

**An Roinn Oideachais agus Eolaíochta
Department of Education and Science**

**Subject Inspection of Mathematics
REPORT**

**Blackrock College
Blackrock, County Dublin
Roll number: 60030V**

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REPORT ON THE QUALITY OF LEARNING AND TEACHING IN MATHEMATICS

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Blackrock College, conducted as part of a whole school evaluation. 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, deputy principal and subject teachers.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

Timetabling provision for Mathematics is very good. All classes are provided with five periods of Mathematics per week. Mathematics classes are set in each year and are timetabled concurrently within each year group. This is very good practice as it facilitates movement of students between levels and enables students to follow the highest level possible for as long as possible.

Students enter Blackrock College having completed their first-year mathematics programme in Willow Park School in a mixed-ability setting. The content of the first-year programme is agreed between the mathematics teachers in both schools during meetings assigned for that purpose. Ongoing planning meetings are held during the year to monitor progress and to allow the mathematics department in Blackrock College to agree the content of the programme to be followed in second year.

Procedures for identifying the mathematical capabilities of incoming students are very good. The special educational needs (SEN) coordinator from Blackrock College manages the assessment of the students moving from sixth class in Willow Park Preparatory school to Willow Park First Year and of those who transfer from other primary schools to first year in Willow Park. The students sit appropriate standardised tests, and appropriate numerical reasoning tests are used to determine the mathematical abilities of the students. Very close liaison is maintained between the special educational needs department in Blackrock College and the teachers in Willow Park and the educational and other needs of students coming into second year are established well in advance of their arrival.

Learning support in Mathematics is primarily provided in a small-class setting. A learning support class, timetabled concurrently with the remaining mathematics classes, is created in each year group. The learning support classes are taught by a mathematics specialist and follow a programme designed in collaboration with the SEN team. The SEN team liaise closely with the mathematics department. The SEN teachers attend departmental meetings and have developed and distributed strategies for dealing with special educational needs of students in mainstream classes. It is very good that these strategies are included in the subject development plan for Mathematics.

The Mathematics department is very well resourced. An annual budget is provided to the department following negotiations with the head of the department. A wide range of resources is now available which are stored in a convenient central location that is accessible to all of the mathematics teachers. School management has been proactive in investing in the school's information and communication technologies (ICT) infrastructure and the mathematics teachers have access to interactive whiteboards, data projectors and laptops. All of the classrooms are networked and have access to the school's intranet. There was ample evidence of ICT being used in the preparation and delivery of lessons. The teachers have developed a very large number of resources themselves. These and other ICT resources are stored on the intranet and can be freely accessed by all mathematics teachers, when required. In order to enhance the very good work underway in resource development and to inform further procurement, it is recommended that an annual audit of resources be conducted. This should include any material developed by the team during the course of the year. The resulting inventory should be included in the subject development plan for Mathematics.

The mathematics department is comprised of fifteen teachers all of whom have an appropriate qualification in Mathematics. The teachers are assigned to classes and levels by the principal following consultation with the head of the department. Ongoing capacity building has ensured that a large number of the team now teach higher-level Mathematics in senior cycle. Furthermore it is policy that teachers retain the same class group from second to third year and from fifth to sixth year, this is very good practice as it ensures continuity of approach and facilitates long-term planning.

There is clear evidence of leadership within the mathematics department and it is clear that the department works very well as a team. All of the team members are committed to promoting positive attitudes to Mathematics and in enabling their students to have affirming experiences of the subject. Positive attitudes towards Mathematics are promoted by facilitating students' participation in the annual regional table quiz organised by the Irish Mathematics Teachers' Association, the Prism competition and the Maths Olympiad. Maths Week and World Maths Day are promoted enthusiastically. Students are also provided with opportunities to participate in activities designed to illustrate the importance of mathematics in industry, academia and everyday life.

