

An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Science
REPORT**

**Bishop McEgan College
Macroom, County Cork
Roll number: 71030J**

Date of inspection: 25 March 2010



**AN ROINN OIDEACHAIS
AGUS SCILEANNA** | **DEPARTMENT
OF EDUCATION
AND SKILLS**

**REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN SCIENCE**

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Bishop McEgan College, Macroom. It presents the findings of an evaluation of the quality of teaching and learning in Junior Certificate and Transition Year Science 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 the laboratory 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. 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

The provision of Science as a core subject for Junior Certificate and as a modular component of the Transition Year (TY) programme is very positive because it facilitates the development of scientific literacy among all of the students. Students are given an open choice of the optional subjects for Leaving Certificate. From these first choices, blocks of the optional subjects are then created and students choose one subject from each block. This student-centred approach to subject choice is very good. Currently, student choice has determined that just two science subjects, Biology and Physics are timetabled for Leaving Certificate. The uptake of these subjects is good. The school is committed to providing as broad a curriculum as possible and evaluates subject and programme provision on an ongoing basis. This has resulted in a decision to further expand the curriculum and the school intends to offer the Leaving Certificate Applied (LCA) programme for the academic year 2010-2011. This is very positive.

Some aspects of the science laboratory and the adjoining storage and preparation area are in need of renovation. Currently, the water taps do not work on the student benches and this causes difficulties for completion of some aspects of the mandatory student-practical activities. In addition, the chemical store does not have appropriate ventilation. In an effort to improve the facilities available for the teaching of the sciences, the school has applied, under the summer works scheme 2010, for funds to upgrade its only laboratory and adjoining storage and preparation area. This is positive. The science department has endeavoured to provide a stimulating learning atmosphere in the laboratory and this has been achieved through the display scientific posters and students' work. This is good practice. Equipment and resources are very well organised. Chemicals are stored in accordance with Department of Education and Skills' guidelines and best safety practice. The school has a health and safety statement which is currently being updated. The science department has access to a laptop computer and a ceiling-mounted data projector has been installed. This is beneficial for the teaching and learning of the

sciences. To facilitate the more effective use of the data projector, the installation of a black-out blind is advised.

Bishop McEgan College is participating in the Delivering Equality of Opportunity in Schools (DEIS) programme. The numbers of students achieving at higher level in the Junior Certificate science examination have increased over recent years. This is positive. Strategies to achieve increased higher-level participation among students could form part of the school's planned work in enhancing academic attainment under the DEIS programme.

There is very good support for students with additional educational needs in Bishop McEgan College. The science department has collated a list of key words in Science and this list has been furnished to the learning-support department. In addition, individual educational plans have been developed for the students with additional educational needs and these have been provided to the subject teachers to assist them in their work. Furthermore, in one year group, an additional smaller class group has been put in place for Science. Where appropriate, teachers use resources specifically developed to support students with additional educational needs and this is a good strategy. For example, with one class group the teaching resource developed by the Special Education Support Service, *Science Differentiation in Action* is used.

The professional approach of the members of the science department to teaching is illustrated by their commitment to further enhancing their skills and this has been achieved through the following measures. Management has encouraged and facilitated the teachers in attending science related in-service programmes. The development of new teaching approaches to science has also been facilitated through membership of the Irish Science Teachers' Association and also of the Institute of Physics. The science department has also shown a willingness to become involved in science-teaching initiatives such as the *Discover Sensors* project. Links have been fostered with science-education personnel in University College Cork in an effort to keep abreast of up-to-date developments in science teaching. These approaches to continuing professional development are very positive.

PLANNING AND PREPARATION

The collegial spirit in evidence in the science department facilitates a high level of both formal and informal collaboration and communication. This co-operation is enhanced by the work of a co-ordinator, the position of which is rotated among the members. There is evidence from the recorded minutes that issues such as those pertaining to the laboratory and to safety have been discussed and tasks have been delegated. This is good practice

The work done in developing the junior science, physics and biology folders is very good. An extensive array of resources including PowerPoint presentations, acetates and worksheets has been compiled. In addition to subject content, the department's philosophy towards the sciences, subject aims and objectives, and class organisation have also been included in the folder. This is very good practice.

Fine work has been done on developing the science plan. The syllabus learning outcomes have been highlighted for each year of junior cycle and timeframes have been outlined. Building on the work done, the plan should be extended over time in order that, resources and modes of assessment are linked with specific learning outcomes. Outline plans have been similarly devised in Biology and Physics. This good work should be further developed in line with the advice given

for Science. Consideration should also be given to the use of a common planning template for the biology, physics and science plans.

In TY, students study modules of Biology and Physics, but modules of Chemistry are not provided. Plans were furnished during the inspection in which topics to be taught were identified. In each of these subjects, students study aspects of science that are not elements of the certificate syllabuses. These include earth and space, first aid and medicine. It is also clear that an innovative approach is taken to the teaching of certificate examination related material. This is good as it is in line with the philosophy of the TY programme. Subject sampling of all Leaving Certificate science subjects is recommended in TY. Therefore, it is strongly recommended that elements of Chemistry are also incorporated into the TY programme. The exposure of students in TY to Chemistry would assist students in making informed decisions regarding uptake of Chemistry for Leaving Certificate

Preparation for lessons was of a high standard. Advance preparation of equipment and handouts contributed to smooth transitions from one phase of the lesson to the next. A very comprehensive teacher-planning folder has been compiled and this contains resources and handouts to support students' learning.

TEACHING AND LEARNING

A very good quality of teaching and learning was observed in McEgan College. It is clear that a very good teacher-student rapport exists between the science teachers and the students in the school. The warm atmosphere that prevailed in the lessons was conducive to student learning. Students were comfortable asking questions in the lessons observed and their contributions were encouraged at all times, thus ensuring that students were engaged throughout the lessons.

