

An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Mathematics
REPORT**

**Newpark Comprehensive School
Blackrock, County Dublin
Roll number: 81001I**

Date of inspection: 20 October 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

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Newpark Comprehensive School, conducted 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 deputy principal. 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

Newpark Comprehensive School is a co-educational school which offers its students a wide range of programme options including the Junior Certificate (JC), a compulsory Transition Year (TY), Leaving Certificate Applied (LCA), Leaving Certificate Vocational Programme (LCVP) and the established Leaving Certificate.

Newpark Comprehensive School's mathematics department comprises twelve teachers. Teachers are suitably qualified to teach the range of levels and programmes to which they have been assigned. The teaching of higher-level Mathematics at both junior and senior cycle is rotated among two teachers within the department. Given the availability of a number of teachers, it is recommended that additional teachers be included in the rotation at higher level to ensure that the expertise to teach higher level Mathematics is maintained and expanded to meet the changing needs of the mathematics syllabuses in the coming years. In addition, four of the twelve teachers are teaching just one class group each. This practice should be continually monitored to ensure continuity of approach and facilitate long-term planning.

A review of the timetabling of Mathematics has resulted in the identification of some concerns. For example, while time allocated to Mathematics is generally satisfactory, the allocation of four periods of Mathematics in second year is low and should be reviewed upwards. Furthermore, the distribution of class periods throughout the school week for most year groups is not ideal. Many year groups have two Mathematics class periods timetabled on one day of the week and none on other days of the week. It is recommended that a review of the timetabling of Mathematics be undertaken to ensure that daily contact with the subject is afforded where possible.

First-year students are assigned to five mixed-ability class groups. During the year they are given common class tests and an end-of-year common assessment. These results are tabulated and used, along with teacher observation, to form two higher-level class groups and three ordinary-level groups in second year. Concurrent timetabling assists movement between levels and upward movement is possible where a student makes sufficient progress. A letter outlining these

arrangements is communicated to parents from management and the subject co-ordinator. The inspector expressed concern that the current arrangement limits the number of students taking higher level and requires a decision to be made at an early stage. On these grounds it is strongly recommended that this practice be changed in order to raise teacher and student expectations and to encourage as many students as possible to choose higher level.

In TY, students are set for Mathematics based on the level taken in third year. At the beginning of fifth year, two higher-level class groups are formed. Higher-level students in fifth year are assessed after approximately eight weeks, and one higher-level class is then formed. The remaining students in fifth year are assigned to ordinary-level and foundation-level Mathematics classes. In general students remain in these class groupings in sixth year. In addition, one class grouping of LCA is formed in both fifth and sixth year. The concerns raised in relation to higher level in the junior cycle also apply to the formation of higher-level classes in fifth year. The net effect is to reduce the number of students taking higher-level Mathematics and to lower student attainment and expectation. This should be addressed in order to ensure that students attain at the highest possible level. The evidence from the certificate examinations shows that participation at higher level in both the JC and LC is lower than desirable and such data should inform decisions as to how current practice could be improved.

Management is commended for permitting teachers to access and attend relevant subject-specific continuing professional development (CPD) courses. Furthermore, the support given to the mathematics department through the provision of an annual budget is acknowledged. Centrally located resources observed during the evaluation were limited to a teacher set of geometry instruments, a class set of calculators and some reference books. The school library has a section within which some mathematical reference books are also retained. It is recommended that the Mathematics department collaborate to identify key resources that will support the teaching and learning of Mathematics, thus updating the current resources available.

During the course of the evaluation there was evidence to suggest that some school-based mathematics competitions are organised for some year groups. In addition, some teachers had worked with their class groups on activities for Maths Week. These initiatives are commended and should be extended. It is recommended that the mathematics department explore other ways of engaging students in Mathematics. For example, students could be encouraged to compete in competitions arranged by the Irish Mathematics Teachers Association, thus providing opportunities for students to engage with Mathematics in situations other than in a classroom context. In addition, the use of a notice board specifically for Mathematics should be considered to provide students with a focal point to access information regarding upcoming events about Mathematics.

Students in need of numeracy support are identified prior to entry to the school and during the school year. The school offers support to students through a range of provision models. For example, in addition to one-to-one support, small class groups are arranged for students who have difficulties with Mathematics and are timetabled to run parallel with mathematics classes. To enhance these models, the school is considering the reintroduction of team teaching. This is to be commended and is in line with good practice.

