Subject Inspection of Mathematics
REPORT

Coláiste an Átha,
Kilmuckridge, County Wexford
Roll number: 71650Q

Date of inspection: 01 March 2011
REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN MATHEMATICS

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Coláiste an Átha. 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 one day 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 of the school was given an opportunity to comment on the findings and recommendations of the evaluation; the board chose to accept the report without response.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

Coláiste an Átha has an open enrolment policy and participates in Delivering Equality of Opportunity in Schools (DEIS), the Department of Education and Skills action plan for educational inclusion. The school currently offers the Junior Certificate School Programme (JCSP), the established Leaving Certificate programme and has introduced the Leaving Certificate Applied programme (LCA) this year (2010-2011). It is appropriate, in the context of the current student intake, that the entire cohort of junior cycle students follows the JCSP programme. However, this arrangement should be reviewed each year to ensure that the programme is fully meeting the needs of the students. The mathematics teaching team currently consists of four members, all of whom are subject specialists. The majority of the team have attended the workshops provided as part of the national roll-out of Project Maths.

Time allocated to Mathematics in the timetable is in line with syllabus requirements. All year groups have five periods of Mathematics per week and lessons are distributed evenly throughout the school day and the school week. Students in first year are taught on a mixed-ability basis. Mathematics classes are concurrent in each year group apart from first year. This is good practice as it allows students to change level and is an encouragement to remain at the highest level possible for as long as is practicable. Students wishing to change level are accommodated following a consultation process. Teachers generally continue with classes from first to third year and from fifth to sixth year. This is good practice.

Students who find Mathematics particularly challenging are identified through a pre-entry assessment, contact with primary schools and teacher monitoring during first year. Identified students receive extra tuition through withdrawal during some mathematics lessons and it is reported that there is close informal contact between the class teacher and the support teacher. It is now recommended that a wider range of supports be provided for students. The school should give consideration to in-class supports such as team-teaching. Such an intervention is very much in keeping with Department policy as described in the Inclusion of Students with Special Educational Needs - Post-Primary Guidelines (2007).
Management and staff currently review the attainment and performance of students on an annual basis. In general, students follow the ordinary or foundation level course at senior cycle. The teachers who provide extra tuition, outside of their timetabled hours, to the small number of students taking higher level are deserving of praise. An analysis of the certificate examinations results reveals that a sizable number of students are taking foundation level Mathematics at Leaving Certificate and a significant number of those taking ordinary level are achieving below a grade D in both Junior and Leaving Certificate. The introduction of the LCA will provide a more suitable challenge to some of these students. However, there is a need to assess the current mathematics provision in the school with a view to considering all possible strategies to achieve an increase in students’ performance. This should include the development of a whole-school approach to numeracy; examination of the pace of lessons, teaching approaches used and support for weaker students; specification of explicit higher expectations and measures to encourage more students to take higher level including, if necessary, an increase in time allocation.

There is a range of resources within the school to enhance the learning experience of students. All classrooms are broadband enabled. Plans for the use of the recently received information and communication technology (ICT) grant are at an advanced stage. It is important that the team would plan on how to integrate ICT into teaching and learning within the classroom. Further resources should also be acquired as part of the preparation for Project Maths. These should include concrete materials, models, educational software and manipulatives.

Students are given some opportunities to participate in mathematics-related activities outside of the formal curriculum. These include World Maths Day activities. There is scope to include further activities such as Maths Week activities, competitions and JCSP mathematics initiatives.

**Planning and Preparation**

There is currently a subject co-ordinator for Mathematics. The role of the co-ordinator rotates among members of the team on an annual basis. This is good practice as it helps in the development of wider leadership experience across the entire mathematics department. To aid this process, the duties of the subject co-ordinator should be agreed by the team and set down in the subject plan.

Formal planning and review meetings are scheduled around school planning days, and occur about three times a year. Further informal meetings also occur on a regular basis. In line with best practice records of all these meetings are retained in the mathematics folder.

