

An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Mathematics
REPORT**

**Castleknock College
Castleknock, Dublin 15
Roll number: 60100Q**

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**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 Castleknock 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, examined students' work, reviewed school planning documentation and had discussions with the deputy principal and members of the mathematics department. Following the evaluation visit, the inspector provided oral feedback on the outcomes of the evaluation to the deputy principal and a number of the mathematics teachers. The board of management was given an opportunity to comment in writing on the findings and recommendations of the report, and the response of the board will be found in the appendix of this report.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

The subject Mathematics is highly valued in Castleknock College and a variety of steps are taken to maximise students' performance and achievement. It has a good time allocation, in line with or in excess of syllabus guidelines. There are five periods per week at junior cycle, four periods per week in Transition Year (TY) and six periods per week at senior cycle. Lessons in all years are well spread throughout the week, facilitating daily progress in Mathematics, and the positioning of lessons is appropriately balanced between mornings and afternoons. However, a number of class groups, particularly in first year, are shared between two teachers. This is not ideal and should be avoided in future.

From second to sixth years, all classes are concurrently timetabled within year groups. This appropriately supports the formation of groupings of different levels and the movement of students between levels. In addition, an extra teacher has been allocated in fifth year in order to facilitate the creation of small groups in which students can receive more individual attention.

First-year classes are taught as mixed-ability groups, suitably allowing students settle into their new environment prior to decisions being taken regarding their level of study. From second year, division into higher and ordinary levels takes place, based on students' performance in tests and examinations throughout first year. Flexibility remains, however, for students to change level because of the school's concurrent timetabling strategy.

The teaching team, in conjunction with school management, agrees the levels at which teachers teach Mathematics. Continuity is maintained from second year to third year and from fifth year to sixth year. There is rotation of levels between mathematics teachers and, commendably, four members of the team are currently rotating the Leaving Certificate higher-level course.

There is a relatively large team of eleven teachers currently teaching Mathematics in the school. Five of these teachers have minimal contact with the subject, teaching only one class group. To better support a cohesive team and to increase experience and expertise, it is recommended that the team is reduced in size. Also, a number of members of the mathematics team are specialists in subjects other than Mathematics. It is recommended that a review be carried out to see if this is the most effective use of such teachers' expertise. Teachers wishing to continue to teach Mathematics but who do not hold a recognised qualification in the subject should undertake further study. It is notable and commendable that three teachers are currently pursuing or have recently pursued further study in Mathematics.

There is an effective system in place in the school to identify students requiring additional support in Mathematics. This includes an analysis of performance in the school's incoming assessments and information gathered from feeder primary schools and from parents. In addition, individual teachers can refer students about whom they have concerns to the learning-support department. Support is provided mainly on withdrawal and, where possible, from a subject not studied by the student. It is good practice that all supports are provided by members of the mathematics team.

Requests for the purchase of resources to support the teaching and learning of Mathematics are channelled through the subject co-ordinator to school management. A range of materials is available in the school and is centrally stored, making them accessible to all members of the team, or they are distributed among the teachers. It is particularly notable that the school library houses a collection of almost one hundred books related to Mathematics. The school has been involved in the Project Maths curriculum initiative since the beginning of its development. As a result, the level of resourcing of the mathematics department has increased and classrooms are now equipped with digital projectors. In addition, a virtual learning environment established in the school is being utilised by mathematics teachers as an independent learning tool for students.

Teachers are supported and facilitated in engaging in continuing professional development (CPD) and all members of the mathematics team have participated in Project Maths in-service offered. All mathematics teachers hold membership of the Irish Mathematics Teachers' Association (IMTA) and keep up-to-date with issues in mathematics education. In addition, some members of the team have presented at or participated in CPD activities outside school hours, indicative of a strong commitment to the subject and to their students. The school also supports teachers' further study through timetabling arrangements or, resources permitting, partial funding. This has no doubt been of benefit to teachers recently or currently engaged in further study in Mathematics.

