

An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Science and Biology
REPORT**

**Abbey Community College
Ferrybank, County Waterford
Roll number: 76082H**

Date of inspection: 5 May 2010



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 Abbey Community College. 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 the subjects 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, 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 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

Abbey Community College was founded in 2000 as an amalgamation of Slieverue Vocational School and Sacred Heart of Mary Secondary School. It is co-educational with 630 students. The school provides the Junior Certificate, an optional Transition Year (TY) programme, the Leaving Certificate established, the Leaving Certificate Vocational Programme (LCVP) and the Leaving Certificate Applied (LCA).

The science subjects feature in every programme in the school. Science is an optional subject for each year of junior cycle but most students choose Science. The highest uptake is found among this year's first-year students at eighty-seven percent. Also, there is a good gender balance in the uptake for each year. Management reported that it strongly recommends incoming first-year students to choose the subject for Junior Certificate. For Leaving Certificate, Biology is one of three senior science subjects provided annually, in addition to Physics and Chemistry. It is possible for students to study all three of the senior sciences. Approximately two-thirds of senior cycle students choose Biology, and this is a very good uptake, with approximately one-fifth of students taking Physics or Chemistry. As with the junior cycle, management makes efforts to augment the numbers taking sciences for Leaving Certificate by encouraging uptake at key opportunities and through the school's guidance service. Science is provided as an elective subject in the school's LCA programme. Within the TY programme, an optional year-long course is provided in Biology as well as a combined course in Physics and Chemistry.

Very good provision is made for the subjects on the school timetable. Junior Certificate Science is allocated four periods per week, TY Biology is allocated three periods and Biology is allocated five periods per week. Each allocation includes one double period in line with best practice. Students are assigned to all class groups in the sciences for junior and senior cycle on the basis of mixed ability. Management maintains class sizes of no more than twenty-four students for the science subjects by splitting first, second and third year class groups for Science and limiting group size in senior cycle. There are two Biology groups in fifth and sixth year, one Science class

in LCA 2, one group for TY Biology, five groups for Science in first year, and four groups for Science in second and third year.

Excellent facilities are provided for the subjects. The school has three well-equipped laboratories and these presented as very stimulating learning environments for the sciences. The laboratories and preparation rooms are well stocked for practical work in the subjects. A very high level of organisation was noted in these areas. Very good laboratory safety systems are in place. Access to the laboratories is very good as most lessons in the sciences are held in a laboratory.

Excellent information and communication technology (ICT) facilities are available for students and teachers and very good use is made of these. The laboratories are fully fitted with modern ICT equipment including projection facilities. Data logging equipment is present and used mainly with Science and Physics but plans are in place to extend its use to Biology with the purchase of specific probes for the experiments. Audio-visual facilities are available within the laboratories to support the use of educational DVDs in lessons. Blinds are shortly to be fitted in each laboratory to enhance digital projection and it is suggested that a printer might be useful in each laboratory. Students have access to computers in the school's three computer rooms and each student is given a personal file on the school server. Some teachers utilise internet facilities to post class notes and homework assignments for students. This is commended.

Management encourages and facilitates opportunities for continuing professional development (CPD) and teachers avail of such opportunities. In-service courses in the revised syllabuses were attended and on-going events continue to be attended when opportunities arise. Management arranges whole-staff CPD events annually and most recently these have included seminars in assessment for learning (AfL), teaching mixed-ability groups, 'The Good Teacher' and the TL21 project through National University of Ireland Maynooth. The latter programme generated an in-school initiative that involves the work of a core committee, which includes one science teacher, to examine teaching and learning across the school. One aspect is looking at ways of increasing student grades in senior cycle. Another involves peer observation of teaching practice and subsequent critical reflection. These initiatives are highly commended and should support overall development and a professional focus on pedagogy within the school. Management encourages staff members to join their subject associations and this is supported financially by the school.

PLANNING AND PREPARATION

The science department is made up of four teachers, all of whom are deployed to teach Junior Certificate Science. Management also assigns each teacher to teach at least one science subject to Leaving Certificate according to their qualifications. Two teachers are deployed to teach Biology.

