An Roinn Oideachais agus Scileanna

Department of Education and Skills

Subject Inspection of Science
REPORT

Borris Vocational School
Borris, County Carlow
Roll number: 70400L

Date of inspection: 4 and 5 November 2009

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 Borris Vocational School, Borris, County Carlow. 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 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 science teachers. 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

Science is a core subject at Borris Vocational School. First year and second year class groups are of mixed ability while at the time of the evaluation the third year groups were streamed. Streaming is being phased out in such a way that all junior cycle class groups will be of mixed ability in the next academic year. This is a welcome development.

On completion of third year, students are given the option of taking Transition Year (TY). In the current year there has been a substantial increase in the number of students choosing the TY programme, with three (of the four) class groups now opting for the programme. It is praiseworthy that the school's TY programme continues to strengthen and develop. Modules in Biology and Chemistry are taken by all TY students. Such modules not only provide a sample of these subjects for Leaving Certificate but also develop many key skills in line with TY guidelines. Biology and Chemistry are offered for Leaving Certificate. Uptake of these subjects is good with two biology class groups and one chemistry class group in each year of senior cycle. Students are well supported at senior cycle in making an informed choice.

It is good that there is continuity of teaching of Science throughout junior cycle. Weekly time allocation to Science at junior cycle is one double and two single class periods. TY science subjects are allocated one double period, while Biology and Chemistry at senior cycle are allocated two double class periods and one single class period per week. This time provision is satisfactory and adheres to syllabus requirements in the main. The distribution of class periods across the week provides for regular contact with the subject.

Senior management supports attendance of science teachers at in-service courses and ongoing continuous professional development (CPD). Attendance and participation in junior Science, TY Science, Biology and Chemistry courses has been supported by senior management in recent

years. Teachers are members of a professional association and some teachers pursue personal professional development. Some members of the science department are involved in providing inservice courses to teachers, in developing new teaching materials and in undertaking post-graduate studies. There was evidence that this expertise had been shared between staff and this is very praiseworthy.

The school's two recently built science laboratories are very well maintained with equipment stored in an orderly and safe manner. Each class group now has timetabled access to a laboratory for at least a double class period each week. A portion of the new laboratory science equipment grant remains unspent and the school is currently prioritising its best use to enhance science provision in the school. Each laboratory has an adjacent preparation and storage room and they are well stocked with equipment. In addition, the laboratory is enhanced with many relevant models, posters and charts and students' work is also on display. Good information and communications technology (ICT) facilities have been provided in each laboratory. In addition, each laboratory is broadband enabled, is part of the school's network, has three computers and some data-logging equipment. These facilities are well utilised in the delivery of science education.

Health and safety provision in both laboratories is modern and teachers ensured a safe environment during practical work. Laboratory rules for students were in evidence. It is recommended that students be required to store school bags safely while in the laboratory and that this forms part of laboratory rules. Chemicals are stored in a separate ventilated facility. However, the addition of flame-proof cabinets would further enhance safety. The school's health and safety policy is at least four years old and is in need of immediate review. This matter should receive the urgent attention of the board of management and the Vocational Education Committee (VEC). It is acknowledged that County Carlow VEC has plans in place to support the school in this matter.

The profile of Science within the school is raised through teachers' commitment to the provision of co-curricular and extra-curricular activities. Science events form part of the annual open day, students participate in science quizzes during Science Week and there has been a long history of school involvement in the BT Young Scientists Competition. In addition students visit science events at third-level institutions.

PLANNING AND PREPARATION

A very good science plan is in place. It is praiseworthy that many of the recommendations from a previous subject inspection report in Science and Biology conducted in 2004 have been implemented through the good efforts of the science department and school management. The provision for Science is clearly outlined with details on many areas, including aims, objectives, effective methodologies, resources, provision for students with additional education needs, health and safety and assessment procedures. This plan could be further enhanced to include: the setting of long term goals for science; an analysis of state examination results for Science; the development of ICT for Science including the development of a shared bank of resources. The scheme of work for Science for each year group references each topic to the relevant chapter of the chosen textbook. The scheme could be made more textbook independent by further references to the syllabus and with additional details of methodologies, resources and assessment.

A TY plan for each of the subjects Biology and Chemistry was made available during the evaluation. While the content of these plans is very good and in the main adheres to TY guidelines, the structure of each plan is in need of readjustment in line with Department

guidelines on writing the TY programme. The school should consider the development of a Transition Unit for Science. Further details, including a teachers' handbook on designing transition units, are available on the website of the National Council for Curriculum and Assessment, www.ncca.ie/transitionunits.

Science is very effectively coordinated and coordination duties include collating and updating the science plan, recording minutes of subject department planning meetings and the purchasing of resources. Time is made available by school management for science teachers to meet during school planning days on two occasions during the year. Teachers meet informally on an ongoing basis and the commitment to the planning and organisation of Science is highly commended. There was very effective individual planning in evidence in advance of lessons observed. Practical and ICT equipment and resources were set up and ready to use. Lesson content was well planned which led to successful learning outcomes, as evidenced during the evaluation.

