

**An Roinn Oideachais agus Scileanna**

**Department of Education and Skills**

**Subject Inspection of Mathematics  
REPORT**

**Marian College  
Ballsbridge, Dublin 4  
Roll number: 60500J**

**Date of inspection: 10 December 2009**



**A N R O I N N | D E P A R T M E N T O F  
O I D E A C H A I S | E D U C A T I O N  
A G U S S C I L E A N N A | A N D S K I L L S**

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

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**SUBJECT INSPECTION REPORT**

This report has been written following a subject inspection in Marian College. 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 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**

Marian College is a voluntary secondary school that participates in the Delivering Equality of Opportunity in Schools (DEIS) initiative. The school offers its 441 students the opportunity to access the Junior Certificate (JC), Transition Year (TY), the established Leaving Certificate (LC) and a repeat LC. The school operates an eight-lesson day with lessons of either forty or forty-five minutes' duration.

Timetable provision for Mathematics at senior cycle is very good with six lessons per week for fifth year, sixth year and the repeat LC group. TY is allocated three lessons per week for Mathematics. The JC allocation of four lessons of Mathematics per week is low. Only students who study higher level in second and third year have a fifth lesson of Mathematics per week. Optimal provision for JC Mathematics is a lesson per day. It is recommended, therefore, that every effort be made to increase the time allocation for JC Mathematics in future timetabling.

It is school policy that students are encouraged to remain with the highest possible level for as long as possible. The current practice of class formation for Mathematics involves the setting of students into ability groups early in first year. Ability setting is maintained in subsequent years with the aim of assisting students to reach their potential. Ongoing monitoring of this practice is encouraged to ensure that it is achieving this aim. Concurrent timetabling of Mathematics takes place for all year groups from first year allowing students to access a level most appropriate to their ability, and this is commendable practice. Foundation level is offered when necessary.

The Mathematics department comprises eight teachers. Good practice in the deployment of teachers to Mathematics in Marian College includes the opportunity to share in the teaching of different levels and programmes and to remain with the same group from year to year within cycles. Commendably, plans to increase the number of teachers available to teach Mathematics to the highest level are in place. This should ensure that the level of expertise that exists within the department is maintained and that the department's capacity is increased.

Management is commended for its high level of support to teachers of Mathematics. Teachers are encouraged and facilitated to attend relevant continuous professional development (CPD), funding is available for teachers who undertake additional studies and also for payment of subject association subscriptions. In addition, management has invested significantly in information and communication technology (ICT) to enhance teaching in the school. The school is broadband-enabled and management has provided laptops for all staff and some digital projectors for the teaching of subjects. Requests for additional subject-specific resources are made through the principal and approved by the finance committee of the Board of Management. However, given the availability and potential of the available resources it was disappointing that the resources used in lessons observed were limited to teacher-developed worksheets, some posters and the overhead projector. It is recommended that Mathematics teachers plan for the full use of the available resources to enhance the teaching and learning experience for students. Furthermore, teachers of Mathematics should collectively identify a range of suitable resources that will serve to enhance the learning experience for students. These should be stored centrally where they can be easily accessed by all.

Students in need of numeracy support are identified through contact with local primary schools, teacher observation and an assessment. A good range of supports is in place for students who find Mathematics challenging, including morning, lunch and after-school homework clubs with many students availing of the Voluntary Tuition Programme offered by Trinity College. Numeracy support is offered to students either as individual or group support. In some instances this support is offered to students during one of their Mathematics class periods. This arrangement is not ideal and may lead to discontinuity of learning for students. It is recommended that where possible this practice be discontinued.

To enhance and promote the teaching of Mathematics in the school, it is recommended that students be given opportunities to participate in mathematical activities outside the classroom context, such as mathematics competitions organised by the Irish Mathematics Teachers Association or involvement in activities organised nationally as part of Maths Week Ireland.

## **PLANNING AND PREPARATION**

Management facilitates and attends formal meetings of the Mathematics department throughout the school year. Additionally, Mathematics teachers meet informally on a more regular basis. The principal acts as convenor of Mathematics meetings. To further develop the Mathematics department into the future, it is recommended that a co-ordinator of Mathematics be appointed on a rotational basis. This would allow members of the department to share and experience duties associated with the organisation and running of a department.

Minutes of formal meetings observed are limited to the organisational details associated with the assignment of students to class groupings. Agendas for meetings should be expanded to provide opportunities for teachers to discuss and share areas of common practice and strategies for the long-term development of Mathematics in the school. For example, common strategies should be discussed and developed for the teaching of some topics such as factorisation. This would ensure that students who may move between levels learn common methods.

Each year management, in collaboration with the partners in education, develops and produces a document titled *An Information Booklet and School Plan*. This document is an invaluable

reference for all in the school community as it provides details of school policies, practices and procedures in addition to school planning objectives.

Schemes of work for Mathematics were provided and included shared or individual schemes for a year group or level. It is recommended that the Mathematics department collaborate to develop one succinct document for Mathematics in the school. In this document, agreed practices and procedures that currently exist should be formalised and documented, and schemes of work should be written in terms of learning outcomes based on the relevant syllabus rather than chapters of a textbook. This would allow for a review and synchronisation of topics across levels where appropriate. Reference to the school's *Information Booklet and School Plan* should be made as many of the details contained within are relevant. This plan should be uploaded onto the intranet along with teachers' additional resources and common assessments to provide one central location for materials. In this way all teachers can access material and, once it is in electronic format, necessary adjustments and amendments can be made.

