An Roinn Oideachais agus Scileanna
Department of Education and Skills

Subject Inspection of Science
REPORT

Rosary College
Armagh Road, Crumlin, Dublin 12
Roll number: 60841M

Date of inspection: 5 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 Rosary College, Crumlin, which was conducted as part of a whole school evaluation. 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 one day during which the inspector visited classrooms and observed teaching and learning. The inspector interacted with students and the teacher, examined students’ work, and had discussions with the teacher. The inspector reviewed school planning documentation and the teacher’s written preparation. Following the evaluation visit, the inspector provided oral feedback on the outcomes of the evaluation to the principal and subject teacher.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

All students take Science in first year at Rosary College, after which Science is offered as an optional subject. The current second-year students were offered a choice between Science, Business or Art while the current third-year students chose one subject from Science, Home Economics or Technical Graphics. The uptake of Science for Junior Certificate is very low with just over a quarter of the entire student cohort opting for Science. It is, therefore, recommended that measures are put in place by senior management and the science department to raise the profile of Science in the college and in particular to encourage all students who are considering taking Biology for senior cycle to study Science for the Junior Certificate. This message also needs to be clearly relayed to parents at the subject choice information evenings. The college should set targets to support the increased uptake of Science.

Banding is utilised in first year to form ability groups in Science. There are three class groups in first year with one class group in second and in third year. Numbers of students in each class group are small and this supports the development of students’ individual needs. It is good that there is best practice in the continuity of teaching of Science for the vast majority of students and, on that basis, the shared teaching of one first-year class group between two teachers should be discontinued. At the conclusion of first year, students will decide whether they want to continue with Science, so their first-year experience of the subject is crucially important. Second and third-year science lessons are currently timetabled on consecutive days. It is recommended that science lessons be more evenly distributed throughout the week so that there are not long gaps between students’ exposure to the subject. Weekly time allocation for Science in first year is one double and one single class period. In second year and third year, students receive one single and two double-class periods each week. The overall time allocation for junior Science complies with syllabus recommendations.

Biology is offered to senior-cycle students. The current uptake of the subject is good at over fifty percent of the student cohort. It is important that those who choose the subject have the background, knowledge and skills to achieve to their potential in the subject. A background in junior science for senior biology students would normally be essential. There are two qualified teachers in the school’s science department. Senior management indicated support for the science teachers’ continuous professional development (CPD) and teachers should
now avail of this opportunity. For example, membership of a professional organisation would support the sharing of best practice and is particularly important in the small school context with small subject departments. It is praiseworthy that new teachers receive an induction pack from senior management and ongoing support from colleagues.

The college has currently one science laboratory. At the time of a previous science inspection in 2003, the college had two science laboratories and made the decision to convert the downstairs laboratory to a technical graphics room. The remaining laboratory is well organised with equipment stored in an orderly manner. Posters, charts, models and science books are on display in the laboratory and storage presses are clearly labelled. The work of the science teachers in this regard is commended. School management should ensure that the laboratory is well maintained. For example, all gas taps should be in working order. Access to the laboratory is good for all class groups. Senior management has confirmed that the science grant, which had not been spent at the time of the previous evaluation, has now been fully utilised. The science department submits a budget for equipment and resources each year to senior management. Equipment for most mandatory practical activities is available, however, some further investment in resources for Science should be considered. Information and communications technology (ICT) facilities in the laboratory require the attention of school management. The provision of broadband internet facilities together with the associated infrastructure and hardware would greatly enhance and support science education. School management should consider such provision within the resources available to the college.

The school’s health and safety policy is in need of review following an audit of hazards in the science area. The issue of the safe storage of chemicals formed one of the recommendations in the science inspection in 2003, and has yet to be addressed. Chemicals should be stored in accordance with best practice guidelines in a separate ventilated facility. The addition of flame-proof cabinets would further enhance safety. Reference should be made to the website of the Professional Development Service for Teachers, where a copy of the guidelines can be downloaded.

In recent years, students have entered the BT Young Scientists Competition and have participated in quizzes and in visits to Dublin Zoo. This helps ensure that the profile of Science is raised within the college. The provision of a dedicated science notice board would help to create awareness for students of important events, activities and competitions in Science.

**PLANNING AND PREPARATION**

A subject department plan for Science and Biology was made available at the time of the evaluation. The plan utilises the template provided by the School Development Planning Initiative and outlines many areas including the subject aims and objectives, the organisation of Science and assessment procedures. While the work done on the science plan to date is commended, it is recommended that the plan be expanded to include more information on planning for students with special needs, homework procedures and on the methodologies and strategies utilised in the delivery of the curriculum. The science plan also needs to focus on short, medium and long-term goals for the subject. Areas worthy of inclusion are: teacher CPD, analysis of trends in state examination results, measures to raise the profile of Science, the provision and utilisation of resources including ICT and measures to increase the uptake of Science.

The scheme of work for Science for each year group clearly shows the timeframe for the teaching of each topic and each practical investigation. It is recommended that the scheme makes reference to the syllabus learning outcomes and that additional details of methodologies, resources, homework and assessment are included.
Science teachers are provided with the opportunity to meet formally on three occasions throughout the year. It is important that minutes of such meetings be recorded and relayed to senior management. Teachers meet informally on an ongoing basis and commitment to the planning and organisation of Science is commended. There was very effective individual planning in evidence in advance of the lessons observed. A good lesson plan was made available for each lesson visited. Practical equipment and resources were set up and were ready to use. These factors contributed to successful learning outcomes, as evidenced during the evaluation.

