

**An Roinn Oideachais agus Scileanna**

**Department of Education and Skills**

**Subject Inspection of Mathematics  
REPORT**

**Pobalscoil na Tríonóide  
Youghal, County Cork  
Roll number: 91513S**

**Date of inspection: 19 October 2009**



**AN ROINN | DEPARTMENT  
OIDEACHAIS | OF EDUCATION  
AGUS SCILEANNA | AND SKILLS**

**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 Pobalscoil na Tríonóide. 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**

Pobalscoil na Tríonóide was officially opened in 2006 following the amalgamation of the existing post primary schools in the town of Youghal. Currently the school provides an education to over nine hundred students from the town and its environs. The school includes an Aonad: a stream in the school where education through the Irish language is provided. Mathematics education through Irish is available to students during their junior cycle.

The time allocated to Mathematics is in line with syllabus guidelines. Four periods are allocated per week for first year and Transition Year (TY) classes and five for second year and third year class groups. Leaving Certificate classes have six periods per week in fifth year and five in sixth year. The Leaving Certificate Applied (LCA) programme, currently available in year two of its cycle, has three periods of Mathematical Applications per week. In third year, due to reported timetable constraints, a class has one mathematics teacher assigned to teach three lessons each week and another teacher to teach the other two. It is suggested that this practice be avoided, if possible, in future years as this does not facilitate continuity of approach.

The mathematics department in Pobalscoil na Tríonóide is large. Sixteen teachers are involved in the teaching of the subject, some of whom are teaching the subject to a single class group in the current year. It is recommended that, over time, the number involved in the teaching of Mathematics be reduced, through the development of a core team of mathematics teachers, each of whom is allocated significant contact time with the subject. On a practical level, when facilitating meetings, developing collaborative work practices and planning and reviewing activities, a smaller team would be more appropriate.

The good practice of assigning first-year students to classes on a mixed-ability basis is in place. It is very good that mathematics classes are concurrently timetabled for all years from second year onwards. Outside of the TY programme this is done within two bands in each year group. Within each band students have access to higher-level and ordinary-level classes. Again, commendably, classes are organised on a mixed-ability basis within these levels. This allows students access to

all levels of the subject throughout their studies and facilitates transfer between levels. Where Irish is the language of instruction, one first-year and one second-year class group is taught on a mixed-ability basis. In third year a higher-level and an ordinary-level group is created. This is very good provision.

The size of class groups in first year is as small as possible. Also, an additional teacher is allocated to each band in third year and in senior cycle to allow for the formation of small or level-appropriate groups. This is further evidence of the school's commitment to providing a high quality mathematics education for all its students. This structure also helps to ensure that students are encouraged to study the subject at the highest level possible for as long as possible. The setting of common formal tests across all first-year classes and within levels in the other year groups is a further help to support teachers in their recommendations to students and parents regarding levels of study for the remainder of their junior or senior cycle. Students who wish to change levels must consult with the appropriate class teachers and the school's guidance counsellor and have written parental consent. Change of level is then allowed at appropriate times during the school year. This is good practice as it reduces any disruption that can be caused to classes when students change from one level to another

Teachers are assigned to year groups by school management and, following a consultation process, to levels and classes. It is policy and practice within the school that, in the interests of maintaining high levels of continuity, where possible, teachers remain with the same class groups from second to third year and from fifth to sixth year. Currently Leaving Certificate higher-level classes are shared between five teachers. At junior cycle, levels are rotated among a wider group of teachers. This is good practice as mathematics teachers should have experience of teaching as many year groups and levels as possible.

Co-curricular activities related to Mathematics are available to students within the school. These include the Irish Junior Mathematics competition and in-school activities organised as part of Maths Week. The school hopes to increase the range of such activities in the coming years. On occasion students from the school, based on their Junior Certificate results, have been invited to avail of 'enrichment classes' organised by University College Cork. All the teachers involved in the organisation and promotion of these events are commended for their commitment to the students and to the subject.

The mathematical abilities of all first-year students are formally assessed prior to entry into the school. This assessment, along with ongoing teacher monitoring and observation during first year helps to identify students who find the subject particularly difficult. In addition to the efforts to maintain small class sizes outlined earlier in the report, support for these students is provided in the form of extra tuition through withdrawal for small-group or one-to-one tuition outside of their timetabled mathematics classes. This support is generally provided by a member of the mathematics team. The support aims to improve the numeracy skills of the student as well as supporting the learning that takes place in the mathematics classroom. Progress is assessed through informal contact between the support teacher and the mathematics teacher. In light of the reported benefits of having a variety of models of support for students is suggested that the current supports in Mathematics should be reviewed and the opportunities offered by in-class support and team teaching be trialled and assessed in the context of this review.

