An Roinn Oideachais agus Scileanna

Department of Education and Skills

Subject Inspection of Science
REPORT

Loreto Secondary School
Fermoy, County Cork
Roll number: 62270F

Date of inspection: 12 May 2010
REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN SCIENCE

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Loreto Secondary School, Fermoy. It presents the findings of an evaluation of the quality of teaching and learning in Science 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 laboratories and observed teaching and learning. The inspector interacted with students and teachers, examined students’ work and had discussions with the school management. 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. 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

Whole-school support for the sciences is good in Loreto Secondary School. All students study Science in first year. Science is offered as an optional subject thereafter. Given the very good uptake of the subject and the increased emphasis on practical work in the revised Junior Certificate syllabus, the school should consider making Science a core subject in junior cycle. This would facilitate the further development of scientific literacy among all students. Agricultural Science, Biology, Physics and Chemistry are offered as optional subjects in senior cycle. The uptake of the science subjects is generally good. The inclusion of the science modules in the Leaving Certificate Applied (LCA) programme, which are required for entry into some beauty-therapy courses, is positive.

The Transition Year (TY) programme is optional in the school. It is good to note that Leaving Certificate subject pre-selection does not occur in TY, allowing students an extra year of experience and of maturation before making their subject choices. Over the years, the school has reflected on its approach to the delivery of the science modules in TY and consequently its practice has varied with regard to the timetabling of the sciences. Currently, all TY students take Biology for the full year. Chemistry and Physics are offered as half-year modules and the students choose either the physical sciences or one of the other subjects that are concurrently timetabled. While acknowledging the good practice of reviewing the provision for the sciences in TY, it is recommended that the school examines strategies that would facilitate subject sampling of all the sciences by all students for at least a portion of time in TY. This would provide all TY students with the opportunity to further enhance their science process skills and provide an equal opportunity for all to sample the science subjects on offer.

Timetabling supports the delivery of the sciences. The time allocation for the science subjects is in line with the class contact time recommended in the syllabuses. Practical work is facilitated by
means of double-lesson periods and almost all classes receive an even spread of lessons over the week. This is positive.

The school is very well resourced for the teaching of the sciences, with three well-equipped, bright and visually stimulating laboratories, and a demonstration room. Storage and preparation areas adjoin each laboratory and the chemical stores are appropriately ventilated. A very good level of collaboration and co-operation among the teachers in this large science department ensures that all class groups have access to a laboratory for at least one lesson each week. The laboratories have very good levels of information and communication technology (ICT) and this equipment includes a ceiling-mounted data projector and laptop computer in each laboratory and in the demonstration room. In addition, there is an interactive white board in two of the laboratories. A science notice board in the corridor outside two of the laboratories is used to communicate science-related information to students. All of these resources are beneficial to the teaching and learning of the sciences.

It is clear that safe working practices are of paramount importance in Loreto Secondary School. There is a very good level of safety equipment in the laboratories and chemicals are stored in accordance with best safety practice and Department of Education and Skills’ guidelines. The school has a health and safety statement which has been recently reviewed. It is good to note that general classroom safety procedures, laboratory safety guidelines and chemical storage guidelines are delineated in the statement.

All classes are of mixed ability. Students take decisions regarding examination levels in the latter half of third year. This is positive as this strategy assists students in achieving at the highest level possible, appropriate to their ability.

Loreto Secondary School is committed to meeting the needs of its students and providing them with a broad and balanced education. To facilitate this process, the school operates a year-long subject-sampling system for all optional subjects in first year. The operation of the subject-sampling system assists students in making informed choices for the Junior Certificate and is good practice. The process used for the selection of optional subjects is student-centred. Students have an input into the creation of the subject-option blocks for both the Junior Certificate and the Leaving Certificate. This is good practice. Students are supported in making appropriate subject choices.

A good level of contact is maintained between the science teachers and the special educational needs department, thus striving to ensure that the needs of the students are met. This is achieved in part because one of the science teachers, who is qualified in the area of learning support, coordinates the provision of learning support and provides support to students in the science subjects as necessary. In addition, a key-word list of scientific terms has been compiled and is available in the first-year plan. It is recommended that the science department further develop this very good resource to incorporate the key terms for the complete science syllabus.

