

An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Science and Biology
REPORT**

**Mercy Secondary School
Ballymahon, Co. Longford
Roll number: 63710M**

Date of inspection: 2 March 2011



**A N R O I N N | D E P A R T M E N T O F
O I D E A C H A I S | E D U C A T I O N
A G U S S C I L E A N N A | A N D S K I L L S**

REPORT

ON

THE QUALITY OF LEARNING AND TEACHING IN SCIENCE AND BIOLOGY

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Mercy Secondary School, Ballymahon. It presents the findings of an evaluation of the quality of teaching and learning in Science and Biology 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, 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 the subject teachers. The board of management of the school was given an opportunity to comment on the findings and recommendations of the report; the board chose to accept the report without response.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

Mercy Secondary School, Ballymahon is a co-educational school with a current enrolment of 487 students. The school provides the Junior Certificate, Transition Year (TY) and the Leaving Certificate (Established) programme and the Leaving Certificate Vocational Programme.

Science is a core subject for all junior cycle students and Biology, Chemistry and Physics are offered as optional subjects to Leaving Certificate students. The school's TY cohort also follows a programme in the sciences which includes modules based on Biology, Chemistry and Physics. Subject option lines for fifth year are based on students' choices. The number of students choosing Biology is very encouraging.

The time allocated to Science is in line with syllabus recommendations. Junior cycle science classes are allocated four single periods per week in first and second year. From the next school year, it is intended to phase in one double and two single periods in first and second year, as is the situation in third year. All classes based on are mixed-ability groupings.

TY science students are allocated six single periods each week, to facilitate the provision of three year-long modules. This provision is currently under review and options to provide a double period in future, to improve provision for practical work, are being considered. There are two mixed-ability biology classes currently in fifth and sixth year. All biology classes are allocated one double and three single periods each week.

At present, five teachers of science subjects, all deployed in line with their qualifications, are teaching in the school. Teachers are allocated to classes in order to provide continuity with their assigned class groups throughout junior or senior cycle, a good practice which facilitates long-term planning. School management has been supportive of teachers' continuing professional development (CPD) and teachers have attended in-service courses in Science, Biology and the

physical sciences. Membership for three teachers of the Irish Science Teachers Association (ISTA) is supported by the board of management of the school.

Three laboratories and a demonstration room are available for teaching the sciences. These facilities are well organised and are well stocked. Chemicals are appropriately stored. The information and communication technology (ICT) infrastructure in the laboratories is of a high standard and teachers demonstrated a high degree of expertise in making use of it. All science students have laboratory access at least weekly. The collaboration and planning between teachers to maximise access for all class groups is commended.

Teachers and management support the provision of a range of science-related extracurricular and co-curricular activities, primarily in TY, and it is suggested that opportunities are sought to provide similar activities for other year groups. It is commendable that the school has developed links with Athlone Institute of Technology to support the provision of guest speakers on science-related issues.

Health and safety is well managed and the school has a health and safety statement which was drawn up with appropriate consultation. Health and safety policy is currently undergoing a major review. Appropriate safety equipment is available in the laboratories. It is recommended that, in order to enhance existing health and safety provision, simplified safety notices be displayed in a prominent manner in the laboratories.

PLANNING AND PREPARATION

The science department is characterised by the high level of collegiality and co-operation that was evident during the inspection and by the quality of the planning documents that have been developed. One teacher has worked as part of the Second Level Support Service (SLSS) Physics support team and contributes additional valuable expertise to the department.

The science department folder contains impressive schemes of work for all the courses taught, based on the relevant syllabus documents, which are well linked to teaching methods, resources and assessment modes. The manner in which these schemes have been used, by most teachers, to develop monthly schedules for the delivery of curriculum content to each class is also impressive. These schedules have been independently developed by the teachers who each plan their own way through the years' allocated work. It is recommended that these individual schedules are co-ordinated to describe common termly or half-termly, rather than yearly, sections of work in order to support the provision of common assessments on two occasions each year.

It is very encouraging that the outcomes for students in the state examinations are examined in detail each year by the science department members. However, the purpose for which the analysis is used is unclear. It is suggested that an action plan be drawn up to detail the concrete steps to be taken to bring about stated and agreed improvements each year and that the implementation of this plan be monitored on an ongoing basis.

Individual teacher lesson planning was good in all instances. The teachers were well prepared for class and due cognisance was given to the needs and abilities of students in preparing and delivering lessons. Such preparation resulted in good quality lessons. Required resources were prepared in advance, including electronic resources, and the apparatus required for demonstration and student-centred investigative work.

TEACHING AND LEARNING

The quality of teaching was good in all lessons observed and very good in some. All lessons were purposeful and good progress was made. Teachers were patient and worked hard to create positive, supportive learning environments. Teachers had high expectations of students and supported them well to achieve these expectations. Classroom management was well handled and students were busy at all times. Students behaved very well, engaged well in the learning process and worked hard. Student-teacher interactions were invariably positive and a good rapport between teachers and students was apparent at all times. Textbook use was minimal and consistent with good practice, with reference to appropriate passages in textbooks being used on occasion to reinforce learning. The topics addressed during the lessons included the eye, rusting, electricity, nutrition and reproduction in plants.