While there is no specific budget for Mathematics, the department requests for purchase of resources are normally granted. The school has recently acquired extra sets of whiteboard drawing equipment for use in the teaching of the subject. The majority of teachers are classroom based. A range of teaching resources, stored centrally in one classroom, is available to members

of the team. These include overhead calculators, geometric shapes, geostrips, clinometers, probability kits, dice and playing cards. Each classroom is also well resourced with broadband internet access, a computer, overhead projector, television and DVD player. One mathematics classroom has an interactive whiteboard and a number of others have fixed data projectors installed. The team has access to four well-equipped computer rooms and the school has access to the services of a computer technician. This high level of resources should facilitate greater use of information and communication technologies (ICT) in the teaching of Mathematics in the future.

The school engages in the good practice of conducting an analysis of the school's performance in the certificate examinations in Mathematics in relation to achievement and uptake levels and of comparing these with national norms. Such analyses are useful in informing future planning.

School management facilitates and encourages attendance at continuing professional development courses. It is reported that all members of the team will attend the Project Maths workshops scheduled for later in the school year.

In many instances, good efforts have been made to enhance the physical working environments of the students through the use of a range of commercial and teacher-generated posters. In some instances these include samples of pages from the new 'formulae and tables' booklet which has replaced the Mathematical Tables formerly used by students in the certificate examinations. To further enhance the learning environment for all students, it is suggested that teachers display and use examples of students' high-quality mathematical work and project work in classrooms

## **PLANNING AND PREPARATION**

The mathematics department is co-ordinated on a voluntary basis by a member of the team. The co-ordinator is appointed on an annual basis. This is positive as this system will allow each member of the team to gain a deeper understanding of the issues involved in the workings of their subject department. It is suggested that the role of the coordinator be agreed among the team and written into the mathematics plan. Meetings take place formally around school-planning activities and occur about four times in the course of the school year. Recent discussions have led to a revised policy on the process to be followed by students who wish to change level. Commendably, ICT is used in the recording of the minutes of these meetings. In light of the upcoming series of continuing professional development (CPD) events associated with the national rollout of Project Maths, it is suggested that agendas of team meetings be expanded to include a time for sharing feedback from CPD events attended, and for teachers to discuss teaching approaches and methodologies appropriate to the changed syllabus.

The mathematics team have made considerable and commendable progress in the preparation of their department plan. The plan includes a mission statement, aims and objectives for mathematics education within the school, minutes of meetings, organisational details, syllabus documents and details of supports available or planned for students. It also contains a record of continuing professional development courses attended by teachers and an analysis of the performance of students in the certificate examinations. The plan also includes homework and assessment procedures and cross-curricular planning. The effort and commitment of all teachers involved is noteworthy. The team has agreed programmes of work for each year group and level. This is positive. However, these are currently presented in the form of a list of chapters from the textbook to be covered each term. It is recommended that the 'common introductory course'

proposed as part of the Project Maths curriculum initiative should be integrated into the first-year section of the plan and building on this, the use of learning objectives within topics is recommended in all sections of the plan. To further enhance what has already been achieved in planning, it is further recommended that course content be explicitly linked to relevant active methodologies, furthering the sharing of and implementation of high quality professional practice. The 'teaching and learning plans' prepared by the Project Maths Development Team (PMDT) and the resources available on the website [www.projectmaths.ie](http://www.projectmaths.ie) could prove useful in this regard.

The TY plan is generally based on the Leaving Certificate syllabus. Circular M1/00, *The Transition Year Programme*, states that: "A Transition Year programme is not part of the Leaving Certificate programme, and should not be seen as an opportunity for spending three years rather than two studying Leaving Certificate material." It is therefore recommended that the mathematics department reviews the TY plan for the department to ensure that there is a clear distinction between Leaving Certificate material and the TY mathematics programme.

The mathematics department works collaboratively as evidenced by the progress made in planning, by the records of meetings presented for inspection and by the high level of coordination in the setting of common assessments within subject levels.

## **TEACHING AND LEARNING**

In all classes observed, lesson content was appropriate and in line with syllabus requirements and agreed programmes of work. The method of presentation of work was clear and suited to the task. The teachers were well prepared for their teaching. Lessons progressed at an appropriate pace and effective use was made of time. In order to ensure that the goal of the lesson is clear at all times, it is suggested that teachers explicitly share the learning objectives of the lesson with students. Such an approach is in line with the principles of assessment for learning and, along with a review of the learning achieved at the conclusion of the lesson, it, can increase student motivation and maintain a better focus on learning during the lesson.

