

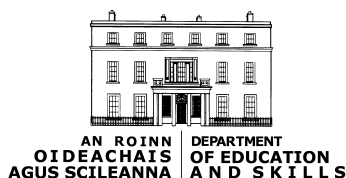
An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Mathematics
REPORT**

**Moville Community College
County Donegal,
Roll number: 76084L**

Date of inspection: 22 April 2010



REPORT ON THE QUALITY OF LEARNING AND TEACHING IN MATHEMATICS

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Moville Community 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 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 report; a response was not received from the board.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

Time allocation for Mathematics is very good. Students are assigned to mixed-ability classes in first year, with the exception of a small group of students identified as requiring support with Mathematics. For second and third year, students are assigned to higher and ordinary-level classes. Mathematics lessons are not concurrently timetabled for these year groups, therefore it is not possible to change level for Mathematics without also changing base group. This would involve a move to a different class group in a number of other subjects, together with the possibility of a different teacher in many cases. While acknowledging the demands on timetabling, it is recommended that every effort be made to concurrently timetable mathematics lessons in second year and in third year. Such a move would improve students' access to the various levels in the subject without disruption to learning in other subjects. Arrangements for level choice in the senior cycle are good with concurrent timetabling to facilitate movement between levels.

The mathematics department comprises ten teachers. Teachers are deployed in accordance with their experience and expertise. There is good rotation of levels among the teachers in both the junior and senior cycles. School management strongly supports teacher continuing professional development (CPD). In addition to attendance at the workshops organised in preparation for *Project Maths*, teachers have participated in many whole-school CPD training courses. Training in 'Instructional Intelligence' has been arranged by school management for some members of the mathematics department. Teachers also attend CPD subject-specific courses outside school time; this is evidence of their commitment to professional development and to the subject.

There is very good access to information and communications technology (ICT) for teaching and learning in Mathematics. Teachers have use of a number of laptops and data projectors; three interactive whiteboards and *Bluetooth Pads*; and three computer rooms are available on a booking system. A range of mathematical software such as examination revision software, *Autograph* and

Geogebra are installed on the schools systems. There was little use of ICT, however, in the lessons observed and it is recommended that ways in which ICT could be used effectively as a regular feature of mathematics lessons be explored by the teaching team.

A very wide range of resources is available for mathematics lessons. Algebra tiles, set circles, folding geometrical shapes, 3-D solids, *Geostrips*, dice, counters, angle and algebra dominoes, probability kits and wooden geometric models are a sample of the large range of equipment that has been accumulated. Games such as, 'Connect 4', 'Battleships' and 'Draughts' are also used to help students develop problem-solving, critical-thinking and other mathematical skills. In addition, teachers use everyday objects and materials to make the subject more relevant to the students' lives. The internet is also used as a significant resource for lessons. The range and diversity of teaching aids available are evidence of teachers' enthusiasm for the subject and their commitment to ensuring that Mathematics is enjoyable and accessible for students.

Appropriate measures are in place to identify students who have learning support needs in Mathematics. Support is provided through the creation of smaller class groups, individual withdrawal where necessary and small group withdrawal. Team teaching is well established in the school and was observed to be working very effectively. Teachers provide for the support needs of their students through very careful monitoring and through devising a variety of creative ways to explain concepts and to engage learners. Overall, it was evident that students requiring support with Mathematics are very well catered for and that teachers are driven by a genuine desire to ensure that student individual learning needs are comprehensively met.

Students participate in the *PRISM Maths Challenge*. In addition, *World Maths Day* and *Maths Week* celebrations are held each year. The events undertaken include, table quizzes, treasure hunts, and algebra hunts. This provides a valuable experience to students and raises the profile of the subject in the school through connecting it with the world outside the classroom. It is also a very good way of encouraging students to develop an enthusiasm for Mathematics through engaging in enjoyable mathematical activities.