TY Mathematics teachers have developed two independent plans with some common elements. However the content of one plan focuses on material from the LC syllabus while the second plan includes topics such as a module in Applied Mathematics, some work on Fermat's Last Theorem and some LC material. It is recommended that the Mathematics programme for TY be reviewed to avoid the predominance of Leaving Certificate material and in this regard Circular M1/00 should be referred to. Consideration could be given to the rotation of the two class groups among the Mathematics teachers of the programme. This would allow teachers to teach to their strengths, and students to experience different elements of Mathematics, such as Applied Mathematics. To this end materials and resources available should be accessed on <http://ty.slss.ie/>.

## **TEACHING AND LEARNING**

Eight lessons were observed during the evaluation, covering a range of levels and programme. The teaching observed was competent and largely traditional in style. Lessons were well planned with the necessary materials prepared in advance and available to hand. In line with best practice the explicit stating of the learning objectives at the beginning of the lesson was observed in all lessons. In one instance the use of time for review at the end of a lesson allowed students to have a clear understanding of what had been achieved during the lesson. This practice should become a feature of all lessons.

Teachers have developed excellent rapport with their students. Lessons were conducted in a warm atmosphere. Examples of good practice included the use of linkages between the geometry syllabus at JC and trigonometry material at LC, and the setting of Mathematics in real-life contexts. Many teachers took time to circulate to provide support to students when tasks were assigned. However, on occasion the seating arrangements for some students were poor especially where students who required careful monitoring were seated at the back of the room. Teachers are reminded that all students should be given opportunities to participate in the lesson so that appropriate progress is achieved with their work.

Interactions between teachers and their students were very positive. Questioning of students frequently focused on the next step in the solution of a question or on procedural matters. It is recommended that teachers expand the range of questioning strategies to encourage greater dialogue during the lesson that will provide opportunities for students to participate in their own learning. Greater use of higher-order questioning which allows students time to reflect and provide suggested solutions to a question is to be encouraged.

The teaching style observed in all lessons was traditional whole-class teaching. This included the teacher demonstrating at the board and students completing a range of exercises to practise the technique. However, during a lesson on algebra an example of excellent practice was seen when students were given the opportunity to reflect on the lesson content and pose a question based on their observation. This allowed a student's question to be skilfully integrated into a lesson and used to benefit the learning for all students in a lesson. To complement the traditional teaching style it is recommended that a range of teaching approaches be used. For example, group work or investigative methods could be included that would recognise the preferred learning styles of all students. This would further enhance the learning opportunities for students and allow students to become more involved in their own learning.

Resources used in lessons were mostly confined to the whiteboard, textbooks and handouts. Effective use of an overhead projector in some lessons allowed teachers to model best practice in the presentation of work while ensuring the prompt correction of homework. The use of such available resources in other lessons would have allowed the teachers to circulate and identify areas of misconception. Many of the handouts prepared for lessons provided opportunities to study a good range of challenging questions, which meet the diverse needs of students. However, in some instances, careful selection of questions on handouts would have allowed all students to achieve to the best of their ability. To enhance the learning experience for all it is recommended that a greater range of resources be identified and shared among teachers of Mathematics. Furthermore, teachers are encouraged to use the available information and communication technology.

Many teachers are classroom based and in such instances there were some excellent samples of teacher and student developed mathematical posters in addition to commercially sourced visual aids. In some instances teachers used these resources to reinforce learning. It is recommended that opportunities to develop the visual environment to enhance the learning for students be taken by all teachers.

Teachers made very good use of appropriate mathematical terminology and many took time to ensure that students were fully aware of the exact meaning of mathematical terminology and symbols. Interactions between the inspector and students were positive and students demonstrated capabilities when answering questions posed to them.

## **ASSESSMENT**

Students' progress is monitored on a regular basis, through in-class questioning, end-of-topic tests and formal examinations including 'mock' examinations for exam year groups. Common assessment papers and agreed marking schemes are used for all year groups where appropriate, which is good practice. Reports are issued to parents after formal examinations and ongoing communication with the home is maintained through the student diary, parent-teacher meetings and other means as appropriate.

Regular homework is assigned and corrected as part of the following lesson, which is good practice. In all lessons observed the homework assigned was appropriate and relevant and in line with syllabus requirements. Students' homework copies provide insights into daily achievements and work undertaken in class and homework. The presentation of students' work varied greatly. Most students followed their teachers' best practice in the presentation of work during lessons, while a minority produced careless work. Ongoing vigilance is suggested to ensure that all

students are encouraged to present their work in an organised manner. Observation of students' copies and classroom practice revealed that many teachers provide oral and written annotation, suggesting areas for improvement. This is in line with the school's own practices and procedures.

Teachers retain good records of student attendance and attainment in their diaries and are keenly aware of the abilities of their students.

## **SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS**

The following are the main strengths identified in the evaluation:

- Management supports the mathematics department by facilitating access to ongoing CPD courses and supporting teachers' studies.
- Time allocated to Mathematics in fifth-year, sixth-year and repeat LC is very good.
- Teachers have developed very good rapport with their students and this supported the learning environment for students.
- Teaching and learning that focused on the engagement of all students in the lesson, through the use of appropriately chosen questioning, was very good.

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

- Time allocated to Mathematics at JC should be increased from four to five class periods from second year onwards for all students.
- Teachers of Mathematics should collaborate to advance work on one succinct long-term plan for Mathematics.
- Teachers should vary their teaching methodologies and questioning strategies to provide greater learning opportunities for students.
- Teachers of Mathematics should plan for the integration of the available resources within their lessons and should collaborate to identify and source the most suitable resources for the teaching and learning of Mathematics.

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

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