Subject Inspection of Mathematics
REPORT

Coláiste Réithín
Bré, Contae Chill Mhantáin
Roll number: 70821M

Date of inspection: 17 September 2009
REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN MATHEMATICS

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Coláiste Ráithín. 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.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

Coláiste Ráithín provides education through Irish for students from the town of Bray and its surrounding area. The school offers the Junior Certificate, Transition Year (TY) and the Leaving Certificate programmes to its 239 students.

The mathematics team consists of six teachers. Commendably, the school also offers Applied Mathematics as an optional subject to fifth-year and sixth-year students.

Each year has two class groups for Mathematics with the exception of sixth year where commendably a third class has been created to allow for the creation of smaller class groups. First-year and second-year students are taught in mixed-ability groups. In third-year, fifth-year and sixth-year classes are divided into higher and ordinary levels, which are timetabled concurrently. The timetabling of second-year classes concurrently is recommended, as it would allow greater flexibility in the division into higher and ordinary level groups and allow the setting of a more challenging pace to students capable of following the higher level. Students wishing to change level are accommodated following parental consultation with senior management.

Teachers are assigned to classes and levels by senior management following consultation. It is practice within the school for teachers to remain with the same class groups from first to second year and from fifth to sixth year, where possible, thus maintaining high levels of continuity. The full rotation of teachers in the junior cycle is commended. In order to extend the expertise necessary for teaching higher-level Leaving Certificate Mathematics, it is recommended that more teachers become involved at this level. Currently, Leaving Certificate Applied Mathematics is the responsibility of one member of the teaching team.

The time allocation to Mathematics is good. All junior cycle mathematics classes have five periods per week. Fifth-year and sixth-year classes also receive five periods each week. Commendably, a further class period is allocated in sixth year to the higher-level class group. Four lesson periods are allocated to TY Mathematics. In line with accepted good practice, mathematics lessons are generally distributed evenly throughout the school day and the school week. However, one of the first-year classes has two double periods and hence three contact points with the subject each week. In addition, TY Mathematics currently consists of two double
periods each week. Such an arrangement should, if possible, be avoided in future timetabling to ensure that all classes enjoy the benefits of an even spread of lessons across the week.

There is no specific budget for mathematics equipment, however requests for resources have been favourably considered by management. A number of resources have been purchased and are available to all members of the team. These include overhead projectors, geometrical shapes and some software packages. The school has a computer room and two laptops and data projectors are located in the science rooms and are available for use by the mathematics teachers. Greater utilisation of these resources would benefit students in their learning of the subject. Teachers’ attendance at continuing professional development (CPD) courses is facilitated by management and commendably teachers have availed of a course offered by the Mathematics Support Service in recent years. Teachers new to the school receive a general induction from the Vocational Education Committee, school-based induction and informal support and mentoring from the mathematics team.

Students in Coláiste Ráithín have an opportunity to participate in a range of co-curricular activities connected to Mathematics. In recent years students were involved in the Problem Solving for Irish Second-Level Mathematicians (PRISM) competitions, organised nationally as part of Maths Week Ireland held in October each year. On occasion, students from the school have been invited to training for and to participate in the Maths Olympiad competition. Such activities help to engage students, raise the profile of the subject and provide an opportunity to experience Mathematics outside of the classroom. All involved in the organisation of these activities are praised.

The good practice of determining the mathematical abilities of all incoming first-year students is achieved through a pre-entry assessment along with ongoing monitoring and observation by the teachers during first year. This helps to identify students who find the subject particularly challenging. Support for these students is provided in the form of extra tuition through withdrawal for small group or one-to-one tuition. Students are withdrawn at times that do not coincide with their timetabled mathematics classes. This support is sometimes provided by a member of the mathematics team. It is suggested that the current model of support should be reviewed and the opportunities offered by in-class support and team teaching be assessed in the context of this review.