TEACHING AND LEARNING

Differentiated methodologies were used appropriately to support students across a wide range of abilities. The teacher circulated and ensured that individual support was given to students who needed additional help. The quality of teaching was good. A good atmosphere prevailed in all lessons evaluated and all lessons were conducted in a supportive learning environment. Student-teacher rapport was good and the ongoing affirmation of student effort by the teacher contributed to good relationships in the classroom.

Classroom management was very good with appropriate seating arrangements for students. All lessons took place in the science laboratory and were conducted in a safe environment. For example, female students were reminded to tie back their hair in advance of using the bunsen burner, school bags were stored away safely in advance of practical work and students wore safety glasses during practical activities as appropriate. The commitment of the teacher in this regard is highly praiseworthy. Lesson structure in the main was very good. It is praiseworthy that the planned aims and objectives of each lesson were fully implemented. The organisation of smaller class groups would help to ensure that students achieve more ownership of the investigative process and this strategy should be implemented when undertaking practical lessons.

Questioning was well used as an ongoing learning and teaching strategy. Interest was heightened in many instances by the use of good questioning techniques. Students exhibited confidence in answering questions on their work during the lessons observed. In an effort to improve participation by some students, it is recommended that increased use be made of questions that are targeted at individual students.

The varied methodologies engaged the vast majority of students in effective learning. Appropriate worksheets and handouts were given to students during each lesson. The board was very well utilised in one lesson where it was used as an aid to highlight key words and concepts and to collate and summarise the student learning experience during a very good plenary session at the conclusion of the lesson. It is recommended that this good practice be extended to other lessons. The availability and subsequent use of ICT would greatly enhance the learning experience by, for example, helping to link lesson material to students’ everyday experiences. The short concise and well-chosen use of photographs or video from the multitude of internet resources is another example of a resource that would be of immense benefit to student learning.

Student practical work formed part of one lesson visited. Students were facilitated to carry out an investigation to show the presence of micro-organisms in air and soil. There was good emphasis on adopting an investigative approach to learning with students being asked to predict the outcomes of the investigation. The organisation of the investigation was mainly teacher-led. Further student autonomy and ownership of the investigative process would be more closely in line with syllabus recommendations and would further enhance the student learning experience. It is recommended that this strategy be adopted and planned for in advance of lessons.
In recent years students have been more successful in their Junior Certificate grades and at attempting higher level in Science. The uptake of higher level still needs to improve substantially and the college is encouraged to keep this situation under review by ongoing analysis of the state examination results, whereby trends in student attainment can be monitored. It is important that students are better supported in making the correct choice of subjects for Leaving Certificate to ensure that they have a reasonable chance of achieving successful outcomes. It is also important that teacher expectations of students’ capabilities be raised so that students will endeavour to live up to these expectations. This will help to improve student confidence and attainment.

ASSESSMENT

There are formal examinations at Christmas and summer and third and sixth-year students sit pre-certificate examinations in February. Continuous assessment practices are also in place. A parent-teacher meeting is held annually for each year group and reports are sent to parents on two occasions each year following examinations.

Homework was assigned during lessons visited in the form of completion of worksheets and revision sheets which were distributed during lessons. Student journals examined at the time of the evaluation were not well utilised for recording of homework or assignments with the majority of pages left blank. Student journals are a valuable resource in any school and should be monitored and signed to ensure that they are kept up to date. In order to improve student attitudes to learning and to improve student attainment, it is recommended that a science homework policy be devised and that a more structured approach to homework be implemented. This measure will require the support of senior management and the whole school community.

Practical notebooks examined in the course of the evaluation were maintained by students to a reasonable standard. Good formative assessment practices were observed in the form of teacher comment. This practice should be further implemented together with the raising of teacher expectations of students’ abilities in an effort to enhance student confidence, motivation and pride in their work. It was noted that many students do not maintain a practical notebook and many students record practical activities in copybooks together with other material, as evidenced during the evaluation. In an effort to further improve the quality of students’ written practical records, it is recommended that all students be expected to maintain a high quality, dedicated practical notebook. Practical notebooks should be further monitored to ensure that corrections are completed. It is praiseworthy that a portion of school examination marks is allocated to the accurate recording of student practical activities.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- The numbers of students in each class group for Science are small and this supports the development of students’ individual needs.
- The laboratory is well organised with equipment stored in an orderly manner. Posters, charts, models and science books are all on display in the laboratory and storage presses are clearly labelled.
- There was very effective individual planning in evidence in advance of lessons observed.
- Differentiated methodologies were used appropriately to support students across a wide range of abilities.
The quality of teaching was good. A supportive atmosphere prevailed in all lessons evaluated and all lessons were conducted in a good learning environment.

- Student-teacher rapport was good and the ongoing affirmation of student effort by the teacher contributed to effective relationships.
- Students exhibited confidence in answering questions on their work during the lessons observed.
- Appropriate worksheets and handouts were given to students during each lesson.
- Continuous assessment practices are in place.

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

- Measures should be put in place to raise the profile of Science and to increase the uptake of Science for the Junior Certificate and also to increase the uptake of higher level in certificate examinations.
- School management should consider the provision of enhanced teaching resources including ICT facilities in the science laboratory, within the resources available to the college.
- The school’s health and safety policy is in need of review following an audit of hazards in the science area. Chemicals should be stored in accordance with best practice guidelines.
- It is recommended that the science plan be expanded to include short, medium and long-term goals for the subject.
- It is important that teacher expectations of students’ capabilities be raised.
- Practical notebooks should be further monitored to ensure that corrections are completed.
- It is recommended that a science homework policy be devised and that a more structured approach to homework be implemented.

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 May 2011*