An Roinn Oideachais agus Scileanna

Department of Education and Skills

Subject Inspection of Mathematics
REPORT

Rosary College
Armagh Road, Crumlin, Dublin 12
Roll number: 60841M

Date of inspection: 7 May 2010
REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN MATHEMATICS

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Rosary College, conducted as part of a whole school evaluation. 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 and deputy principal.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

Rosary College is a co-educational school which offers the Junior Certificate, Junior Certificate School Programme (JCSP), Leaving Certificate Applied (LCA) and the established Leaving Certificate to its 256 students. The structures in place and the range of programmes which the school has on offer are designed to cater for the wide range of its students’ abilities in Mathematics.

The time allocated to Mathematics is in line with syllabus guidelines. Four periods are allocated per week for first-year classes and five for second-year and third-year class groups. Leaving Certificate classes have five periods per week in fifth year and in sixth year. The Leaving Certificate Applied (LCA) programme has three periods of Mathematical Applications per week.

The mathematics department is large with seven teachers involved in the teaching of the subject. It is recommended that, over time, the numbers involved in the teaching of Mathematics be reduced, through the development of a core team of mathematics teachers, each of whom is allocated significant contact time with the subject.

The school has offered the JCSP programme to a portion of its junior cycle students for the past three years. This is a positive development, as is the annual review of incoming students to assess the proportion who will derive maximum benefit from the programme and their allocation to classes.

It is good that mathematics classes are concurrently timetabled for all years from second year onwards. This allows students access to all levels of the subject throughout their studies and facilitates transfer between levels.

Teachers are assigned to year groups by school management and, following a consultation process, to levels and classes. It is policy and practice within the school that in the interests of maintaining high levels of continuity, where possible, teachers remain with the same class groups from second to third year and from fifth to sixth year.
The mathematical abilities of all first-year students are formally assessed prior to entry into the school. This assessment, along with ongoing teacher monitoring and observation during first year helps to identify students who find the subject particularly difficult. Support for these students is provided through the JCSP mathematics programme and in some instances extra tuition through withdrawal for small-group or one-to-one tuition outside of their timetabled mathematics classes. This support is generally provided by a member of the mathematics team. The support aims to improve the numeracy skills of the student as well as supporting the learning that takes place in the mathematics classroom.

As part of its Delivering Equality of Opportunity in Schools (DEIS) planning the school should undertake testing to assess numeracy levels of students on entry to the school. There is also a need to have further testing at regular intervals. The data acquired can then be used to monitor the progress of students during their schooling and provide useful information on the added value that results from the interventions put in place by the school. It could also be used to identify students with the potential to follow higher level but who might require additional supports in first year and second year if they are to fulfil this potential.

While there is no specific budget for Mathematics, the teachers’ requests for purchase of resources are normally granted. The school has recently acquired a diagnostic kit and teachers have access to a data projector and other resources. There was little evidence of the use of information and communication technologies (ICT) in the teaching of Mathematics. It is recommended that the provision of hardware and the integration of technology into the teaching and learning of Mathematics be prioritised in the future.

The school does not engage in the good practice of conducting an analysis of the school’s performance in the certificate examinations in Mathematics in relation to achievement and uptake levels. Such analyses are useful in identifying trends and in informing future planning. An analysis of results in recent years indicates that strategies to promote the uptake of levels beyond foundation level are required in the school.

Teachers have availed of continuing professional development courses offered by the JCSP support service in recent years. It is unfortunate that members of the team were not facilitated to attend the two Project Maths workshops scheduled during the current school year. It is recommended that members of the mathematics team would avail of the in-service that will be provided in the coming years.

In many instances, good efforts have been made to enhance the physical working environments of the students through the use of a range of JCSP Maths and keyword posters. To further enhance the learning environment for all students, it is suggested that teachers also display and use examples of high-quality mathematical work and project work in the classroom.

**PLANNING AND PREPARATION**

Formal planning and review meetings are scheduled around staff meetings and school planning days. The mathematics department does not have a co-ordinator to direct its activities. It is recommended that the team would agree a list of duties to be undertaken by a co-ordinator, add this list to the department plan and appoint a member of the team to undertake these duties on a rotating basis within an agreed timeframe. It is further recommended that an electronic record of meetings be retained and that an agenda of meetings along with this record be included in the mathematics-planning folder and communicated to management.
The mathematics team has made progress in planning and has developed a plan for Mathematics using School Development Planning Initiative guidelines. The overall plan includes a mission statement, overall goals for mathematics education within the school, organisational details of classes and teachers, an inventory of resources, reference to a variety of methodologies, and a description of provision for students with special educational needs. This is in line with good practice.

The long-term plan for the subject is made up of lists of topics to be covered by individual class groups. The structure of this long-term plan should be reviewed. The plan should have timeframes for topics and subtopics which are accompanied by lists of learning outcomes to be achieved by students and the linking of resources and methodologies to these outcomes.

Immediate planning for Mathematics needs to take into account the introduction of strands of Project Maths in the coming year. This will require a high level of planning, co-operation and communication within the team.

Individual plans and records, made available by some teachers during the inspection were detailed and very good. Some teachers have developed supplementary materials such as handouts, charts and acetates for use in the teaching and learning of Mathematics.

**TEACHING AND LEARNING**

Generally the quality of teaching and learning observed was good. In all classes observed, lesson content was appropriate and in line with syllabus requirements. The presentation of work was clear and teachers were prepared for their teaching. Lessons progressed at an appropriate pace and effective use was made of time. In many instances, in order to ensure that the goal of the lesson was clear at all times, teachers explicitly shared the learning objectives of the lesson with students. Such an approach is in line with the principles of assessment for learning and is recommended for all lessons. It is also recommended that a review of the learning achieved, be conducted at the conclusion of the lesson. This will help to increase student motivation and maintain a better focus on learning during the lesson.