Co-curricular mathematics activities, including the celebration of Maths Week, are strongly promoted and supported by members of the teaching team. Mathematics students have participated in the Junior Mathematics competition and the Team Maths competition organised by the IMTA, Problem Solving for Irish Second-level Mathematicians (PRISM) organised by NUI Galway, training sessions for the Irish Mathematics Olympiad, American Mathematics Competitions and the BT Young Scientist and Technology Exhibition. In addition, a weekly mathematics problem competition and a Maths Club run throughout the year. The cumulative effect of all these activities appropriately raises the profile of the subject within the school and provides students with valuable opportunities to experience Mathematics outside the classroom setting.

PLANNING AND PREPARATION

The subject department structure is well established in the school and the role of co-ordinator, which includes chairing department meetings, co-ordinating the preparation of programmes of work, co-ordinating attendance at CPD and disseminating information, is undertaken on a voluntary basis. The role is rotated approximately every three years, allowing the department to benefit from the different strengths of each of its members. The current co-ordinator took up the position at the beginning of this school year.

Formal meetings of the full mathematics team are facilitated by school management and take place approximately six times during the school year. Informal meetings of subsets of the team take place as required, often outside scheduled class time. In line with good practice, minutes of all meetings are recorded and maintained with the department plan. Minutes of meetings that have taken place since August 2010 provide evidence of collaboration and discussion on areas including class-group formation, achievements in certificate examinations, co-curricular activities and first-year assessments.

The subject plan reflects the Project Maths syllabuses and includes subject organisation details, an annual improvement plan, and brief references to cross-curricular links. Long-term programmes of work have been developed for each year group and, in line with good practice, are outcomes-focussed. The stated learning outcomes are linked to prescribed textbooks and also to syllabus strands. This is highly appropriate. Overall, however, the plan would present as more comprehensive with the addition of a policy and details on additional mathematics supports for students as well as up-to-date details of teachers' CPD in Mathematics.

TY Mathematics operates within a modular structure and is rotated among four teachers. Plans for the modules commendably include references to project work and field work and a variety of assessment strategies. Care must be taken, however, particularly with the algebra module, to ensure that TY is not simply a third year of the Leaving Certificate programme. In line with the ethos of TY, it should provide different experiences of Mathematics for students, with a particular focus on their active participation.

Most teachers made individual planning and preparation materials available during the inspection. These included attendance and assessment records, student test papers and answer sheets, worksheets, teacher notes, internet downloads and student projects, and were indicative of thorough preparation and planning by many teachers.

TEACHING AND LEARNING

The inspector observed nine lessons over two days covering all year groups and all programmes in the school. The quality of learning and teaching in the majority of these lessons was good or very good. All teachers were prepared for class and, in each lesson, content was appropriate to year group and level. A number of teachers followed the good practice of explicitly sharing the lessons' objectives with students. This should become normal practice in all mathematics lessons as a means of engaging students' interest and focus from the outset.

The pace of lessons was appropriate in most cases, as were the expectations teachers had for students' achievements. Students' written work and answers given to questions posed provided

evidence of learning taking place. Teaching strategies included the engagement of students at the board and their involvement in a drawing activity. However, lessons were predominantly teacher-focussed. Further efforts should be made to involve students more actively in their learning.

There were some impressive examples of the successful use of probing questions, challenging students' understanding and guiding them to the solutions to problems. The use of such questioning methods by all teachers would deepen students' mathematical understanding and promote independent learning among students, and is recommended. There was a very good example of the promotion of students' mathematical communication skills through the use of topic-related mathematical terminology. A focus by all teachers on this very important aspect of mathematics would be good practice.

In almost all lessons observed, students engaged fully in the work at hand. There was a lesson during which a significant number of students were distracted from their work. In this case, it is advised that a calm atmosphere, in which students can work without disruption, is set by the teacher. Teachers had a relaxed rapport with students and mutual respect was mostly in evidence. Classroom management was almost always effective and the learning environment was, in most cases, affirming and supportive of students' efforts.

