

An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Mathematics
REPORT**

**Saint Mary's Secondary School Convent of Mercy
Mallow, County Cork
Roll number: 62350D**

Date of inspection: 24 September 2009



**AN ROINN | DEPARTMENT
OIDEACHAIS | OF EDUCATION
AGUS SCILEANNA | A N D S K I L L S**

**REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN MATHEMATICS**

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Saint Mary's Secondary School. 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.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

The mathematics department consists of twelve teachers and commendably all are subject specialists. The school provides an induction programme for new teachers and there is a culture of support among the members of the mathematics teaching team.

Classes are allocated to teachers through consultation with management. It is good practice within the school that, where possible, classes retain the same teacher from year to year. Levels are rotated between some members of the teaching team. The full rotation of teachers across levels in the junior cycle is positive. It is recommended that more teachers become involved in teaching higher level Leaving Certificate Mathematics and that a move towards more rotation of teachers in the senior cycle be considered. This will serve to extend and utilise the high level of competence and expertise witnessed at this level and should enable the school to meet the changing needs of the curriculum in the coming years.

Timetable provision for Mathematics is in line with syllabus requirements. Four mathematics lessons per week are allocated to the first-year group. The second-year and third-year groups all have five lessons each week. The Transition Year (TY) group receives four class periods of Mathematics per week. The fifth-year and sixth-year groups alternatively receive five lessons and six lessons each week over the two years. Within this arrangement the six periods change between the fifth and sixth year for alternate cohorts. Students following the Leaving Certificate Applied programme receive three lessons in Mathematics in each of their two years in the programme. Mathematics lessons are timetabled concurrently within each year group and are evenly distributed throughout the school day and across the week which is good practice.

Students are assigned to mixed-ability classes in first year. This is positive. Throughout the year, students sit regular, common, assessment tests. In second year and subsequent years, classes are formed on a higher and ordinary level basis. Students are set at the beginning of second year in order of ability on the basis of the results from common end-of-topic tests and more formal Christmas and summer examinations in Mathematics. At the beginning of TY, which is optional,

students are divided into class groups in accordance with their levels of attainment in mathematics. In the current year classes are set within levels for the sixth-year group while in fifth year, higher level students are assigned to classes on a mixed-ability basis. It is recommended that class formation for Mathematics be reviewed. To accommodate the varying rates of student development and to exploit the correlation between levels of teacher expectation and levels of student achievement, it is recommended that students be divided into higher and ordinary level groups and then assigned to mixed-ability classes within these levels. This would allow for the highest possible expectation for the greatest number of students and the maximum benefit to be achieved from common testing.

Students are encouraged to study the highest level possible for as long as possible, and this is good practice. Change of level is facilitated by concurrent timetabling and is achieved in consultation with parents and, on occasions, with the guidance counsellor.

School management is commended for the provision of a variety of teaching resources. Most teachers have been assigned their own classroom. All mathematics teachers' classrooms have broadband internet access and are also equipped with a range of teaching aids such as sets of geometry instruments, 3-D solids, and commercial posters. Teachers also have access to the school's computer room as well as access to a laptop and data projector. These resources provide opportunities to integrate information and communication technology (ICT) more regularly into the teaching of Mathematics in the school. Teachers' continual professional development (CPD) is fully facilitated. Teachers are encouraged by management to attend in-service courses. The school funds membership of the Irish Mathematics Teachers' Association. There is an annual budget for the mathematics department through which requests for resources and equipment are accommodated.

Students who find Mathematics particularly difficult are identified through discussions with feeder primary schools, pre-entry and post-entry assessment, regular in-house common testing, and teacher observation. Support is provided through the creation of an extra small class group in first and second years. In addition, small groups and, occasionally, individuals receive extra tuition during withdrawal from subjects other than Mathematics. In sixth year two teachers are timetabled to teach one class group. Mathematics learning support is generally provided by members of the mathematics department. These supports are commended.

The mathematics department encourages participation in the Team Maths competition and Junior Mathematics competition organised nationally by the Irish Mathematics Teachers Association. Students engage in a "maths poster" competition and other mathematics-related activities organised within the school. On occasion students from the school have been invited to participate in Maths Enrichment classes and career talks organised by University College Cork. These good practices raise the profile of the subject within the school, give students the opportunity to enjoy Mathematics and enable them to pursue their interests in Mathematics outside of the classroom.

The school does not engage in a formal review of uptake rates and achievement of its students in the certificate examinations. Such a review can prove useful in future planning and should be undertaken on an annual basis. The school can be proud of its high uptake rates for higher level Mathematics in the certificate examinations, the significant higher level retention rate from Junior Certificate to Leaving Certificate, and the achievement in Mathematics of all its students, in the certificate examinations.

PLANNING AND PREPARATION

Formal planning time for Mathematics is set aside three times per year as part of the whole-school planning process. The good practice of keeping records of these meetings is in place. Planning is co-ordinated by a member of the mathematics team and the position of mathematics co-ordinator is rotated among members of the team.

It was evident from the inspectors' review of planning documentation that school development planning has progressed to subject areas. There is a comprehensive subject plan for Mathematics. This plan includes the school's mission statement, the overall aims and objectives for mathematics education within the school, organisational details of classes and teachers, reference to students with special educational needs and cross-curricular planning, all of which is in line with good practice and is commended. The folder also includes samples of common assessments, worksheets and puzzles as well as support-service material and syllabus documents.