TEACHING AND LEARNING

The quality of teaching observed was very good. Differentiated methodologies were used appropriately to support students across a wide range of abilities. Teachers circulated ensuring that individual support was given to students who needed extra help. In this way students with additional needs were very well integrated.

A good atmosphere prevailed in all lessons evaluated and all lessons were conducted in a positive and supportive learning environment. Student-teacher and student-student relationships were very good with the ongoing affirmation of student effort by teachers. Interest in the lesson material was high with frequent references to everyday applications of the material presented. This increased the relevance of many of the more difficult concepts for students and its use is very praiseworthy. Subject content was relayed with energy and enthusiasm. Student participation was in the main very good. However, in some lessons, teachers need to ensure that students are engaged throughout lessons in a meaningful way. This will help to ensure ownership by students of the material presented.

Lesson structure was good. Learning objectives were shared with students in many lessons and it is recommended that this good practice be extended to all lessons. For some lessons, better management of lesson time is required to ensure that students can fully complete tasks set out in the planned timeframe.

The varied methodologies engaged the vast majority of students in effective learning. Demonstrations, games and group work were all used very effectively. In one lesson visited, students learned the names and symbols of elements from the periodic table while participating in an appropriate card game. Students completed the assigned tasks with confidence and enthusiasm. ICT was used effectively to support student learning in some lessons and its use should be extended as appropriate to further enhance student learning. Short, clear teacher inputs and good use of the board contributed to effective lesson development. On occasion, the use of worksheets, particularly during some practical investigations, would have consolidated the learning experience for students.

There was very good emphasis on adopting an investigative approach to learning and this was in evidence during all lessons evaluated. Students conducted practical investigations in a safe

environment and worked in small discrete groups. In one lesson, students successfully investigated current electricity, set up an electrical circuit and tested conductors and insulators. A focused approach to learning was adopted by teachers which ensured very good learning outcomes. In another lesson, students investigated the activities of various metals and had the opportunity to compare the activities by investigation. First-year students received expert advice on procedures to be followed while writing an account of a practical investigation. The pace of the lesson ensured that all students could successfully fulfil this task, even at this early stage of learning in their subject.

Interest was heightened in many instances by the use of probing questions. Questioning was used effectively as an ongoing learning and teaching strategy. Students exhibited good confidence in answering questions on their work during the lessons observed.

Students have, in the main, been successful at achieving grades commensurate with their abilities in the Junior Certificate examinations. The uptake of higher-level science has increased over recent years and the cohort of students receiving good grades at this level has also increased. School management and the science department are encouraged to monitor student attainment in Science by ongoing analysis of the state examination results.

ASSESSMENT

Assessment, homework and record-keeping procedures are clearly laid out in the science plan. First-year, second-year and fifth-year students sit Christmas and common summer examinations. Third and sixth year students sit formal examinations in November and pre-examinations in February. Continuous assessment procedures are implemented for TY students and all students are continually assessed on their ongoing class work. It is recommended that portfolio interview procedures forms part of TY assessment procedures for Science in future years.

There is good emphasis on homework, with many lessons beginning with checking of homework and assignments given to students at the conclusion of some lessons. However, a more consistent approach to homework is recommended and should be implemented following consultation between members of the science department. Student journals were well utilised with students recording their homework assignments.

Practical notebooks examined in the course of the evaluation were in the main of good standard. In an effort to further improve the quality of students' written practical records, it is recommended that notebooks are further monitored with further formative assessment procedures implemented. It is recommended that a portion of marks in school examinations be awarded for the completion of practical work and the accurate recording of this work in a notebook. In order for first-year students to get a reasonable number of practical investigations completed in the first term, it is recommended that measures are put in place for each student to purchase a practical notebook during the first week of term.

A parent-teacher meeting is held annually for each year group. Reports are sent to parents on two occasions each year with an additional progress report based on work ethic sent to parents of third-year and sixth-year students. Further communication with parents takes place as needed.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- Science is a core subject. Biology and Chemistry are available as modules in Transition Year and are offered as Leaving Certificate subjects.
- The school's modern science laboratories are very well maintained with equipment stored in an orderly manner.
- A very good science plan is in place. Science is very effectively coordinated.
- The quality of teaching was very good.
- Differentiated methodologies were used appropriately to support students across a wide range of abilities. Students were frequently affirmed in their work.
- Subject content was relayed with energy and enthusiasm and lesson progression and pace were very good.
- There was good emphasis on adopting an investigative approach to learning.
- Assessment practices are very good with common assessment for many classes.

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

- The school's health and safety policy is in need of immediate review.
- To build on the good planning completed to date, it is recommended that the science plan be further developed to ensure the development of Science subjects into the future.
- The integration of ICT into teaching and learning should be extended.
- It is recommended that a more consistent approach to homework be implemented following consultation between members of the science department.
- It is recommended that a portion of marks in school examinations be awarded for the completion of practical work and the accurate recording of this work in a notebook.

Post-evaluation meetings were held with the teachers of Science, together 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.

Published November 2010.