Teaching was predominantly conducted through the presentation of work at the board followed by the setting of exercises for individual student practice. This methodology was used effectively. However, over-reliance on this teaching strategy can result in students being passive recipients of learning and dependant on the teacher. In lessons, students could have participated more and been more actively engaged in the learning process, through the employment of worksheets, class discussion, investigations, pair work, oral work and practical hands-on activities. To complement this teaching style it is recommended that a wider range of teaching methodologies be explored, developed and included. The incorporation of such strategies in lessons takes advantage of the widely accepted benefits for students of being actively involved in their own learning and acknowledges students' different preferred learning styles.

There were commendable examples of teachers having high expectations of students' capabilities and students responded appropriately to these expectations. Other examples of good practice in mathematics teaching observed in the lessons visited included clarity in the worked examples which acted as templates for students' work, clear explanations, affirmation of student effort, well-established cross-curricular links, accurate use of mathematical terminology, use of concrete materials, the integration of ICT and the active involvement of students in class.

Interactions between teachers and students generally took the form of brief answers by the students to questions posed by the teacher. These tended to be directed to individual students and

to be based on finding the next steps in the solution to a problem. There were, also, in line with good practice, some good examples of teachers using questioning to extend students' understanding and encourage the expression of ideas in clear mathematical language. This approach can help students to strengthen their learning, maintain engagement with the topic and develop their problem-solving skills. It is recommended, therefore, that all teachers make more use of probing questions, appropriately challenging students and supporting them in developing the skills of mathematical thinking and communication.

Classroom management was observed to be relaxed and effective. Students were generally attentive to and engaged in their work. Mutual respect between students and teachers was in evidence creating a good working relationship in the classrooms. There were many examples of the effective use of class time to provide assistance to individual students.

Generally students were able to apply concepts and procedures taught to similar type questions from the textbooks. In interactions with the inspector, students used mathematical language appropriately and were able to suggest and justify solutions to problems set in unfamiliar contexts.

## **ASSESSMENT**

Student progress is assessed through oral questioning, the assignment and correction of homework, regular topic tests and term examinations. Teachers keep records of students' achievements in assessments. There is good use of common exams for classes studying at the same levels and for first-year students. Those year-groups not taking the certificate examinations in June have term examinations in November, in March and at the end of the school year. Third-year and sixth-year students are assessed in November and sit the 'mock' examinations in the Spring. Progress is formally reported to parents/guardians following these assessments and through parent-teacher meetings.

A random examination of students' copybooks revealed relevant work, with varying standards of presentation, generally monitored by teachers. In several instances, the good practice was evident where teachers, through the use of positive comments, encouraged students' efforts and directed them on ways to improve their work. In some classes, practice has been established whereby examples, carefully worked and laid out on the board at the beginning of a topic, are copied by students and used as a template for subsequent work. The modelling of clear approaches to the solutions of problems and the explicit acknowledgement of students' efforts are good practice and it is recommended that these should be incorporated into all lessons.

Lessons generally began with the correction of homework. This was dealt with effectively and efficiently and concentrated on areas where students identified that they had difficulties. Commendably homework and assessment policies have been devised for Mathematics. Homework was assigned in lessons observed and was appropriate in terms of quantity and relevance to the work done during the lesson. An examination of student journals indicated that homework is regularly assigned which is in line with the school's homework policy and recognised good practice in mathematics teaching.

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

The following are the main strengths identified in the evaluation:

- The time allocated to Mathematics is in line with syllabus guidelines.
- Classes are organised on a mixed-ability basis within subject levels.
- Students are encouraged to study Mathematics at the highest level possible for as long as possible.
- Co-curricular activities related to Mathematics are available to students within the school.
- Students who find the subject particularly challenging are appropriately supported.
- A wide range of teaching resources, including ICT, is available to teachers.
- The mathematics team has made considerable and commendable progress in planning.
- The teachers have high expectations of students' capabilities in Mathematics.
- Good examples were observed of teachers using questioning to extend students' understanding and encourage the expression of ideas in clear mathematical language.
- Classroom management was effective.
- There is good use of common examination papers for classes studying at the same levels.
- Homework and assessment policies have been devised for Mathematics.

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

- The number of teachers involved in the teaching of Mathematics should be reduced.
- The current approach to providing supports for students in Mathematics should be reviewed and the opportunities offered by in-class support and team teaching should be trialled and assessed in the context of this review.
- The long-term plan for Mathematics and the TY mathematics plan should both be reviewed in light of comments made in the report and during the inspection.
- The range of teaching methodologies and questioning strategies used in lessons should be expanded.
- The modelling of clear approaches to the solutions of problems and the explicit acknowledgement of students' efforts should be incorporated into all lessons.