lesson. In keeping with good practice, teachers ensure that only the problematic elements of homework are corrected on the board and that students who have their homework done correctly are provided with additional work to do. In addition to nightly homework, longer pieces of work are assigned where appropriate; these are then taken up for correction. This is all good practice.

An analysis of the school’s performance in the certificate examinations compared to national norms is carried out annually and is used to inform planning for Mathematics. This analysis indicates that the school is performing well.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- There is good whole-school support for mathematics.
- Very good opportunities are provided for students to engage in extracurricular mathematical activities.
- The mathematics department engages in very good strategic planning and the curricular planning in relation to the introduction of Project Maths is exemplary.
- Seven lessons were observed in the evaluation and in all cases the quality of teaching and learning was very high.
- The ICT materials and worksheets used in lessons were very well designed to support learners.
• Students engaged and participated well in lessons and it was clear that they have developed the skills to work independently and to think for themselves.
• There was a very strong sense of warmth and care in all of the classrooms visited.
• There is good practice in relation to assessment and the analysis of student achievement in the certificate examinations indicates that the school is performing well.

As a means of building on these strengths and to address areas for development, the following key recommendations are made:
• In the interest of maintaining the expertise to teach this level within the school, it is recommended that the number of teachers delivering higher-level Leaving Certificate Mathematics to sixth years be increased.
• The position of mathematics co-ordinator should be rotated amongst all members of the teaching team to ensure that the expertise necessary to co-ordinate the department is retained within the school.
• In the interest of sharing the very good classroom practice evident in the evaluation teachers should observe each other’s teaching.

A post-evaluation meeting was held with the teachers of Mathematics, the principal and deputy principal at the conclusion of the evaluation when the draft findings and recommendations of the evaluation were presented and discussed.

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