An Roinn Oideachais agus Scileanna

Department of Education and Skills

Subject Inspection of Mathematics
REPORT

Newbridge College
Newbridge, County Kildare
Roll number: 61680T

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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 Newbridge College carried out 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 subject teachers.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

The mathematics department in Newbridge College benefits from effective leadership and its operation is characterised by a spirit of collaboration and innovation. The leadership of the department have a clear vision for its future development and communicates this effectively to the school's various stakeholders. The subject, as a result, enjoys a very high profile in the school. The mathematics department is very large. It is comprised of fifteen teachers, many of whom teach Mathematics to just one class group. Consideration should be given therefore, to reducing the number of teachers involved in teaching Mathematics and to increasing the size of the core group having Mathematics as their main teaching subject. Restructuring the department in this manner will ensure that all of the members of the department will have Mathematics as their primary focus and will therefore serve to ensure greater consistency in curriculum delivery.

Timetabling provision for Mathematics is very good. The allocation of time in both senior cycle and junior cycle is generous and the manner in which classes are scheduled allows students to follow higher-level Mathematics for as long as possible and to transfer between levels without any disruption to the overall timetable when the need arises. Mathematics classes are well distributed throughout the week and the balance of provision between morning and afternoon is also very good.

The arrangements in place to determine the mathematical abilities of students transferring into first year are very good. All incoming students sit a mathematics competency test designed to establish their basic skills set and to identify specific strengths and weaknesses. Following the transfer programme, mixed-ability classes are formed and these follow a common programme throughout the first year. While the use of the competency test is very welcome, its outcomes should have a greater influence on common programme in first year. It is recommended that the content and delivery schedule of the programme be reviewed to ensure that it addressed the weaknesses and exploits the strengths identified by the test. The ongoing assessment of the programme should take due cognizance of the outcomes of the analysis and be used to measure improvement in the targeted areas. The programme should be subject to annual review to reflect the identified needs of the incoming cohort.

Upon completion of the junior cycle, students have the option of entering transition year (TY) or going directly into fifth year. There are currently six mathematics classes in TY. Five of these classes are mixed ability and follow a common programme. The remaining class follows a modified course intended to develop student skills and to boost their confidence in Mathematics. This approach, which provides the students with access to Mathematics at an appropriate level, is very good practice. The content of the common programme delivered to the majority of the TY students is, however, in need of review. In its current form, the programme is very general and consequently the manner in which it is delivered is left to the discretion of the individual teacher. The programme which results from the review should not only specify the content to be covered but should detail the teaching methods to be employed and the timing and nature of any project work in which the students may engage. There are some very good examples of the work done by TY students in the school in previous years. This should be used to inform the review.

Learning-support provision in Mathematics is very good. A range of interventions, including small-group and individual withdrawal, team teaching and in-class co-operative support, is implemented in delivering a comprehensive learning-support programme in Mathematics. A teacher dedicated to delivering learning support in Mathematics has recently been employed and it is intended that the amount of team teaching and in-class co-operative support will increase as a result. This is a very welcome development. Owing to timetabling restrictions, the learning-support model in first year has been altered this year. A number of students receive additional support in Mathematics while the remainder of the year are attending assembly. While acknowledging that this is an interim arrangement for the current year, it is advised that in framing future timetables such situations be avoided.

The Mathematics department is very well resourced. Management has been proactive in developing the school's information and communication technology (ICT) infrastructure and the majority of classrooms are equipped with a computer and data projector. Members of the mathematics department have access to an interactive whiteboard and resources to facilitate active teaching and learning have also been purchased in the recent past. There is considerable scope to enhance the consistency with which these resources are integrated into lesson delivery across the department; some of the lessons involved innovative and effective integration of resources, while in other classes there was little or no evidence of their use.

Arrangements to facilitate teacher attendance at continuing professional development courses are very good. Members of the department attend in-service regularly, including courses provided outside of school time, and all have availed of the workshops made available as part of the national implementation of Project Maths. Teachers wishing to pursue additional qualifications receive financial support from the school's board of management. Two members of the mathematics department currently avail of this facility. The commitment of management and staff to ongoing professional development is worthy of the highest praise.