PLANNING AND PREPARATION

Subject department planning in Mathematics is very good. The head of department, supported by the assistant head, assumes responsibility for coordinating planning. The mathematics team holds regular formal meetings, the minutes of which are kept in the subject development plan for Mathematics. Regular meetings of the heads of department further support collaborative planning. These meetings serve to ensure that individual subject planning is an integral part of overall school planning and facilitates the provision of appropriate whole-school training and informs the development of facilities.

Subject department planning in Mathematics is underpinned by a culture of collaboration and by very effective leadership from the coordinators. The members of the department engage in an annual review of the performance of the students in the state examinations with reference to data supplied by the State Examinations Commission. The outcomes of the analysis are used to inform subject planning, to identify strengths and areas for development which is excellent practice. Collaborative planning is also evident in the amount and variety of shared resources developed by, and available to, the members of the team.

A comprehensive subject department plan for Mathematics is in place. The plan contains a statement of aims and objectives, details of departmental organisation, schemes of work for each year and level and details of homework and assessment practices. The schemes of work take the form of topic lists together with the intended delivery schedule. In order to build on the existing good work in subject planning, it is recommended that the schemes of work be amended to specify the key learning outcomes in each section and to propose the most effective teaching methods to be used in realising them. The plan should also be amended to reflect existing classroom practice with regard to the use of robust agreed procedures when carrying out standard mathematical operations.

The mathematics department provides management with a written annual report detailing the activities, achievements and challenges faced by the department during the course of each year. Copies of these reports are available in the subject development plan for Mathematics. The development of the annual report involves reflection, collaboration and critical analysis and is very good practice.

A separate plan for TY Mathematics is in place. The plan describes the topics to be covered during the course of the year and is largely in keeping with the aims and objectives of the TY programme. However, it is recommended that the plan be reviewed to include a core of material which will enhance the students' competence in carrying out key operations and underpin their existing mathematical knowledge. The core should be augmented by a number of modules to provide enhanced opportunities for active learning, exploit cross-curricular links and facilitate investigation, portfolio development and teamwork. The materials chosen for the different modules should reflect the strengths and interests of the members of the department, the needs of the students and should be reviewed annually.

Individual teacher planning in Mathematics is very good. The lessons observed during the inspection were well prepared and were in keeping with the overall schemes of work as detailed in the subject development plan. Planning for the inclusion of resources is particularly good. Worksheets, revision materials and ICT were seamlessly integrated into the lessons visited. The resources were relevant, appropriate to the needs of the students and served to support the lessons' objectives and to reduce the reliance on the textbook during lesson delivery.

Ongoing continuing professional development (CPD) forms a central part of the mathematics department's planning. School management actively supports attendance at relevant CPD courses and a number of whole-school training programmes have also been organised. Newly appointed mathematics teachers avail of the school's comprehensive induction programme and ongoing support from the school's senior management team and the members of the mathematics department.

TEACHING AND LEARNING

The quality of teaching and learning in Mathematics is very good. The lessons observed during the inspection were very well planned. They proceeded at a suitable pace, were inclusive of all of the students and there was very good adherence to correct procedure when carrying out mathematical operations. Very good links were drawn to the students' earlier learning and to the relevance of Mathematics in everyday life. The teachers taught with enthusiasm and care. The material being

covered was presented in a sequential fashion and, as a result, the lessons were purposeful and clear. The teachers were very knowledgeable and gave the students very good strategies to avoid common pitfalls and to recognise the correct strategies to be used in tackling problems.

A range of teaching methods including ICT integration and the use of worksheets was in evidence during the inspection. The use of ICT was particularly successful in enabling differentiation and in providing opportunities for discussions regarding the most appropriate approach to be adopted in solving a variety of problems. In one instance ICT was seen to very good effect in analysing the features of Bar Charts, Pie Charts and Trend Graphs. The use of ICT meant that the students could focus on the important issues being raised in the lesson and that the teacher was free to circulate and support individuals as the need arose. The lesson was delivered in a very efficient and productive manner where there was very little emphasis on time-consuming repetitive calculation.