PLANNING AND PREPARATION

Planning time is provided three times per year as part of the whole-school planning process. Minutes are kept of all planning meetings. Planning for Mathematics is ongoing as teachers routinely collaborate and work very well as a team. Currently there is no co-ordinator for the mathematics department. It is recommended that a co-ordinator be appointed and that this position periodically rotate amongst members of the teaching team.

The minutes of planning meetings suggest that much time is spent on discussing organisational issues. While this is an important function of the subject department it is recommended that some time be set aside for the sharing of ideas around teaching and learning in Mathematics. There is also scope for mathematics teachers to share valuable expertise gained from attendance at CPD events and to observe its implementation in the classroom. This would be very worthwhile and the mathematics department should give this practice strong consideration.

A comprehensive subject department plan has been developed. It contains all of the necessary policy documents as well as programmes of work for each year group and level. In keeping with very good planning practice these are set out in terms of learning objectives, necessary resources, methodology and assessment. It is very good that the mathematics department has begun to plan

for the implementation of *Project Maths*. It is recommended that this planning include the creation of teaching and learning plans similar to those provided by the *Project Maths* development team.

A very good transition year (TY) plan has been developed. It emphasises the importance of making Mathematics both enjoyable and relevant for students. Topics include aircraft scheduling and time zones, permutations, combinations, algebra, problem solving, trigonometry and a mathematics project. Syllabus content is taught using a variety of methodologies and ICT, for example, the study of trigonometry involves the use of clinometers to measure angles. A very good feature of the TY programme is the fact that the syllabus topics included were chosen to enable students to develop confidence with the subject and the methodologies were chosen to encourage independent thinking.

TEACHING AND LEARNING

High quality teaching and learning was evident in most of the eight lessons observed during the evaluation. In general the choice of material was suitable for the class groups and for the achievement of the lessons' learning objectives. In one case, however, although there were some examples of good practice observed, the learning objectives could have been achieved if more suitable material had been chosen. Teacher instructions and explanations were clear and in many cases included the very good practice of relating the new work of lessons to prior learning. All teachers shared the learning objectives at the beginning of lessons. Best practice was observed in many cases where the objectives were written on the board and their achievement was checked on an ongoing basis. This very good practice allowed teachers to modify the learning activities to suit individual learner needs.

Very good use was made of various types of questioning strategies. There were many instances of teacher questioning expecting students to examine underlying ideas, to determine whether or not their answers made sense and to explain their reasoning. Teachers encouraged students' intuition by expecting them to look at the ideas presented in a way that illustrated their true meaning. A good example occurred in a lesson on combinations where students intuitively worked through material; in this case students derived much benefit from not using the calculator. Students contributed freely through engaging in discussion around the concepts presented. Teachers were careful in providing thorough answers to students' questions through listening carefully to students and establishing accurately any areas of confusion. All of this is very good practice.

Teachers made considerable effort, in the lessons observed, to ensure students fully understood the concepts taught. There were many examples of creative practice in this regard. These included using ideas that students were very familiar with to explain more difficult concepts; using concrete materials such as 'Geosolids'; using a variety of examples, including negative examples, to illustrate a particular idea and ensuring that explanations genuinely focused on addressing specific areas of difficulty for students. In most cases teachers worked up from the lowest hierarchical level in explanations and built towards the lesson's learning objective. This is a very valuable strategy in learning in Mathematics. In one case there was scope for the basic elements of the topic's hierarchy to be more comprehensively covered. Care should be taken to ensure that students fully grasp each of the prerequisite ideas before moving on to more difficult concepts. This practice would contribute to solid learning that is not reliant on repetition and revision, is based on genuine understanding rather than knowledge of rules, and facilitates best outcomes for learners.

Teacher exposition was the predominant methodology used in the lessons observed. The good balance between student activity and teacher instruction, the lively pace, and the quality of the interactions made the lessons vibrant and interesting. In some cases pair work and concrete activities were used as additional learning strategies. Group work was used in a lesson on combinations to very good effect. One lesson using 'Instructional Learning' strategies was observed. This involved very well designed group work. The students of this class group worked on a variety of tasks, a chairperson had been appointed, and one member of the group was provided with a laminate sheet to feed answers back to the whole group. Although the teacher was available to provide help, there was a notable absence of the need for assistance as students worked together and discussed the tasks at hand. The level of student engagement with the work was very high with students taking responsibility for their own learning and communicating very well. The lesson was very well prepared and this contributed to the smooth running of the activities and to the overall success of the lesson.