PLANNING AND PREPARATION

Management facilitates the mathematics department in meeting on a regular basis throughout the school year. The most senior member of the mathematics department acts as co-ordinator of the subject and has retained this voluntary position for a number of years. It is recommended that the

position of co-ordinator be rotated among mathematics teachers to ensure that the skills required in the organisation and development of a department are shared among colleagues.

Minutes of departmental meetings are retained and include issues discussed, decisions taken and action proposed. This is in line with good practice. To further advance work in this area it is recommended that the areas of need identified and documented in the “Professional Development Plan for the Maths Department” should be progressed through collaboration among members of the department with the development of clear strategies for these highlighted areas. In addition, meetings should also reflect on strategies that would allow for the sharing of best practice in the teaching of Mathematics. It is recommended that the teachers use meeting times to share their skills and best practice in the teaching of Mathematics. This could also provide opportunities for teachers to share information and communication technology (ICT) skills and knowledge.

To date, the mathematics department has developed a plan for Mathematics that includes details of the organisation of the department and the aims and objectives of mathematics education in the school. In addition, schemes of work for each year group and level have been developed. A review of these schemes should be undertaken to ensure that topics at all levels are synchronised so that in the event that a student changes a level, all topics are covered. Furthermore, there is a need for the schemes of work to be updated to reflect the desired learning outcomes of the relevant syllabuses rather than the chapters of the chosen textbooks.

Three modules are identified for the TY Mathematics plan. Students are given the opportunity to study some Leaving Certificate material, to explore Mathematics in context, and to undertake some project work. A review of the plan should consider the feasibility of choosing innovative means of delivering the Mathematics programme such as the rotation of class groups for a period of time among members of the department. This would allow teachers to teach specific areas of interest and provide a stimulating programme for students.

In some instances individual lesson plans were made available and detailed the topic to be studied, the learning objectives for the lesson and the resources to be used in the lesson. The lesson plans were appropriately based on the long-term schemes of work for each of the year groups and levels.

TEACHING AND LEARNING

During the evaluation ten lessons were observed, covering all levels and programmes. In some lessons the teaching observed was of a good standard while in the remainder it was of a fair standard. Good practice observed included good lesson structure, the setting of a good pace, appropriate classroom management and suitably chosen material that was engaging of students. Traditional whole-class teaching was the predominant methodology used during classroom observations with some limited use of student-directed learning. There was good and appropriate use of mathematical terminology and notation by teachers and students in many lessons.

Some lessons began with the explicit stating of the intended learning objectives, which is in line with good practice. However there were occasions where insufficient time was allowed to bring the learning to the desired conclusion. It is therefore recommended that attention be directed to time management, to ensure that there is a clear structure to all lessons.

The main methodology observed was structured around the teacher presenting work at the whiteboard and assigning tasks to students to complete. While this method has merits, it is recommended that teachers explore a range of appropriate teaching approaches as suggested in

the mathematics department long-term plan that would encourage greater student engagement in the learning activities.

The use of questions that only allowed for the recall of facts or the next step in the solution of a question tended to dominate lessons observed. Less frequently, teachers made use of questions that challenged students to provide justification for their answers. It is recommended that teachers incorporate a variety of questioning strategies during the lessons, to encourage greater student participation. The use of global questions and chorus answering as observed in many lessons should be avoided as it does not provide equal opportunity for full inclusion of all students in the lesson. Furthermore, it is advised that teachers should not confine their interactions or teaching to a limited number of students but that all students be included in lesson activities. It is therefore recommended that strategies as outlined in the assessment for learning (AfL) document, located in the long-term plan for Mathematics, regarding questioning such as “wait time” and “distributed answering” should be accessed to assist teachers in this area.

In most lessons, classroom management was appropriate and allowed for progress to be made. However, on occasion, when tasks were assigned, students became talkative and disengaged. This interrupted the learning opportunities for all students in the class. It is recommended that all teachers establish appropriate protocols to ensure that a good work ethic is realised in all lessons.