Teaching strategies and methodologies were well chosen in relation to both the students' abilities and the topics being taught. The adept use of ICT was evident in all lessons observed and a variety of approaches, including animation, video clips and PowerPoint, were used to engage, inform and stimulate students. Topics were well related to students' experiences and there was good use of subject-specific terminology.

Questioning of students was used extensively with a mix of lower order questions, to test recall and monitor learning, and higher order questions, to challenge students' understanding of topics, being used. Questions were generally directed to named students and an occasional tendency to accept global answering should be guarded against. Students answered confidently in most instances and demonstrated good quality learning. In two of the lessons observed, questioning of students was expertly used to develop lesson content, building on and developing prior knowledge.

Lessons were mostly well structured. Best practice was seen where the learning objectives were shared with students at the opening of the lesson and were reviewed and students' learning consolidated at the close of the lesson. It is recommended that this practice of sharing and reviewing learning objectives be adopted as standard practice across the science department.

In one lesson, a lengthy series of related topics was expertly taught in increments, using a repeating structure of introduction, explanation, demonstration or activity and review, breaking the material into small individual sections. The strategy of assigning homework at the beginning of the lesson, when sharing the learning objectives, was noted in one lesson. This very useful strategy was motivating for students, helped them focus on their own learning and set an expectation of them regarding the standard of this learning. While the balance between teacher-centred and student-focussed phases was good in almost all lessons, it is recommended that teachers, in a few instances, include more opportunities for active learning in their lessons.

The level of differentiation was generally good during lessons and teachers tailored and adapted their presentations and questioning techniques to accommodate individual students' needs. There was a good level of teacher movement throughout the classrooms in the lessons observed and this served to enhance the level of differentiation through monitoring and supporting individual students as necessary. The systematic use of *Assessment for Learning* strategies was not in evidence although teaching staff have received CPD in this area. It is recommended that this area be revisited and a more definitive approach to its use be implemented.

In all instances observed, practical work was carried out efficiently and safely. Students displayed a mature and disciplined approach to their work. Whole-class plenary sessions in advance of practical activities ensured that students were properly prepared for their work. Similar sessions following the activity provided students with an opportunity to review the procedures they had followed, to examine their results and to draw appropriate conclusions.

ASSESSMENT

There is an appropriate system of formal and informal assessment and reporting in place. Students in first, second and fifth year are formally assessed at Christmas and in May and are issued with progress reports following these assessments. TY students are subject to continuous and project-based assessment and they also receive Christmas and summer reports. Sixth-year students sit in-house assessments in October and all certificate examination students sit mock examinations in the spring, with progress reports being issued on each occasion. Additional testing is at the discretion of individual teachers.

The quality of students' learning, as evident from their interactions with teachers and with the inspector, the questions they asked and the quality of their answers during in-class questioning, their overall level of engagement and the quality of certificate examination results, was good.

Teachers used questioning, examination of homework and general observation of students, to assess students' performance on an ongoing basis. Students were frequently affirmed for their efforts during class. The quality of students' laboratory notebooks was very good in most cases. However, overall, the provision of feedback was not consistent. It is important that students' written work is affirmed and that their copybooks and laboratory notebooks are regularly monitored and feedback provided in order to encourage improvement and to develop their report-writing skills. It is recommended that teachers agree common standards for students' written work and implement a common approach to monitoring and correcting this work and to providing quality feedback to students.

Good practice by teachers in relation to monitoring and recording student attendance and attainment was evident. Sufficient information is recorded, by teachers to enable the provision of accurate and comprehensive reports at parent-teacher meetings, which are held annually for each year group.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- Science is well supported in Mercy Secondary School, Ballymahon, with very good provision of resources.
- Science is a core subject for all junior cycle students. The school's TY students also follow a programme in the sciences.
- Timetabled provision for Junior Certificate Science is good and is very good at senior cycle.
- Very good ICT infrastructure is available to support the teaching of the sciences.
- A strong and active science department is in place and high quality science folders have been compiled and are maintained by the members of the science department.
- Planning for the implementation of courses is exemplary.

- Good quality teaching and learning was observed in all classes visited, with some very good practice in evidence in a number of instances.
- Lesson structure was very good in a number of lessons observed and the use of a variety of appropriate and well-chosen teaching methodologies was in evidence.
- Arrangements for assessing and monitoring student progress and achievement are appropriate.

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

- It is recommended that teachers' individual planning schedules are co-ordinated in order to describe common termly or half-termly sections of work in order to support the provision of common assessments on two occasions each year.
- It is recommended that the practice of sharing and reviewing learning objectives be adopted as standard practice across the science department.
- It is recommended that a more systematic use of *Assessment for Learning* strategies is put in place to support students' learning.
- It is recommended that teachers agree common standards for students' written work and implement a common approach to monitoring and correcting this work and to providing quality feedback to students.

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