Teachers are appropriately deployed and have been facilitated by management to attend science-specific in-service programmes over the years. The commitment of the staff to continuing professional development (CPD) is illustrated by, the school’s willingness to host science in-service and by the involvement of the science department personnel in the delivery of in-service training over the years.

A good level of provision is made for co-curricular and extracurricular science activities, including fieldtrips and participation in science quizzes. The school has achieved some success in
the science-related competitions including the winning of the County Cork Junior Certificate Science Quiz in 2009. The defence of the title was taking place during the course of this subject inspection. The commitment and enthusiasm of these students and their teachers is praiseworthy.

PLANNING AND PREPARATION

Collaboration among the science teachers is very good. Co-ordination of the work of the science department is undertaken by the subject convenor. The science teachers meet formally as a group at set intervals during the academic year. The purpose of meeting formally is to provide a structured way for the science and biology subject teams to formulate agreed yearly plans. Common programmes of work are also devised for Chemistry when there is more than one class group in any year. The recording of decisions taken at these meetings is good practice and provides evidence of determinations in respect of, for example, planning for access to laboratories and common assessment. It is clear that the formal collaboration that takes place is supplemented by ongoing informal communication and co-operation. This is very positive.

Satisfactory progress has been made in the area of curricular planning. Evidence provided in the science department’s planning material indicates that the focus of planning has been the development of the science plan. This plan includes the school’s policies and procedures that relate to the teaching of Science, health and safety, assessment procedures and outline programmes of work in Science. Particularly noteworthy are the cross-curricular links that have been clearly identified with subjects such as Mathematics, Technology, Geography, Physical Education (PE) and Social, Personal and Health Education (SPHE). Programmes of work were provided for each year of junior cycle. It is recommended that the science programme of work be further developed as follows. In addition to the naming of the topics and the associated learning outcomes in the form of the syllabus codes, it is recommended that teaching and learning methodologies and assessment strategies for the specific topics be outlined in the termly programmes of work. This approach would assist teachers in ensuring that the needs of the many different kinds of learner are met through the use of a range of appropriate teaching styles. One suggested way of doing this is to draw up the extended programmes of work in linear columns that outline the list of coursework topics, the associated learning outcomes, the intended allocation of time for the coverage of each topic, the teaching and learning methodologies to be incorporated into the study of the topics and the resources to be used.

TY programmes of work have also been devised. There is some evidence that study of a limited amount of material outside certificate syllabuses is undertaken by students. Building on this good practice, it is recommended the study of aspects of science, not undertaken as part of the Junior Certificate and Leaving Certificate syllabuses, be increased, as this approach provides the opportunity for students to learn about scientific issues in everyday life and is in keeping with the philosophy of the TY programme.

The planning for lessons was good. Handouts and equipment were readily available for use during lessons and this contributed to the seamless progression of lessons where different activities took place.
TEACHING AND LEARNING

A good standard of teaching and learning was observed in Science in Loreto Secondary School. Lessons were well structured and the pace was appropriate in the main. In some instances it was clear that, when planning for the lesson, time was factored in for recapitulation of students’ learning. This good practice should be extended to all lessons. The use of a range of methodologies including questioning, written work and a practical activity was an effective approach to revision in one lesson.

In some instances, lessons began with the correction of homework or revision tests. The homework correction helped to set the scene for the lesson. In almost all instances, lesson aims were outlined at the outset of the lesson. Building on this practice, it is recommended that the learning intentions of lessons be clearly outlined at the start of lessons. These could be written on the board and revisited during the recapitulation stage of the lesson to ascertain students’ learning. This strategy would also assist students in independently reviewing their own learning during the lesson.

In some lessons, questioning was used effectively to gauge students’ level of understanding, to probe their responses, to develop the lesson content and to direct their attention towards more complex aspects of a topic. Students responded well to questions. Chorus answering was observed in some instances. Teachers are advised to encourage individual student answering to a greater extent as this assists in ascertaining the extent of individual student learning.

Where ICT was used, it was employed effectively to provide visual images and outline the main points of the topic under consideration. Further use of ICT in the teaching and learning of Science is strongly encouraged.

