

An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Mathematics
REPORT**

**St. Raphaela's Secondary School
Stillorgan, County Dublin
Roll number: 60361V**

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AN ROINN OIDEACHAIS AGUS SCILEANNA | DEPARTMENT OF EDUCATION AND SKILLS

REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN MATHEMATICS

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in St.Raphaela'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 and subject teachers. The board of management was given an opportunity to comment in writing on the findings and recommendations of the evaluation; a response was not received from the board.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

St.Raphaela's Secondary School has a population of 422 female students who are offered the Junior Certificate (JC), an optional Transition Year (TY) programme and the Leaving Certificate (LC).

The timetabling of Mathematics is generally very good. Time allocated to Mathematics is optimal and allows for all junior cycle students to have five class periods per week, while TY students have an allocation of four class periods and senior cycle students have six class periods per week. Concurrent timetabling of Mathematics is facilitated for all year groups from first year onward. However, some aspects of timetable provision require further attention. For example, the timetabling of the majority of third-year mathematics classes in the afternoon is not ideal. It is recommended that a review be undertaken to allow for greater distribution of mathematics classes across the school day. Also, the sharing by two teachers of one first-year mathematics class is not ideal and should be avoided in future timetabling.

First-year students are assigned to mixed-ability class groupings. Ongoing common assessment takes place, usually until Christmas of first year, following which students are then assigned to either higher or ordinary level class groupings. Student progress is continually monitored and movement between levels is facilitated. The aim of the mathematics department is to have two higher and one ordinary level class grouping in each junior cycle year group, which is commendable. However, a review of the state examination results for the past few years indicates that many students are achieving grade B or above on ordinary-level papers. Strategies and action plans should be developed to ensure students choose the most appropriate level at junior cycle. Arrangements for accessing levels at senior cycle are good with one higher and two ordinary-level classes created. Foundation level is timetabled concurrently for students who find Mathematics challenging.

The mathematics department is relatively large, with some members teaching only one or two class groups. School management should consider the formation of a core group of mathematics teachers who would have a substantial allocation of time with the subject.

The deployment of additional teachers to both junior and senior cycles is commended as it facilitates the creation of independent class levels for Mathematics. The teaching of all levels is rotated among teachers at junior cycle. However, the teaching of higher level is the remit of only one or two at senior cycle. The availability and recruitment of sufficient personnel to teach higher level at senior cycle is currently being addressed by management and is welcomed.

Management supports teachers' continual professional development and facilitates attendance at subject specific in-service courses and whole-school in-service regarding education issues such as assessment for learning (AfL). Teachers also attend evening courses.

Mathematical resources are retained centrally and can be accessed by all teachers. Request for resources are agreed upon during departmental meetings and forwarded to management by the co-ordinator of Mathematics.

Prior to entry to the school, students sit a standardised assessment of ability in Mathematics. The findings of this assessment coupled with relevant information from primary schools assist in the identification of the spectrum of student ability in the subject. A good range of supports for students who have difficulties in Mathematics is in place with the most appropriate supports selected to address the individual needs of the student. These include one-to-one support, withdrawal and the creation of small class groups timetabled in parallel with mainstream classes. To cater for students who are deemed to be gifted, the school is currently preparing a policy document with supports being developed to complement work in this area

Students are given opportunities to participate in a range of co-curricular activities associated with Mathematics including, Maths Week, and in more recent years in Team Math competitions and Maths Olympiads. Continued participation of students in such activities is encouraged both to further the profile of Mathematics within the school and to offer students opportunities to encounter the subject in situations other than in classroom context.

PLANNING AND PREPARATION

The mathematics department meet throughout the school year. Minutes of meetings are retained and indicate a range of topics discussed. The position of co-ordinator of Mathematics is a voluntary, rotating position with responsibilities including convening and chairing subject department meetings and liaising with management.

The planning work of the department has progressed with many good practices identified, including the development of common schemes of work and the use of common assessments. To further this work, time should now be devoted to the development of long-term objectives for the department. Analysis of the state examination results should be used to inform subject planning in the future. Collaboration and agreement on the development of common teaching strategies to specific topics in Mathematics, and planning for the integration of ICT into the teaching of mathematics should also be on the agenda for future departmental meetings.

Planning documentation presented during the evaluation was good and provided an overview of the workings of the mathematics department. The set of planning documents included organisational details associated with the department and separate schemes of work for each year group and subject level. It would be preferable for a single document to be developed that would allow for the integration of all levels and associated learning outcomes. Such a document would bring greater cohesion to overall subject planning and acknowledge the syllabus adjustments

required for students changing levels during a cycle. The use of a teacher's individual planning template, as exemplified during the evaluation, would assist in this regard.