Many teachers took opportunities to circulate to provide individual assistance to their students. While this is good practice, it is important that students are not allowed to become over dependent on their teacher. To this end, students should be encouraged to make clear attempts at their work and, when engaging in paired work, students should work collaboratively. In some instances students were given tasks without a timeframe. A specified length of time should be given to students for the completion of set tasks during a lesson, and the procedures to be followed should be outlined to them in advance. Properly managed tasks will also provide teachers with an opportunity to address issues of concern or misconceptions on a collective basis rather than individually.

In many lessons, the main resources used were textbook and whiteboard. In some instances, teachers used a range of colours to highlight important steps in the completion of a solution to a question. In some lessons, teachers had prepared supplementary materials for their teaching, including worksheets and in one instance the prior preparation of electronic presentations. It is recommended that differentiated worksheets be prepared to allow students to achieve at their own level during the completion of the assigned tasks. Furthermore, there were instances where available resources such as a data projector and a laptop computer should have been used to enhance the learning experience for students.

ASSESSMENT

Ongoing assessment featured in most lessons observed. Regular end-of-topic or module assessments take place for all year groups. In line with best practice, common assessment and marking schemes are used where appropriate. Formal examinations take place twice per year for first, second and fifth year students, at Christmas and summer, with an extra assessment at the October half-term for fifth year students. Examination year groups sit ‘mock’ and Christmas assessments and TY students are assessed at the end of each of their three modules.

Homework was assigned in lessons observed and varied in type and form. Some students were required to continue with the exercise from the textbooks or complete assignments for handouts, while other students were asked to prepare work for the next lesson based on newly acquired skills. In general, homework was carefully chosen and was appropriate in the quantity and

relevance to the topics studied during the lesson. However, care is advised that selected homework questions are suitably differentiated to allow all students to have a sense of achievement when completing their homework.

In addition to a review of LCA key assignments, students' homework copies were examined and indicate that many teachers provide some written feedback to students in many instances. This is supplemented by teachers providing oral feedback to students during lessons. In many instances the presentation of students was untidy and it was unclear what was homework or class work. Greater monitoring of students' work is recommended, to encourage good practices in the presentation of work. The recording of homework in students' school journals varied. Some teachers encouraged students to record homework while many students did not record their assigned work. Greater consistency in accurately recording of homework tasks should be sought by all teachers.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- Management is very supportive of the mathematics department, through the provision of an annual budget and accommodating CPD attendance.
- Work on the mathematics plan and schemes of work for each year group and level has been undertaken by the mathematics department.
- Departmental meetings are facilitated by management and minutes of these meetings are retained.
- The provision of small class groups that run parallel to Mathematics, in addition to other models of numeracy support offered to students for whom Mathematics is challenging, is commended.

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

- The basis for class formation should be changed in order to raise teacher and student expectations and to encourage as many students as possible to choose higher level.
- Teachers should choose and use the most suitable methodology to ensure that the preferred learning style of students is catered for.
- A varied range of questioning strategies, that will challenge students during lessons and encourage greater involvement by students in their learning, should be used by teachers.
- All teachers should establish high expectations in terms of classroom management and encourage all students to participate fully in lessons.
- Differentiated worksheets should be developed to allow all students to work to the best of their ability.
- The Mathematics department should collaborate to identify the most appropriate range of resources that can be acquired through the annual budget to support the teaching and learning of Mathematics.
- Actions for future development within the department should be progressed and associated strategies developed to give direction to the aims of the department.

Post-evaluation meetings were held with the principal and deputy principal 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

1. The Board of Management wishes to acknowledge the professionalism and courtesy of the Inspectorate in the manner in which the evaluation was carried out.
2. It notes the joint union directive in operation at the time of the evaluation directing staff not to attend pre or post evaluation meetings or scheduled meetings during the time of the evaluation.
3. The Board acknowledges the positive comments made in the report.

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

1. Co-ordinators have been appointed to Junior and Senior cycle mathematics following retirement of previous co-ordinator.
2. All staff have attended a planning day dealing with differentiated learning.
3. An extra period has been allocated to 6th year.
4. An extra teacher has been added to 3rd year thus reducing class size.
5. In service has been undertaken on Project Maths by the Mathematics department.
6. 3 groups of higher level mathematics have been set in 2nd year.
7. New resources and materials have been accessed by the Department, including ICT to aid learning and teaching.
8. The pool of teachers available to teach higher level Maths in Junior cycle has been increased.