The mathematics team has made progress in planning. The plan follows the School Development Planning Initiative (SDPI) template and is being developed collaboratively over time. The department plan includes a mission statement, overall aims and objectives for mathematics education within the school and organisational details. It also includes reference to a variety of methodologies and a description of provision for students with special educational needs. This is good practice. The long-term plan consists of a list of topics to be covered in each term. The plan for first year includes a list of learning outcomes for each chapter of the textbook. To build on this solid foundation, a review of programmes of work should, over time, see them expanded to include the resources, including software packages, in place to assist students in acquiring key skills and ideally linked to relevant mathematical topics. In addition, it is suggested that a teaching and learning focus should be applied to the subject-planning process. In the short term the *Common Introductory Course* section of the Project Maths syllabus review should be included.
as part of the first-year section of the plan. The plan should continue to be developed, over time, in order to link content and skills using a learning-goal oriented approach. A potentially useful resource for this work is the learning-targets statements for JCSP which are available at www.jcsp.ie. In addition, areas such as co-operative learning and assessment for learning could continue to be developed through teachers’ involvement with the Project Maths and JCSP support services.

All teachers presented individual planning documents that detail the topics to be studied and a timeframe for their completion. In addition, teachers had developed individual assessment materials, handouts and other supplementary materials and these were accessed and used during lessons visited. This is good practice.

**TEACHING AND LEARNING**

The quality of teaching and learning observed was generally good. In lessons observed, teachers’ presentation of work was clear and preparation for teaching was evident. However in some instances the pace of lessons could have been more challenging. In line with good practice, in most instances the topic to be covered was stated at the start of the lesson, while in a small number of instances this was given in the form of a clear learning outcome for students to have achieved by the end of the lesson. Building on this good practice, it is recommended that the planned learning outcomes be communicated to students at the outset in all lessons, be referred to during the lesson and that time be allocated to check understanding, during a review phase at the end of the lesson. This practice will help to ensure that students have a clear short-term goal in each lesson, become involved in evaluating their own learning and make them more active participants in the learning process. Teachers will also be able to evaluate the level of challenge appropriate to each cohort of students.

Examples of good practice in mathematics teaching observed included the highlighting of key mathematical terminology, the relating of learning to students’ experiences, the use of clear methods in arriving at solutions, the appropriate use of mathematical language by both teachers and students, ongoing review of concepts, reviewing previous learning and high levels of attention to individual students. In one instance there was a very positive explicit emphasis on the process of learning and the use of students’ analysis of their own errors to reinforce and improve the learning of the group.

Where time management was seen not to be effective, the slow pace of the lesson resulted in students not being sufficiently challenged and inadequate material being covered, thereby compromising student progress. Clear direction and timeframes were not given to students as to what was expected of them when completing assigned work. This allowed some students to become disengaged and unwilling to proceed, leading to the non-completion of the assigned work. It would have been more beneficial to give a specific time to complete an exercise after which corrections would take place, allowing for the identification of common errors or misunderstandings. The sharing of good practice among the team and the adoption of a common approach should ensure that all lessons are planned and clearly structured to allow sufficient time to be allocated to the exposition of material and techniques, practice of newly acquired skills and correction. This structure will allow all students to have a sense of achievement in their work and an appreciation of the importance of their engagement in their own learning.
A common method used in lessons saw the teacher demonstrating a technique at the board and students individually repeating the method on similar type questions while the teacher worked with students who required assistance. It is recommended that the teachers add to this traditional teaching style and introduce students to a range of methodologies which help to increase confidence and self-esteem, encourage students to take responsibility for their own learning and support independent thinking. In this context a range of methods such as practical work, discussion, group work, and quiz activities or investigative work could be considered. The teaching and learning plans available on the Project Maths Development Team’s website www.projectmaths.ie as well as the sharing of experience within the team would also support this objective.

In many instances, interaction between teacher and students took the form of brief answers by the students to closed questions from the teacher. Questioning focused mostly on finding the next steps in the solution of a problem. However, there were some good examples where teachers built on their students’ answers, exploited the learning potential of incorrect answers and encouraged them to explain and justify their methods and thinking. This is good practice as it helps students to consolidate their learning and maintain engagement with the topic. It is recommended, therefore, that a varied range of questioning strategies be employed in all lessons.