This year, two class groups are following the optional TY programme. The TY Mathematics programme provides time to consolidate material encountered in junior cycle, some elements of LC Project Maths material and an opportunity to study mathematics topics such as Fibonacci numbers and Fermat's last theorem. The school's TY programme offers some subjects in modular form but Mathematics is not one. It is recommended that consideration be given to offering Mathematics in a modular system. This would provide the opportunity for teachers to rotate class groupings during the year and allow teachers to teach a topic to their strengths.

Individual lesson plans and teachers' schemes of work were well developed. Many teachers have collected a wide a varied range of resources and in many instances have shared these resources.

TEACHING AND LEARNING

The evaluation was conducted over two days during which trial examinations for third and sixth year were taking place. Six lessons were visited during the evaluation and a range of year groups and programmes were observed. The quality of teaching observed varied but, in general, was of a good standard.

In line with best practice, some instances of very good lesson preparation were observed. This included a clear focus on the learning objectives with students combined with skilfully pacing of the lesson to achieve the stated objectives. In these lessons, students were suitably challenged and very good progress was made. However, in a minority of lessons where this was not the case, poor lesson pacing and a lack of clarity as to the focus of learning objectives resulted in limited learning opportunities for students. This also resulted in some students becoming disengaged and distracted in their learning. Attention to this area is necessary and recommended.

There was very good use of mathematical terminology and symbols both by the teachers and students, indicating frequent exposure to them. Particularly effective questioning was used by some teachers to ascertain students' own understanding of mathematical terms. In addition, the setting of Mathematics in real life situations and the linking of topics with prior learning were further examples of good practice observed.

In the majority of lessons observed, teachers used traditional whole-class teaching, with a minority of teachers using group or paired work. In most instances, the chosen methodology was appropriate; however, on occasion an alternative methodology should have been chosen to encourage greater student participation and engagement in learning. Therefore, it is recommended that teaching and learning methodologies are more frequently varied to ensure that a range of students' preferred learning styles are catered for. Active methodologies proposed and encountered by teachers during Project Maths in-service should be more widely adopted and not confined to students who are currently following the Project Maths syllabuses.

In most instances, questioning strategies applied by teachers were very good and many lessons included a good balance between lower and higher order questions. The use of higher order questions allowed students' understanding to be challenged and encouraged justification of their answers. In many lessons, teachers initiated discussion by providing a global question which individual students were then requested to answer. However, on occasion, insufficient time was given to allow students to fully reflect on their answer before the teacher provided the solution. It is recommended that teachers adopt aspects of AfL strategies during questioning of their students.

Classroom management was in general very good, with many teachers circulating to provide assistance, individual feedback or to ask questions. In many instances students were attentive in their learning and were eager to participate in most lessons. Interactions between the inspector and students were very positive and students demonstrated clear understanding of mathematical concepts.

Resources used during the lessons included differentiated worksheets, an interactive whiteboard, text books and short presentations from the internet. In most instances, these were carefully selected and supported the learning objectives. However, in a minority of lessons the chosen resource did not add sufficiently to the chosen topic. It is recommended that care be taken in the selection of resources to ensure that they will augment the learning experience for students. As the school intends to increase availability and access to ICT in within classrooms, it is recommended that teachers plan for greater inclusion of this resource into the teaching and learning of Mathematics.

Many teachers are classroom based and displays of student project work in addition to commercially sourced materials were evident.

ASSESSMENT

Regular assessment of students' progress takes place throughout the school year. The mathematics department uses common tools and marking schemes in formal school-based student assessments. This is very good practice as it allows for students' achievements to be compared within their own year group and level.

The department's assessment procedures were followed during all lessons observed; homework is assigned daily to all students and corrected in class both orally and written on the board. A review of students' copies and diaries confirmed these procedures. Feedback offered by teachers to their students included oral and written comments in relation to areas for further work. However, in some instances greater annotated commentary by teachers on students' written work is necessary.

Teachers retain good records of student attendance and achievement in school-based assessment. Contact between the home and school is maintained in a variety of ways including the issuing of school reports following formal school assessments, parent-teacher meetings and students' journals.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- There is very good whole-school support for Mathematics.
- Students presented as being positive about their learning with many eager to participate in assigned tasks.
- Many teachers presented very good individual planning documents.
- There are good structures in place to assess and report on students' attainment in school examinations.

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

- Teachers should more frequently vary their choice of methodology, taking the lesson topic and students' preferred learning styles into consideration.
- Clear and focused learning objectives and an appropriate lesson pace should be established for all lessons.
- A review of planning should focus on preparing a single integrated subject plan, examining the teaching and learning methodologies and the setting of long-term objectives for the subject.

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.