Positive attitudes to Mathematics are promoted by encouraging students to take part in a range of extra-curricular activities pertaining to Mathematics. World Maths Day and Maths Week are celebrated annually and students from the school regularly participate in the Mathematics Olympiad.

PLANNING AND PREPARATION

Subject department planning in Mathematics is well established. A co-ordinator, appointed as part of the schedule of posts, manages the operation of the department with enthusiasm and skill. Regular formal planning meetings are held and meetings of smaller groups to plan assessments and other issues affecting individual year groups are also facilitated. The minutes of all formal meetings are contained in the subject department plan for Mathematics. A significant amount of informal planning also takes place. This is a very welcome feature of the department's activities, particularly in light of the size of the department.

A comprehensive subject department plan is in place. The plan is clear and concise and provides a very valuable framework to support the operation of the department. The sections of the plan dealing with learning support, homework and assessment and classroom organisation are particularly good. The plan also details the schemes of work for each year and level in the form of chapter lists with an associated delivery schedule. This element of the plan is in need of review. The review should ensure that the new schemes reflect the approach adopted in the Project Maths, where the curricular content is expressed in terms of learning outcomes. In addition, the preferred teaching methods, the resources to be used in lesson delivery, agreed approaches to carrying out key mathematical operations and the most effective ways to exploit cross-curricular links should all be included in the schemes that emerge from the review.

The mathematics department carries out an analysis of student performance in the certificate examinations each year. The outcomes of the analysis are contained in the subject department plan and are used to inform ongoing department planning. For example, the outcomes of the analysis recently led to an alteration in the manner in which the fifth-year class groups were organised. This enlightened and informed approach to subject planning is very good practice.

Individual teacher planning was, in all but a minority of cases, very good and in one case was of the highest quality. Where the planning was at its best it featured clear strategies to empower students to become reflective and self-directed learners and to incorporate resources effectively into teaching and learning. In the less impressive cases, the intended lesson outcomes were unclear, little accommodation was made for the needs of the students at either end of the ability range and the textbook was relied upon as the key resource in lesson preparation. The review of the department plan mentioned above should help to address any deficiencies in this area and therefore should actively involve all of members of the department.

TEACHING AND LEARNING

The quality of teaching observed during the inspection was in almost all cases very good. In the most effective cases, the teachers were well prepared for class, the lessons had a good structure, and the pace of the lessons ensured that the students were consistently challenged. Best practice was in evidence where the intended learning outcomes were agreed at the outset and time was set aside towards the end of the lesson to review the lesson content and agree the extent to which the intended outcomes were met. In a small minority of cases, the lessons proceeded in a pedestrian fashion, the objectives were unclear and the content was not consistent with that observed in other lessons at the same year and level. It is therefore recommended that once the reviewed schemes of work are agreed they be implemented uniformly across the department.

A wide range of teaching methods was in evidence during the inspection. ICT was very successfully integrated into lesson delivery in a number of instances. In one case, materials

presented at the Project Maths workshops were used to illustrate concepts in geometry. The material supported by a very good worksheet and an enthusiastic approach by the teacher ensured that the lesson was stimulating and engaging. The use of ICT also ensured that the teacher could assist individual students without interrupting the flow of the lesson.

A wonderful lesson reviewing the properties of fractions was facilitated by the use of flash cards, timely and insightful teacher inputs and the appropriate integration of ICT. The most striking feature of the lesson was the extent to which the students were encouraged to engage in independent and self-directed learning and the meticulous planning in place to facilitate this. As a result of this approach, the students gained an appreciation of Mathematics as a challenging and exciting endeavour and the positive attitude of the teacher was mirrored in their own approach to the lesson.

Traditional teaching methods involving teacher exposition at the board followed by the students working on assigned tasks also featured in a number of lessons. While this approach worked very well, particularly where allowances were made for the needs of individual students, it would be preferable if the active teaching methods espoused by Project Maths were more generally adopted across the department.