The long-term plan for senior cycle at higher and ordinary level consists of a list of topics to be covered on a monthly basis over the two years. A similar monthly list forms the higher level plan for second and third years. The first year and ordinary level junior cycle plans are less detailed. The planning initiated here should be developed. The 'common introductory course' proposed as part of the Project Maths curriculum initiative should be integrated into the first-year section of the plan and the use of learning objectives within topics is recommended in all sections of the plan.

There is a Transition Year (TY) mathematics plan for the school. The TY mathematics plan is differentiated and presented at higher and ordinary level. The spirit of the TY programme puts the emphasis on teaching different Mathematics or on Mathematics taught differently. In the higher-level plan there is a good balance between topics that consolidate the prior learning of students, some work that introduces elements of the Leaving Certificate programme, along with other topics which are outside the current curriculum. The ordinary-level programme contains much material more closely associated with the current Leaving Certificate programme. There is a need for more cohesion in terms of the TY programme than is currently in evidence. It is therefore recommended that the mathematics department review the TY plan to ensure that the goals of TY are reflected in their planning for all groups.

There was evidence of the sharing of resources among the team. Teachers' resources that were available for inspection in the folder included revision sheets, tests, worksheets and handouts. Individual planning materials and resources were not made available for review during the inspection.

TEACHING AND LEARNING

The lessons observed in Saint Mary's Secondary School were purposeful and appropriate to the syllabus. In all cases the lessons were well planned. The pacing of the lessons was challenging yet realistic and the content matched the ability levels of the students. In all cases, teachers' explanations were clear. In almost all the lessons observed, the learning intentions were shared with the students. Best practice in this regard was observed when the teacher presented the aims as an outcome to be achieved by the students, and then checked at the end of the lesson to see that this had been achieved. This strategy is effective as it increases motivation and leads to a sense of

accomplishment on achieving the day's goal. It is good that effort was made to revisit work previously done and to connect it to new material being presented, thus helping to reinforce learning and to situate new ideas. Some teachers used real-life examples to help make Mathematics more relevant, which is good practice.

In all lessons observed, teachers made effective use of the range of resources at their disposal. Teachers' work on the white board was very clear and, in all cases, teachers were very careful to model good presentation. This was of particular note where the high level of student ability necessitated a fast pace and here the teacher included a number of reviews of learning at key points in the lesson. In one instance, good use was made of a powerpoint presentation to revise learning in the area of coordinate geometry. It is recommended that an action plan to increase the integration of ICT in teaching and learning over time, be implemented by the team.

Teaching predominantly consisted of teacher example followed by student exercise. Within this traditional approach, teaching was effective. A characteristic of this teaching style is that students are sometimes passive and can see their role solely as reproducing the method of solution in similar-type problems from the textbook. To complement this 'didactic' approach, it is recommended that a broader range of teaching methodologies and materials be explored and integrated into the current teaching methodologies including working on student-generated questions, pair work, group work, investigation, consolidation activities, the use of concrete materials, discussion, and quiz activities, more use of ICT and student project work. The incorporation of these methodologies into lessons acknowledges the preferred learning styles of individual students and helps to engage them more actively in their own learning.

Teachers made good use of questioning, both global and directed, throughout the lessons observed. Best practice was seen when more open and probing questions were included and used to encourage students to think for themselves. This type of questioning is very beneficial to learning in Mathematics, and it is suggested that it be incorporated into lessons more frequently.

The relationships between students and teachers were observed to be mutually respectful. This has contributed to the creation of a working environment where high expectations are generally set for students and where students respond accordingly. The very high standard of student behaviour and the good working atmosphere that exists in each classroom enables students to contribute to and participate fully in lessons with confidence. In interactions with the inspector, the students were able to demonstrate understanding of the concepts taught and could display clear, solid mathematical knowledge. They were also quite fluent in the use of appropriate mathematical language.

Teachers have been allocated their own base classrooms. They have made considerable efforts to enhance their physical working environment with a range of teacher-generated posters to remind students of key concepts and create a mathematically stimulating visual environment. This is commended.

ASSESSMENT

Students are formally assessed twice a year at Christmas and summer. Common examination papers are set at the end of first year and within levels for subsequent year groups. Third-year and sixth-year groups also sit mock examinations. Reports are sent home on foot of these formal examinations. Parent-teacher meetings take place once a year.

Learning is routinely assessed through teacher observation, oral questioning and a review of homework and class work. Homework, which has an important role in the learning process, was assigned in all lessons observed. This is in line with the homework policy of the mathematics department. Students' copybooks and journals revealed that regular homework is assigned, which is good practice. There was evidence that teachers monitor students' copybooks. Good practice was evident where teachers, through the use of comments, encourage students' efforts and direct them on ways to correct and improve their work.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- Timetable provision for Mathematics is in line with syllabus requirements.
- There is an annual budget for the mathematics department through which requests for resources and equipment are accommodated.
- Supports are provided for students who find Mathematics challenging.
- There is a comprehensive subject plan for Mathematics.
- Mathematics lessons were well planned.
- Teachers made effective use of resources.
- Teaching was effective.
- Students' learning was good.
- Teachers made good use of questioning.
- Homework is assigned and monitored regularly.

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

- Class formation for Mathematics should be on the basis of mixed ability within levels after first year.
- The long-term plan for Mathematics should be further developed.
- A broader range of teaching strategies and materials should be identified and integrated into the current teaching methodologies.

Post-evaluation meetings were held with the principal at the conclusion of the evaluation when the draft findings and recommendations of the evaluation were presented and discussed.