The lessons observed were well structured and the pace was good. All resources and equipment were readily available and lessons started as soon as students entered the laboratory. While the topic of the lesson was outlined to students at the outset of lessons, it is recommended that learning intentions be explained in such a manner that students would clearly understand the planned learning that would take place. This would assist students in ascertaining what progress was achieved during the recapitulation phase at the end of the lesson and thus facilitate self-assessment.

The phased structure of many lessons assisted in enhancing student engagement. Short practical activities were interspersed with recurrent oral questioning, whole-class discussion and student-written activities. This very good approach to lesson development facilitated the consolidation of students' learning and, at the same time, contributed to students' enjoyment of that learning. Lesson content was clearly communicated and good explanations facilitated students' understanding of the scientific concepts in many lessons.

A broad range of innovative strategies was used to promote students' interest in topics under discussion. The overhead projector and PowerPoint presentations were used very effectively to provide visual images and animations and to outline the main points of the topic under consideration. In one lesson, a song on pressure was played at the outset, to set the scene for the lesson, while students recorded ten words relating to pressure based on their previous knowledge. In the same lesson, a very short video clip was successfully used to stimulate students' understanding of the scientific concept that was illustrated and students were strongly encouraged

to elucidate their ideas. The teacher supported the students during this activity through the use of probing questions that were scaffolded in some instances. In these cases, the teacher adapted the language of the question to suit individual needs and assisted the students as they developed their answers. This is very good practice. The lesson content was effectively developed in this manner.

In the lessons observed, effective questioning strategies containing a mix of lower-order and higher-order questions focused students' attention and assisted in the development of the lesson content. Question and answer sessions were effectively used at the start of the lessons to create links with material covered in previous lessons, to develop lesson content during lessons and to ascertain students' learning during the recapitulation phase.

In one lesson, a number of students were encouraged to assist in the teacher-led demonstration. This is a very good strategy as it served to engender students' interest and thus promoted their engagement with the topic. In the same lesson, differentiated card games that were based on sentence completion or matching terms with explanations, were very successfully used to consolidate students' learning during the recapitulation phase of the lesson. These games also had the effect of enhancing students' literacy which is very good practice. Building on this good practice, keywords should be highlighted in all lessons as they provide a very good support for all students and in particular for those with additional educational needs.

At the end of one lesson, as a means of reviewing learning, students were asked to identify two core points that they had learned that day. This was another successful strategy which focused students on the key learning intentions of the lesson.

Practical work formed the kernel of each lesson observed. Due regard was paid to safety procedures. In instances where students were actively involved in hands-on practical activities, they worked well and good skill development was evident. The use of an investigative approach to teaching science increased students' motivation and enthusiasm and facilitated collaborative work among students. This is very good practice. During practical activities the teachers and the special-needs assistant constantly moved about the laboratory giving appropriate attention and support to individual students.

It was clear that students had a good understanding of the concepts and work of the lessons, appropriate to their abilities. The quality of students' written work was, in the main, indicative of students' learning and progress.

ASSESSMENT

Students' ongoing progress is monitored using a range of modes throughout the school year. Formative assessment is used in lessons. This includes oral questioning and regular monitoring and annotation of students' homework. Formal examinations are held at Christmas and summer and the pre-examinations are held in February for the certificate examination classes. In addition, assessments are organised at the October midterm and at Easter. In some instances, the results of regular topic tests are amalgamated to provide an overall mark which is included on the assessment report that is sent home. Common assessment is used in junior cycle Science. This is very good practice as it ensures standardisation across a year group. The use of such a range of assessments is positive. The importance that the school attributes to informing parents of their son's or daughter's ongoing progress is illustrated by the very good practice of sending reports

home up to five times per year in addition to the annual parent-teacher meeting. The student journal is also used as a means of communication between school and home.

Students' practical written work is of a good standard. It is recommended that marks for the formal examinations be aggregated with marks from the assessment of practical copies to arrive at overall results in order that the elements of coursework assessment and the summative assessment are combined in line with certificate examination practices. This would provide further motivation for engagement by all students with the practical element of the course. In addition, the provision of meaningful written feedback on the written work associated with practical activities is recommended. This approach would further advance students' learning

There is evidence that the school conducts an analysis of the certificate examination results. To extend this good work, the school should use the analysis of these results to inform subject planning and ultimately teaching and learning. This could form one element of the work being done to enhance academic attainment under the DEIS programme.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- Science feature strongly in all cycles and programmes.
- The collegial spirit in evidence in the science department facilitates a high level of both formal and informal collaboration and communication and subject plans have been devised.
- Students study aspects of science that are not elements of the certificate syllabuses in TY and an innovative approach is taken to certificate examination related material.
- The science department has shown a willingness to become involved in science-teaching initiatives such as the *Discover Sensors* project.
- The quality of teaching and learning was very good. A warm atmosphere prevailed in the positive learning environment.
- Strategies to support differentiated learning were used.
- The use of an investigative approach to teaching science increased students' motivation and enthusiasm and facilitated collaborative work among students.

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

- The science subject plans should be extended over time to link resources and modes of assessment with specific learning outcomes.
- It is recommended that elements of Chemistry are also incorporated into the TY programme.
- Learning outcomes should be shared with students at the outset of all lessons and these could be subsequently used to ascertain students' learning.
- Keywords should be highlighted in all lessons as they provide support for students' in their learning.
- Marks for formal examinations should be aggregated with marks from the assessment of practical copies to arrive at overall term results.

Post-evaluation meetings were held with 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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