Student behaviour and engagement was of a very high standard. The atmosphere in the classrooms was warm, and the teachers and students contributed in creating an enjoyable and interactive learning environment. Teacher questioning was used to very good effect, particularly where students were invited to speculate, to suggest possible approaches to problem solving, and to explain their reasoning.

The quality of student learning was, in the vast majority of cases, very good. The students responded readily to teacher questioning and were well able to carry out any tasks assigned by the teachers. In some cases the context in which the material being discussed was established. This meant that, in addition to being able to carry out the requisite calculations, the students were able to apply their knowledge and to justify their solutions. This very good practice should be uniformly employed across the department. The quality of the work contained in students' homework copies was very good and the performance of the students in class tests and in the state examinations offered further evidence of the high quality of student learning.

ASSESSMENT

Practices in relation to the assignment and correction of homework are very good. Homework is assigned and corrected in each lesson. In doing homework, the students are encouraged to refer to *The Criteria for Success in Homework* devised by the mathematics department in 2009. This document provides the students with clear guidelines on how they should carry out and present their homework. The quality of the work in the student homework copybooks is testament to the success of this initiative and of the priority given to homework by the members of the department. In some instances the homework copies contained positive teacher comments and suggestions as to how the students' work might be improved. This very good practice should be adopted as standard across the department.

The mathematics department collaborate very effectively in assessing student achievement. The common programme in first year is initially assessed solely through the use of class tests. The results of the tests are collated and are used to inform the report which issues to parents at Christmas. Formal common examinations with agreed marking schemes are held in March and

May. Student performance in these examinations together with the results of the class tests help to determine the composition of the classes when they are being set at the end of the year. Student performance however, is not the sole selection criterion and teacher recommendations and student preference are also taken into account. Typically, any student wishing to follow higher-level Mathematics is encouraged to do so. The remaining non-examination classes sit formal examination at Christmas and just prior to the summer holidays. Students within levels are provided with common papers with common and agreed marking schemes. The papers produced for these examinations model the certificate examinations in style and content and are of a very high standard.

Students in third and sixth year sit mock examinations in February but have no formal examinations prior to this. Consideration should therefore be given to the provision of an examination during the first term to allow students to gauge their progress and to encourage revision of the material that was covered in second or fifth year.

Practice in relation to recording student attendance and attainment in class and formal tests is very good. Roll call is taken at the beginning of every class and student compliance with homework completion and their performance in class and formal tests are also recorded. Reports issue to parents after each formal assessment and ongoing communication occurs through the use of the student diary, parent-teacher meetings and other less formal means.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- The quality of teaching and learning in Mathematics is very good
- The mathematics department is very well organised, operates in a collaborative manner and benefits from effective and enlightened leadership. The subject enjoys a very high profile in the school.
- Timetabling provision for Mathematics is very good. The time allocated to teaching Mathematics is generous and the arrangements to facilitate student transfer from one level to another are effective.
- The arrangements in place to determine the mathematical capabilities of students transferring into first year and the learning-support provision are very good.
- The mathematics department is very well resourced and is committed to ongoing CPD and to promoting positive attitudes to Mathematics.
- Subject-department and individual teacher planning are very good, homework and assessment practices are very good.

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

- It is recommended that the content and delivery schedule of the common programme in first year be reviewed to ensure that it addresses the weaknesses and exploits the strengths identified by the entrance assessment test. The ongoing assessment of the programme should take due cognizance of the outcomes of the analysis and be used to measure improvement in the targeted areas.

- It is recommended that the TY mathematics programme be reviewed and that the programme which results from the review should not only specify the content to be covered but should detail the teaching methods to be employed and the timing and nature of any project work in which the students may engage. Good examples of the work done in previous years by TY students should be used to inform the review.
- It is recommended that the schemes of work contained in the subject department plan be reviewed. The review should ensure that the new schemes reflect the approach adopted in Project Maths, where the curricular content is expressed in terms of learning outcomes. In addition, the preferred teaching methods, the resources to be used in lesson delivery, agreed approaches to carrying out key mathematical operations and the most effective ways to exploit cross-curricular links should all be included in the schemes that emerge from the review. All of the members of the department should participate in the review and the schemes that emerge should be uniformly implemented across the department.

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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