Differentiated worksheets were successfully used in a number of lessons to support the lesson's objectives, to facilitate discussions and to challenge the more able students. It was clear that the worksheets were intended to deliver particular learning outcomes and to meet the needs of the individual class groups rather than as a mere substitute for the textbook. The worksheets were produced using ICT and were reflective of the thorough and careful approach adopted by all of the members of the mathematics department in lesson planning and delivery.

Classroom management was excellent. Very good teacher questioning served to elicit factual responses from named individuals, to facilitate higher-order thinking and to ensure that the students remained engaged throughout. The lessons proceeded in an atmosphere of mutual respect where the highest standards of performance, engagement and collaboration were expected and realised. The students demonstrated positive attitudes towards Mathematics and contributed constructively to the lessons by asking incisive questions and proposing alternative approaches to problem solving.

The quality of student learning as demonstrated by students' responses to questions, the quality of their written work, their ability to solve the most challenging problems and their ability to express themselves using appropriate mathematical language was notable. Analysis of the uptake rates and student attainment in the state examinations provided further evidence of the very high quality of learning.

ASSESSMENT

Assessment practices in Mathematics are very good. A weekly report issues to parents reflecting the students application and behaviour and a progress report detailing their performance in class tests are sent home each month. Students sit formal examinations at Christmas and Easter, non-examination classes also sit formal examination just prior to the summer holidays. Reports issue to parents after each formal examination.

Common papers are set for all formal examinations and the examinations are corrected according to a common and agreed marking scheme. The papers set for the formal examinations model the certificate examination in layout, structure and in the level of difficulty of the questions. The quality of the feedback given to the students in relation to their performance in formal examinations and class tests is very good.

Homework is assigned daily and is corrected and monitored appropriately. Positive teacher comments and suggestions as to how to avoid common errors were evident in a number of instances. This admirable practice should be adopted by all of the members of the department. Difficulties encountered and any novel approaches to problem solving adopted by students in doing homework were discussed and explored. As a result of this, the correction of homework provided opportunities for shared learning. This is very good practice.

Practice in relation to recording student attendance and attainment in class and formal tests is very good. Roll call is taken at the beginning of class and is noted in the teacher's diary. Student compliance with homework completion and their performance in class and formal tests are also recorded.

Ongoing communication with parents occurs through the use of the student diary and telephone contact. Formal letters are also issued if the need arises. In addition, each class group has one parent-teacher meeting per year and less formal meetings can be arranged if required.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- The quality of teaching and learning in Mathematics is very good.
- Timetabling provision for Mathematics is very good.
- The mathematics department is very well resourced and mathematics classes have ready access to the school's extensive ICT facilities.
- The mathematics department is very ably co-ordinated and works as an effective team.
- Subject department planning in Mathematics is very good and a comprehensive subject department plan is in place.
- Individual teacher lesson planning and planning for the inclusion of resources in mathematics classes is very good.
- Classroom management is excellent.
- The students are very positive towards Mathematics and they demonstrated very high standards of behaviour, engagement and collaboration during lessons.
- A homework and assessment policy is in place and is being implemented effectively.
- Student attainment in Mathematics in the certificate examinations is very good.

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

- It is recommended that an annual audit of resources be conducted. This should include any material developed by the team during the course of the year.
The resulting inventory should be included in the subject development plan for Mathematics.
- It is recommended that the schemes of work included in the subject department plan for Mathematics be amended to specify the key learning outcomes in each section and to propose the most effective teaching methods to be used in realising them. The plan should also be amended to reflect existing classroom practice with regard to the use of robust agreed procedures when carrying out standard mathematical operations.
- It is recommended that the TY plan for Mathematics be reviewed to include a core of material, which will enhance the students' competence in carrying out key operations and underpin their existing mathematical knowledge. The core should be augmented by a number of modules to provide enhanced opportunities for active learning, exploit cross-curricular links and facilitate investigation, portfolio development and teamwork. The materials chosen for the different modules should reflect the strengths and interests of the members of the department, the needs of the students and should be reviewed annually.

Post-evaluation meetings were held with the teachers of Mathematics and 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.