A variety of valuable differentiation strategies was used to facilitate students to achieve the learning objectives of each lesson. These included the provision of individual attention to any student experiencing difficulty; the use of graduated worksheets; the provision of more challenging work for the better able students and the inclusion of activities that stimulated the better able students while allowing plenty of time for all students to think. In one case students who were finished the task provided were encouraged to work ahead on previously unseen material; this is a very good approach to differentiation and to encouraging independent learning. Overall there was very good practice in relation to differentiation of learning; this ensured that individual students' needs were met.

The quality of learning was generally very high. Students studied Mathematics in a supportive environment that encouraged them to participate and engage fully. Teachers were very motivated in providing every opportunity for students to reach their potential by having appropriate expectations of student achievement and by setting high standards for student work. Students contributed freely to lesson discussions and engaged well with learning activities.

The relationships between students and their teachers were characterised by a strong sense of care and team work. Students responded very well to the encouragement and affirmation provided by their teachers. Stimulating mathematical environments have been created with student projects, student-generated and teacher-generated posters and commercial posters displayed on the walls of classrooms. Overall the classroom atmosphere was very positive.

ASSESSMENT

Three formal assessments are carried out for all year groups. For first, second, fourth and transition year students these occur in November, March and May. Third and fifth year students are formally assessed in November and sit 'mock' certificate examinations in February. Parent - teacher meetings are held annually and reports are sent home following all formal assessments. In keeping with very good practice the questions on formal examinations are graduated to provide for students of all ability levels. This approach is also valuable in assuring the quality of the information gained from assessments and permits valid comparisons in attainment.

Teachers assess progress very well during lessons through observation and oral questioning. Learning is also assessed through end-of-topic tests. The high quality of the ongoing assessment

observed, in many cases, appropriately determined some of the work of lessons. The standard of student work in the copybooks reviewed is appropriate to student ability and students are making good progress in Mathematics. Homework is set regularly and usually corrected as part of the following day's lesson. In keeping with very good practice, teachers only correct a selection of requested homework questions on the board. Overall, there is good practice in relation to assessment.

There is good uptake of higher-level Mathematics in the certificate examinations and the school is justifiably proud of its students' performance. The results are analysed by school management each year which is good practice. The mathematics department should be encouraged by the success so far and should continue to use the results analysis in planning for future improvement.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- Time allocation for Mathematics is very good.
- School management strongly supports teacher continuing professional development.
- A very wide range of resources is available for mathematics lessons and there is very good access to information and communications technology.
- Students requiring support with Mathematics are very well catered for and teachers are driven by a genuine desire to ensure that the students' individual learning needs are comprehensively met.
- Very good progress has been made on planning for Mathematics.
- High quality teaching and learning was evident in most of the eight lessons observed during the evaluation. Very good use was made of various types of questioning and a variety of valuable differentiation strategies was used to facilitate students to achieve the learning objectives of each lesson.
- The relationships between students and their teachers were characterised by a strong sense of care and team work.
- There is good practice in relation to assessment.
- There is good uptake of higher-level Mathematics in the certificate examinations and the school is justifiably proud of its students' performance.

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

- Every effort should be made to concurrently timetable mathematics lessons in second year and in third year.
- Ways in which ICT could be used effectively as a regular feature of mathematics lessons should be explored by the teaching team.
- There is scope for mathematics teachers to share valuable expertise gained from attendance at CPD events and to observe its implementation in the classroom. This would be very worthwhile and the mathematics department should give it strong consideration.
- In developing an understanding of mathematical concepts care should be taken to ensure that students fully grasp each of the prerequisite ideas before moving on to more difficult concepts.

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.

Published December 2010