An Roinn Oideachais agus Scileanna
Department of Education and Skills

Subject Inspection of Mathematics and Applied Mathematics
REPORT

Coláiste an Phiarsaigh,
Gleann Maghair, Cork
Roll number: 62301N

Date of inspection: 11 February 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 Phiarsaigh. It presents the findings of an evaluation of the quality of teaching and learning in Mathematics and Applied Mathematics and makes recommendations for the further development of the teaching of these subjects 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 and examined students’ work. 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 mathematics 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

Coláiste an Phiarsaigh, situated on the outskirts of Cork City, is a co-educational school providing education through Irish to both day and boarding students. The school has an enrolment of 542 students, the majority of whom come to the school from an Irish-language-primary-school background. The Junior Certificate, a compulsory Transition Year (TY) programme and the Leaving Certificate programme are on offer to its students. The current mathematics team consists of ten teachers with generally two teachers providing tuition in Applied Mathematics.

First-year classes are taught on a mixed-ability basis. Mathematics classes in each year group from second year on are timetabled concurrently and this is good practice. Concurrent timetabling allows students to follow the highest level possible for as long as possible and facilitates change of level where necessary. During second year following a common end-of-first-year assessment and a common assessment in November, students are allocated to three higher-level classes and one ordinary-level class, based on their performance. In certain years students following the higher-level course are assigned to classes on a mixed-ability basis and in other years they are assigned to streamed higher-level classes. It is positive to note that the method of allocation is currently based on an evaluation of what is perceived to be best for the particular cohort of students and is reviewed annually. However it is suggested that the goal of having mixed ability within levels would be the primary factor in class formation in order to allow for the highest possible expectation for the greatest number of students and the maximum benefit to be achieved from common testing.

Time allocated to Mathematics is good. Lessons are of forty minutes in duration. Sixth-year classes having six lesson periods each week. Four class periods are allocated to Transition Year (TY) Mathematics. In junior cycle and fifth year, students have five periods of mathematics tuition each week. Mathematics lessons are distributed evenly throughout the school day and in most instances throughout the school week. However, apart from the second-year and two first-year groupings, students do not have mathematics lessons every day. This should be avoided in future timetabling as ideally students should have contact with the subject each day. It is positive
that students who wish to study Applied Mathematics are accommodated within and outside of timetabled hours in the school. As a further means of promoting the subject, some of the TY groupings study a short module of Applied Mathematics as part of their Mathematics course.

Teachers generally continue with classes from second year to third year and from fifth year to sixth year. This is good practice. The full rotation of teachers in the junior cycle is praised. The school has the depth of expertise necessary for teaching higher-level Leaving Certificate Mathematics. It is positive that a number of teachers have undertaken professional development courses in Mathematics and Applied Mathematics in their own time and this will enable the school to meet the changing needs of the curriculum at all levels in the coming years.

Students, who find Mathematics challenging, are identified through pre-entry assessment, contact with local primary schools and parents, and teacher monitoring during first year. In addition to withdrawal for small group or one-to-one tuition, support is also provided through the creation of a small class group in second, third, fifth and sixth year.

The mathematics team do not have an annual budget for resources but requests for materials are favourably considered by management. A variety of teaching resources have been acquired. These are stored centrally and are available to the team. Teachers have access to a computer room and a number of data projectors have been installed in classrooms to support teaching. It is planned to extend this to all classrooms in the near future. There was evidence of the use of information and communication technology (ICT) in the teaching of Mathematics during the evaluation.

The school is committed to the continuing professional development (CPD) of its teaching team. It was apparent that teachers had attended workshops on Project Maths. Some teachers had also attended, or were attending, evening courses which have been organised as part of the support for the rollout of Project Maths. This is very positive and reflects well on the commitment of the mathematics teaching team.

The mathematics department encourages participation in the Team Maths competition and the Irish Junior Mathematics competition organised nationally by the Irish Mathematics Teachers’ Association (IMTA). A range of activities had also been put in place for Maths Week. This is good practice as it raises the profile of the subject within the school and enables students to enjoy and appreciate mathematics outside of the classroom setting. A dedicated maths notice area is also used to highlight mathematics-related activities in the school.

School management and the mathematics team undertake an analysis of the school’s performance in the certificate examinations in Mathematics in relation to achievement and examination-level-uptake rates and comparing it with national norms. An analysis of results over recent years indicates significant strengths in both of these areas. As a substantial cohort of the students taking ordinary level Mathematics at Leaving Certificate is achieving high grades, it is recommended that the school look at ways to encourage more of these students to take higher level.

**Planning and Preparation**

The mathematics department is currently co-ordinated on a voluntary basis by a member of the team who was appointed at the beginning of the school year. This practice is positive as is the proposed rotation of the role of co-ordinator among members of the team in the coming years.
Mathematics planning meetings take place as part of whole-school formal planning and review meetings and are scheduled around staff meeting and school planning days, and occur about four times a year. Records are kept of such meetings and they show evidence of collaboration. It is suggested that ICT should be used in the keeping of the records of formal meetings as this would facilitate their retention and distribution. Recent discussions have dealt with the optimal utilisation of the recent ICT grant, harmonisation of approaches to the teaching of mathematical procedures and the implications of the introduction of the Project Maths strands. Further informal meetings occur regularly during the school year.

The team has made substantial progress in planning. Comprehensive plans are in place for Mathematics, and Applied Mathematics. The plans show evidence of collaboration and review. The mathematics department plan includes a mission statement, overall aims and objectives for mathematics teaching within the school, organisational details of classes and teachers, reference to methodologies and resources, and cross-curricular planning. This is in line with good practice. The plan also included a list of ICT resources and a section on the implications of the introduction of Project Maths.