The good practice of conducting an analysis of the school’s performance in the certificate examinations in Mathematics is undertaken by the deputy principal. This analysis includes a focus on achievement, uptake levels and comparisons with national norms. An analysis of results in recent years indicates strengths in these areas. Such analysis can prove useful in informing future planning and provision for the subject.

**Planning and Preparation**

The task of co-ordination of the mathematics team is undertaken on a voluntary basis and the position of coordinator rotates between the members of the team most involved in the teaching of the subject. This is good and helps to promote a sense of collaboration and co-operation within the team. This is supported by the good practices of rotation of levels, the following of a similar programmes of work and having common formal assessments at the end of first year and second year.
Formal planning and review meetings are held at the beginning and end of the school year. Other regular informal meetings also take place. The good practice of record-keeping of the formal meetings is in place.

A plan for Mathematics has been prepared. The plan contains overall aims and objectives for mathematics education within the school, organisational details and outline programmes of work for each year group and level, along with reference to students with additional educational needs. The school’s homework and assessment policies are included in the plan. This is in line with good practice and is commended. The long-term plan for the subject consists of programmes of work for year groups and levels in the form of an outline of topics from the syllabus at junior cycle and senior cycle and with details of the timeframe needed to cover each topic. To further enhance this planning, a range of methodologies and differentiation strategies should also be listed and linked to specific learning outcomes for students.

There is also a plan for each of the two TY groups in the school. Within the plan for the higher-level class group, there is a balance between topics that consolidate the prior learning of students, some content that introduces elements of the Leaving Certificate programme and, commendably, details of non-curriculum materials as well as cross-curricular aspects of Mathematics for delivery in TY. This is praiseworthy. The plan for the ordinary level class however contains an over-emphasis on Leaving Certificate topics and should be reviewed to bring it more into line with the objectives of TY.

All teachers made individual planning material available during the inspection and are using their own subject department plan to inform and prepare for their teaching.

TEACHING AND LEARNING

Irish was the language of instruction, interaction and communication, in all lessons visited. The exchange of information through Irish and the use of mathematical terminology in Irish by teachers and students featured in all lessons and formed a natural part of all classroom interactions. This contributed positively to the learning environment and to classroom atmosphere.

The mathematics lessons in Coláiste Ráithín were well structured, purposeful and demonstrated effective execution of planned lesson content. Lessons progressed at an appropriate pace with good use being made of time. In all cases, lesson content was appropriate to the syllabus and ability levels of the students. Teachers’ explanations and instructions were clear. Generally, in lessons observed, the topic of the lesson was communicated to the students at the beginning of the lesson. This is good practice. The greatest benefit from this strategy occurs when the lesson goal is presented as a learning objective for the students and when there is a checking strategy at the end of the lesson. This teaching strategy is worthwhile because it increases students’ motivation and involvement in lessons and leads to a sense of student accomplishment on achieving each short-term learning goal.

Lessons frequently began with the correction of homework from the previous lesson, which was conducted efficiently and effectively. It is good that efforts were made to review previous topics and to create connections to new material being presented, thus helping to develop new ideas and reinforce learning.
The textbook and board were the main resources used in lessons. There were also good examples of the use of a laptop and projector along with graph drawing software and the use of coloured cards by students to evaluate their understanding of concepts taught. Teachers also effectively related students’ own life experiences to learning in some lessons.

The predominant methodology used in lessons was teacher-directed learning. This consisted of the teacher completing a mathematical procedure or problem for the class at the board. The students then worked individually on similar problems from the textbook or worksheet, while the teacher circulated and assisted students, as required. Within this structure the teaching was caring and effective. While teachers were busy, students could have been more active in their learning. It is therefore recommended that teachers build on current methodologies used in lessons and add greater variety to their teaching approaches, so that students can become more independent of teacher support. More use of strategies such as working on student-generated problems, pair work, group work, investigation, consolidation activities, practical work, discussion, group work, quiz activities, the use of ICT and the use of concrete materials would have improved the learning experience of the students. Such methods should have the effect of encouraging students to become active in their own learning and more engaged in the lesson. The teaching and learning plans available on the Project Maths Development Team’s website [www.projectmaths.ie](http://www.projectmaths.ie) could provide a useful resource in this regard.