Some instances of linking the concept to everyday examples and other subjects were observed. In one lesson, a meteorological chart and an ordnance survey (OS) map were used to focus students’ attention on the contours and their understanding of the meaning of those contours was ascertained. This was an effective introduction into whole-class discussion on magnetic field lines. In another lesson, the teacher sprayed iron filings over a clear plastic poly-pocket which contained a magnet and asked the students to explain and devise a rationale for what they observed.

Student practical work formed the kernel of some lessons and was well managed. Students worked well in pairs and small groups and were supported by their teacher as they performed the practical investigation. An enquiry-based methodology was used in a small number of lessons. In one instance a good investigative approach was adopted to students’ learning about the eye. The pre-prepared handouts were effective in guiding the students as they investigated the properties of the eye. Students were given mirrors and asked to draw what they saw when they looked in the mirror. This innovative strategy focused students’ minds on the eye which was the topic under consideration. In another lesson, students were asked to explain how they might determine the north and south poles of a magnet. These approaches are good as they encourage higher-order thinking and are reflective of the aims of the Junior Certificate science syllabus. It is strongly recommended that all teachers should adopt an investigative approach to the teaching and learning of Science.
A very positive atmosphere pertained and very good teacher-student rapport was evident in the lessons observed. It was clear that students felt comfortable asking questions in the relaxed environment of the lessons and this is very good. Some instances of humour added to the constructive learning environment. Students participated well in the main. Effective approaches that maintained students’ interest and engagement throughout the lesson included strategies where teacher explanation was interspersed with questioning and short student activities such as practical work or written activities.

Overall a good level of learning took place in the lessons observed. School management and the science teachers have high expectations for their students. Students’ written work, particularly the laboratory workbooks, was of a good standard.

**ASSESSMENT**

Assessment methods at the school are appropriate. Formal whole-school tests are held at Christmas and for non-examination classes in summer. A report based on these assessments is issued to parents. Junior Certificate and Leaving Certificate classes sit pre-examinations in the spring. Ongoing assessment is carried out by questioning in class and by means of regularly assigned homework and tests. The practice of setting common Christmas and summer exam papers for Science and Biology, and in Chemistry where there is more than one class group is good. Such practice helps to establish a common direction for the subject and ensures consistency and cohesiveness within the department.

It is good to note that in some instances the end-of-year examination marks are aggregated with marks from the assessment of practical copies to arrive at the overall results. This is good practice as it reflects the assessment objectives of the science syllabus, and an aggregate mark that includes a range of components of the examination provides a more accurate indicator of the student’s ability progress in the subject. It is recommended that this beneficial approach be used for all terminal examinations in junior cycle.

Students’ written work in their practical workbooks and homework copies is of a good standard in the main. In a minority of instances students’ work in monitored and annotated by the teacher. There is some evidence of student correction of their written work and this is positive. However, increased teacher monitoring and annotation is recommended. This would assist the teacher in ascertaining the level students’ learning and the standard of their written assignments. In addition, the provision of meaningful written feedback would also advance students’ learning.

Management conducts an annual analysis of the school’s results in the certificate examinations and compares the outcome of the school’s results with national norms. This is good practice. The science department is strongly encouraged to use this analysis to inform planning for teaching and learning. Good links are maintained with parents who receive information on their child’s progress through the annual parent-teacher meeting, the student journal and as previously mentioned the twice-yearly reports. In addition the school operates an open-door policy for parents.
SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- The sciences are in a strong position within the curricular framework in the school and are well supported by school management.
- Very high quality facilities and resources support the teaching and learning of the sciences.
- Very good links have been developed with the special educational needs department.
- Collaboration among the science teachers is very good and this facilitates planning and review.
- The quality of teaching and learning in Science is good.
- School management and the science teachers have high expectations for their students and overall these expectations are met.

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

- Subject plans should be extended to include the teaching and learning methodologies, the resources to be used and the assessment modes associated with each topic.
- The TY science plans should include an increased level of scientific content that is outside the Junior Certificate and Leaving Certificate syllabuses.
- Learning intentions should be clearly outlined at the outset of lessons and revisited during the recapitulation stage of the lesson to ascertain students’ learning.
- It is strongly recommended that all teachers should adopt an investigative approach to the teaching and learning of Science.

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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