ASSESSMENT

There is a high level of monitoring and communication of students' progress with four main assessment points each year for first, second and TY students, following which written reports are issued. Assessment usually takes the form of written tests or examinations, but strategies in TY are laudably varied and include written tests, project work, attendance and participation in class work. In addition, and in line with a formative assessment approach, there were some impressive examples of students being guided on how to improve on their achievements in topic tests.

Short-term progress is assessed generally through the assigning and marking of class work and homework. A review of a random sample of students' copy books indicated work that was relevant to programme and syllabus. However, there was a number of instances where students' standards of presentation were less than would be reasonably expected. Thus, the presentation of students' written work, including diagrams, charts and graphs requires attention. In addition, students need to be continuously reminded of the importance of marking their work and noting corrections.

The good practice of administering common end-of-term examination papers, within levels, is in place in all year groups other than TY. Since September, first-year classes have regular continuous assessment of key skills to help identify ongoing weaknesses. Students not achieving an agreed level of success in these tests attend tutorials, outside regular class time, at which remedial work is undertaken. The mathematics teachers are congratulated on their commitment to the early identification and remediation of students' difficulties in this way. Consideration should now be given to the re-administration of key skills tests following students' attendance at tutorials as a means of charting progress made.

Data on achievement levels in the certificate examinations is made available by school management to the mathematics team each year. Therefore, there is an awareness of the school's standing as compared to the national picture.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- Mathematics is highly valued in the school and a variety of steps are taken to maximise students' performance and achievement.
- Three members of the mathematics teaching team are currently pursuing or have recently pursued further study in Mathematics.
- Co-curricular mathematics activities are strongly promoted and supported by members of the mathematics teaching team.
- The mathematics team works collaboratively through formal and informal meetings and minutes are recorded and stored with the subject plan.
- There were some impressive examples of the successful use of probing questions and of the promotion of students' mathematical communication skills
- There is a high level of monitoring and communication of students' progress with four main assessment points each year for first, second and TY students, following which written reports are issued.
- The key skills of first-year students are continuously monitored to help identify ongoing weaknesses. Remedial work is undertaken at tutorials, scheduled outside regular class time.

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

- Teachers wishing to continue to teach Mathematics but who do not hold a recognised qualification in the subject should undertake further study.
- Care must be taken to ensure that elements of the TY mathematics programme do not simply reflect a third year of the Leaving Certificate programme.
- Further efforts should be made to involve students more actively in their learning.
- More widespread use is recommended of probing questions to deepen students' mathematical understanding and to promote independent learning among students.
- The presentation of students' written work, including diagrams, charts and graphs, requires attention.

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

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Appendix

SCHOOL RESPONSE TO THE REPORT

Submitted by the Board of Management

Area 1: Observations on the content of the inspection report

The Board of Management of St Vincent's Castleknock College welcomes the findings of the Subject Inspection of mathematics. The Board was pleased that the inspectors found that Mathematics is 'highly valued in Castleknock College', that 'there is an effective system in place in the school to identify students requiring additional support in Mathematics', that 'teachers are supported and facilitated in engaging in continuing professional development' and that the 'Mathematics team works collaboratively'.

The Board was particularly encouraged by the detailed list in the inspection report of the many co-curricular mathematics activities which take place at Castleknock College and which encourage students to rise to the challenges of mathematics, to enjoy problem-solving and to have fun taking part in mathematics competitions and quizzes.

Area 2: Follow-up actions planned or undertaken since the completion of the inspection activity to implement the findings and recommendations of the inspection

- In accordance with the recommendation of the inspector, the number of teachers of Mathematics has been reduced, using (for the most part) those who are best qualified and who teach Maths more exclusively.
- The Equations module in TY is now taught with Geogebra (using the Data Projector). The students can use this programme to see the connection between factors, roots and graphs of functions.
- Two staff days in the first month of this year dealt with some of the issues raised in the inspection: making students play a more active role in their own education, high standards of homework, and the use of probing questions. These issues were dealt with by all teachers, not just those who teach maths.