Classroom interactions generally took the form of answers to questions asked by the teacher to individual students or to the class group. The questioning took the form of “next step” or “fill in” type questions. There was good practice with regard to variety in the addressing of questions to individual students and whole class groups. In some instances, more open questions were posed to assess students’ understanding and ability to apply their knowledge. This had the effect of engaging students more in the learning process. It is therefore recommended that teachers should engage in the posing of more open questions to challenge students and probe new material being presented. Students regularly asked questions during lessons. Teachers were receptive to students’ interventions and responded well to students’ questions during the lessons, thus ensuring that students were confident that their questions were treated as relevant and worthwhile and were encouraged to continue to clarify their understanding in this way.

The relationships between students and teachers were observed to be mutually respectful, creating a positive working environment, and classroom management was good. Teachers set appropriate high standards of expectation for their students and students responded to these expectations. Commendably, students also demonstrated a good understanding of concepts engaged with during the lessons and were able to apply then to a range of similar problems from the textbook or worksheet. In interactions with the inspector, students demonstrated an ability to justify solutions to problems posed to them and to answer questions asked of them in a confident manner, using appropriate mathematical terminology.

In some classrooms visited, the good practice of using displays of teacher prepared work and posters was used to enhance the visual learning environment and remind students of procedures and formulae. Such graphics, posters and displays of students’ work are effective in reminding students of key mathematical concepts, methods or terminology and should feature in all mathematics classrooms rooms, where it is practical to do so.

**ASSESSMENT**
Students’ ongoing progress is monitored through observation during lessons, questioning and the assignment and correction of classwork and homework. In addition, topic tests are conducted on a regular basis. Teachers retain records of the results of these assessments. This is good practice. Formal examinations for those students who will be participating in the certificate examinations are organised at Christmas and they also sit mock examinations later in the school year. All other year groups sit formal tests at Christmas and at the end of the school year. Parents receive two reports regarding students’ progress following these formal examinations. The students’ journal is also used as a means of communication between teachers and parents. A parent-teacher meeting is held for each year group during the course of the school year.

Teachers cooperate in the common testing of students, where appropriate. First-year and second-year students sit common formal assessments during the school year. This is good practice. Homework was assigned in all lessons visited, providing students with an opportunity to practise and strengthen mathematical concepts engaged with during the lesson. An examination of students’ copies and journals showed that regular homework is assigned, which is good. An examination of a sample of mathematics copybooks and notebooks revealed work that was appropriate, relevant and reasonably well presented. There was also evidence that teachers are monitoring students’ homework. In some instances, students monitoring of their own work could have been more evident. Students should be encouraged to regularly monitor and correct their own work in order that their copybooks become a template of good practice and a resource for their revision and study within the subject.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- The school offers Applied Mathematics as an optional subject to fifth-year and sixth-year students.
- The time allocation for Mathematics is good.
- Students have an opportunity to participate in a range of co-curricular activities connected to Mathematics.
- There is a sense of collaboration and co-operation within the mathematics team.
- The exchange of information through Irish and the use of mathematical terminology in Irish by teachers and students were evident in lessons and formed a natural part of all classroom interactions.
- Teaching was student focussed and effective.
- Lessons progressed at an appropriate pace and good use was made of time.
- Teachers set appropriate high standards of expectation for their students and students responded to these expectations.
- Students’ ongoing progress is monitored by teachers.

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

- The concurrent timetabling of second-year classes should be prioritised.
- The current methodologies used in lessons should be expanded to in order to have greater variety in teaching approaches.
- Teachers should broaden their questioning strategies in order to challenge students and probe new material being presented.
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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