In general, textbooks, work sheets and past examination papers were the main resources used in lessons. In some instances, where the readability of textbooks was an issue for the students being taught, there were some good examples observed of the use of prepared worksheets to enhance learning. Such good practice ensures that all students are encouraged to work to the best of their abilities and to engage with the learning activities in lessons.

Students generally demonstrated a clear understanding of concepts engaged with during the lessons in interactions with the inspector. They were able to answer questions posed to them in a confident manner and suggested solutions to questions asked.

Classroom management was generally effective and appropriate, and students were kept on task. Students were generally attentive to their work. In almost all instances there was a sense of mutual respect between teachers and students, creating an atmosphere conducive to learning.

The teaching team utilises posters and resources produced by the JCSP support service, as well as worksheets and some resources that they have created and developed themselves. A range of posters was displayed to create a visually stimulating mathematical environment in some classrooms. It is recommended that student-generated posters and displays of students’ work be used to further enhance the learning environment.

ASSessment

The mathematics department plan includes the school’s homework policy. This is positive and recognises that homework plays an important role in the learning process. Homework was assigned in the majority of lessons observed and, in general, was appropriate in terms of quantity and relevance to the work done during the lesson. It is suggested that the mathematics team adapt the homework policy and agree specific mathematics-related homework guidelines.

An examination of students’ copybooks revealed work that was appropriate, relevant and reasonably well presented. There was evidence that teachers are monitoring students’ copybooks
and that students in some instances also have a role in monitoring their own work. This is good practice. Students should be encouraged to review, assess and evaluate their own work to a greater extent. The good practice of using positive comment-based feedback to encourage students’ efforts was noted in a few instances and this approach should be adopted as a motivational and pedagogical methodology by all members of the team.

The use of JCSP statements, where students, in consultation with their teachers, assess their own learning, was noted. The use of these statements can play an important role in increasing student confidence and motivation.

Teachers record student attendance, performance in assessments and, on occasion, daily records of work undertaken or homework assigned. This is an indication that teachers are cognisant of the implications of student attendance and absence on their learning and progress.

Information regarding students’ improvement is communicated through two parent-teacher meetings each year for the third-year and sixth-year groups and one such meeting for all other year groups. The student journal is also used on an ongoing basis as a means of two-way communication between school and home. All parents also receive reports from the school on their children’s progress twice each year. One report is issued for all classes after assessments at Christmas. Non-certificate-examination classes have further formal assessments at the end of the school year. The remaining students sit their ‘mock’ examinations in the second term. It is noted that the school operates an open-door policy where parents can make an appointment to consult with a teacher, thus facilitating ongoing communication.

**SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS**

The following are the main strengths identified in the evaluation:

- The provision for Mathematics in the timetable is appropriate.
- The JCSP and LCA programmes have been introduced to provide for the needs of the student cohort.
- Students are supported through the use of JCSP resources, statements and initiatives.
- The mathematics team have made progress in planning.
- The quality of teaching and learning observed was generally good.
- Classroom management was effective and appropriate.
- A range of posters was displayed to create a visually-stimulating mathematical environment in some classrooms.
- Communications with parents are good.

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

- A wider range of interventions in the area of learning support should be put in place.
- There is a need to assess the current mathematics provision in the school with a view to considering all strategies that might lead to an increase in students’ performance.
- Current mathematics department plans should be developed in order to link content, teaching methodologies and the skills required from students through a learning-goal oriented approach.
• Learning outcomes should be communicated to students at the outset in all lessons, be referred to during the lessons and time should be allocated to check understanding, during a review phase at the end of the lessons.
• Teachers should use a range of methodologies which help to increase confidence and self-esteem, encourage students to take responsibility for their own learning and support independent thinking.
• Students should be encouraged to review, assess and evaluate their own work.

A post-evaluation meeting was held with the teachers of Mathematics and 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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