Teaching was mainly achieved through the presentation of work at the board followed by the setting of exercises which students worked on individually. This methodology was used effectively. However, over-reliance on this teaching strategy can result in students being passive recipients of knowledge and overly dependant on the teacher. In lessons, students could have participated more and been more actively engaged in the learning process. To complement this teaching style it is recommended that a wider range of teaching methodologies be explored, developed and included in the teaching of Mathematics. The *teaching and learning plans* prepared by the Project Maths Development Team and presented at their workshops could provide some useful templates of such methodologies. The incorporation of a range of strategies in lessons acknowledges students’ different preferred learning styles and takes advantage of the widely accepted benefits for students of being actively involved in their own learning.

In many instances, JCSP mathematics posters and keyword posters were used effectively to emphasise the correct use of mathematical terminology. Other examples of good practice in mathematics teaching observed included clarity in the worked examples which acted as templates for students’ work, clear explanations, affirmation of students’ efforts and the use of a diagnostic kit.
There were some commendable examples of teachers having high expectations of students' capabilities and students responded appropriately to these expectations. There were other instances where the explicit statement of an appropriately high standard of performance might have motivated students to achieve more. It is suggested that appropriately high levels of expectations, in relation to behaviour and achievement, be communicated to students on a regular basis to encourage students to achieve their potential.

Classroom management was observed to be effective in almost all cases. Students were generally attentive to and engaged in their work. Mutual respect between students and teachers was in evidence in many classrooms creating a positive working relationship. There were also many examples of the effective use of class time to provide assistance to individual students.

Classroom interactions generally took the form of brief answers by the students to questions posed by the teacher. These tended to be directed to individual students and to be recall and lower-order type questions. There were also, in line with good practice, some good examples of teachers using questioning to extend students’ skills and understanding and to encourage the expression of ideas in clear mathematical language. This approach can help students to strengthen their learning, maintain engagement with the topic and develop their problem-solving skills. It is recommended, therefore, that all teachers make more use of probing questions, in order to appropriately challenge students and to support them in developing the skills of mathematical thinking and communication.

Generally students were able to apply concepts and procedures taught to similar type questions from worksheets and textbooks. In interactions with the inspector, students were able to suggest solutions and justify answers to problems set in unfamiliar contexts. They were also observed to use mathematical language appropriately.

ASSESSMENT

The school has an assessment policy and this is commended. A school homework policy that recognises the important role that homework plays in the learning process is also required. Such a policy should then be adapted to different subjects including Mathematics. Homework was assigned in the majority of lessons observed. This homework was appropriate in terms of the quantity and relevance to the work done during the lesson. In some instances, however, students were not assigned homework. The teaching team should agree on a broad definition of the term “homework” and routinely set appropriate tasks for the students which would consolidate classroom learning or prepare for the following day’s topic.

Student progress is assessed through classroom observation, oral questioning, the assignment and correction of class work, homework, regular class topic tests and term examinations.

Progress in work covered in class can be seen in the students’ copybooks. An examination of a sample of mathematics copybooks revealed work that was appropriate, relevant and reasonably well presented. There was evidence of monitoring of students’ work, with, in some instances teachers’ written comments being used to encourage students’ efforts and direct their learning. This is good practice, in line with the principles of assessment for learning and should be used more widely.

In many instances the correction by students of their incorrect work in copybooks was not evident. It is important that the correct version of each problem reviewed in the classroom be available in students’ copybooks thereby creating a source of reference for students and a
template for further work. It is, therefore, suggested that greater emphasis is placed on ensuring that students play an active role in the monitoring of their own work.

The mathematics plan indicates that students are informally assessed at the end of each topic completed, as well as formally assessed at set times during the school year. In some instances during the inspection, teachers made available records of students’ attendance and performance in assessments. This is an indication that teachers are cognisant of the importance of students’ work, their attendance and the impact of absences on their learning and progress.

Information, to parents, regarding students’ progress is facilitated via an annual parent-teacher meeting for each year group and the student journal. Parents also receive reports from the school on their children’s progress twice a year. One report is issued for all classes after formal assessments at Christmas. Non certificate-examination classes have further formal assessments at the end of the school year. The remaining students sit their ‘mock’ examinations in the second term.

**SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS**

The following are the main strengths identified in the evaluation:

- The quality of teaching and learning observed was good overall.
- The structures in place and the range of programmes which the school has on offer are designed to cater for the wide range of the students’ abilities in Mathematics.
- Support for students who find Mathematics challenging is provided through the JCSP mathematics programme and in some instances extra tuition through withdrawal for small-group or one-to-one tuition outside of their timetabled mathematics classes.
- The mathematics team has made progress in planning.
- Classroom management was observed to be effective in almost all cases.

As a means of building on these strengths and to address areas for development, the following key recommendations are made:

- The number of teachers involved in the teaching of Mathematics should be reduced.
- The school should undertake testing to assess the students’ numeracy levels on entry to the school and to have further testing at regular intervals.
- An analysis of the performance of students in the certificate examinations should be undertaken each year and this analysis should be used to identify uptake trends that need to be addressed.
- Members of the mathematics team should avail of the CPD that will be available in the coming years in relation to Project Maths.
- A co-ordinator of Mathematics should be appointed from within the team.
- The long-term plan for Mathematics should be reviewed.
- A broader range of teaching methodologies should be explored, developed and included in the teaching of Mathematics.
- Students should be more involved in monitoring their own work.

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