The long-term plan contains a list of topics to be covered by each year group and level annually. This is supplemented by a termly plan based on sub-topics to be taught. It is recommended that the mathematics department continue this good work and over time further develop the plan for Mathematics. This revised plan based on an outline of sections of the syllabus at junior and senior cycle, should include learning outcomes to be achieved by students and key skills for students to acquire, linked to resources and methodologies, under each of these sections.

Planning for TY Mathematics and Applied Mathematics is also good. Both plans follow the structure outlined above for the mathematics plan and form a comprehensive template for the teaching in these areas.

Teachers made individual planning and preparation materials available during the inspection. Included in these materials were schemes of work in line with the overall plan, examples of worksheets and handouts and assessment questions and solutions. This level of preparation for teaching is good.

**TEACHING AND LEARNING**

Generally teaching and learning observed was of a very-high standard. In the classes visited, Irish was the language of instruction and communication. In most instances it was evident that competence in Mathematics along with general language skills and appropriate mathematical terminology in Irish were being appropriately developed by the teachers. Lessons were appropriately paced, well structured and purposeful. Preparation for teaching was evident. Effort was made to review work previously done and to create connections to new material being presented, thus helping to situate and reinforce learning and to develop new ideas. Instruction began with a clear outline of the lesson content. This is positive. However this practice could be enhanced if the lesson content was presented as a learning objective for the students and was accompanied by strategies for students to evaluate their own learning at the end of the lesson. Adopting this methodology is worthwhile because it sets a short-term goal, increases students’ motivation and involvement in the lesson and leads to a sense of accomplishment on mastering the day’s challenge. It would also align more closely planning, teaching and learning and assessment. There were good examples of the effective use of worksheets, pair work and relating learning to the experience of the students.
A range of teaching methodologies were used in mathematics lessons to engage students in the learning process. In particular students were active participants in their own learning. In a TY lesson groups of students had the task of preparing resources on a topic that they would subsequently teach to a first-year group. There was a strong emphasis on effective learning within the task and how ICT could be integrated into the process.

Further examples of good practice in the teaching of Mathematics included; the appropriate use of ICT, group work and pair work; the use of loop cards to revise a topic; the use of worksheets and an emphasis on mathematical terminology. In the teaching of Applied Mathematics everyday concrete materials were used to demonstrate a difficult concept and a new formula was effectively linked to students’ prior knowledge.

Teachers made use of a range of questioning strategies during the lessons observed. Along with the usual “next step” type questions a selection of more open and probing questions were included to encourage students to think for themselves. This type of questioning is effective in promoting self-directed learning.

Teachers set appropriate high standards of expectation for their students and students responded to these expectations. Teachers were affirming of the efforts of their students leading to positive interactions within the classroom and creating an atmosphere that was conducive to learning. Classroom management was effective and discipline was well maintained.

In some classrooms, teacher-prepared posters were used to enhance the visual-learning environment. The display of such posters and students’ project work can be effective as a further method of motivating students and reminding them of key mathematical concepts or formulae. It is suggested that more use be made of students’ own work, through projects or examples of high quality work, to highlight the quality of learning and to engage students further.

Learning was evident as students were able to apply procedures, learned in class, to similar type problems from the textbook. They also showed understanding of the concepts taught and displayed clear mathematical knowledge. In interactions with the inspector students used appropriate mathematical terminology. They also demonstrated understanding of concepts, showed their ability to find solutions to problems; justified answers to problems posed in unusual contexts and made relevant connections between topics.

ASSESSMENT

The school has devised homework and assessment policies. These are overseen by the mathematics team. This is good. Lessons generally began with the correction of homework, and an examination of students’ copies and journals revealed that homework is regularly assigned. This is good practice. Copybooks contained work that was appropriate, relevant and well presented. There was evidence that teachers are monitoring students’ copies and that students also take a role in monitoring their own work which is good. In some instances the good practice of using positive comments to encourage students’ efforts was noted.

Students’ progress is monitored on a regular basis through classroom observation, questioning in class, monitoring of class work and of homework, and written assessments following the completion of a topic. Teachers maintain a record of students’ performance in assessments. This is good practice.
Assessment practices at a whole-school level are good. Marks attained as part of a process of continuous assessment constitute the assessment for the majority of year groupings. Formal in-house examinations are held at the end of fifth year and examination classes sit pre-examinations in the spring term. As previously mentioned Mathematics is formally and commonly assessed at the end of first year and during the first term in second year prior to the formation of level specific classes. The move towards the inclusion of a range of modes of assessment in TY is particularly appropriate. Reports are issued to parents twice yearly and all parents are invited to an annual parent-teacher meeting. The students’ journal is also used as a means of communication with parents. This level of contact with parents is good.

**SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS**

The following are the main strengths identified in the evaluation:

- Teaching and learning observed was of a very-high standard.
- Students who find Mathematics challenging are appropriately catered for in the school.
- The time allocated to Mathematics is good.
- The mathematics department encourages participation in co-curricular activities related to Mathematics.
- Teachers set high standards for students and the students responded accordingly.
- The school has devised homework and assessment policies.
- Students’ progress is monitored on a regular basis.
- The level of communication with parents is good.

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

- Mathematics lessons should be more evenly distributed through the school day and the school week.
- The long term plan for Mathematics should be updated to include learning outcomes to be achieved by students and key skills for students to acquire, linked to resources and methodologies.
- The use of student learning outcomes during lessons, allied with a review of learning at the end of lessons should be expanded.

Post-evaluation meetings were held with the principal and mathematics teachers, at the conclusion of the evaluation when the draft findings and recommendations of the evaluation were presented and discussed.

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