The team of science teachers meets formally about twice a year, with teachers rotating the position of planning co-ordinator to facilitate the process. It was reported that there are also frequent informal meetings throughout the school year when teachers discuss issues, share their professional expertise and keep themselves up-to-date. For example, teachers share new approaches to teaching topics. Teachers also collaborate in designing class tests for year groups and these are kept in a shared folder. These are good practices. The collaborative focus to planning that enables teachers to develop and share good practice is commended and will support on-going development of the sciences in the school in the future.

Subject plans have been developed and these include lists of curriculum topics and teaching methodologies for subjects. Teachers follow a common curriculum plan during the first year of

the curriculum for Science and Biology and administer common tests, including an end-of-year summer test. In further developing the curriculum plans, the teaching team should consider using a table or grid that would link the learning outcomes for each year group with planned teaching methodologies and details of how outcomes are to be assessed and recorded. In addition and in relation to Junior Certificate Science, greater attention should be paid to embedding the investigative approach to learning Science in the planning documents. This should be done with reference to the science syllabus and teacher guidelines. The aforementioned collaborative planning approach to developing good practice will facilitate this work.

An interesting range of co-curricular activities for students is planned and facilitated by the teachers, including an electronics club for students, a celebration of Science Week in conjunction with Waterford Institute of Technology, and ecology field trips. Such activities are commended. Teachers sometimes extend the syllabus to include additional laboratory work for students in their lesson planning, thus broadening the learning experience.

Teachers are very committed to using ICT resources to enhance learning. They source a range of appropriate and interesting resources and approaches for topics, regularly sharing these with each other. Teachers also make very good use of the supports and resources available from the science and biology support services.

Individual teacher lesson planning was very good. The teachers were well prepared for class and, in all cases, due cognisance was taken of the needs and abilities of the students in setting out and delivering the lessons. Materials prepared in advance of the lessons included electronic presentations, animations and materials for student practical work and these were integrated successfully into lesson delivery.

TEACHING AND LEARNING

Two double lessons and three single lessons were observed during the evaluation, including Junior Certificate Science, LCA Science and Leaving Certificate Biology. Lessons covered topics such as chemical compounds, conservation, food testing, pH, and revision. The quality of teaching and learning observed was good and there were instances of exemplary practice when marked enthusiasm prevailed among both teachers and learners.

The teaching style adopted was generally very facilitative and student-centred. In all lessons, teachers incorporated student activity into the structure of the lesson and this included practical activities, pair work and peer assessment. All teachers used ICT presentations and animations as well as board work to enhance learning. These practices never dominated the lesson and were accompanied with matching handouts for students. Teachers have appropriately high expectations of their students in relation to participation and commitment to learning, and communicate these clearly. For example, students were encouraged to supplement teachers' handouts with notes of their own as lessons progress. Teachers skilfully differentiated technique to suit the particular curricular programme and to meet the needs of individual students. This was evident throughout all lessons visited. For example, teachers facilitated different skill development during practical work with students in Leaving Certificate and students in LCA. In addition, teachers effectively differentiated their questioning during lessons. These practices are commended.

Generally, very pleasant and secure learning environments prevailed. The student-teacher dynamic observed during the evaluation varied according to individual teaching style. Exemplary practice was observed in many instances where the teachers' evident enthusiasm for the subject

was combined with productive and confident two-way dialogue with students. In these instances, careful questioning with discussion guided students to build their knowledge of the topic. In some lessons, the learning was enhanced through the use of interesting anecdotes when topics were related to real and everyday scenarios. These productive and lively discussions are highly commended. In a small number of lessons, however, dialogue was not as productive and this may have been due to somewhat firmer classroom management and teaching style. Overall, however, students studying Science and Biology demonstrated a very positive attitude to learning. This was particularly evident during teacher questioning when they gave very good responses. In some lessons students were seen to constantly contribute by building on each others' answers. In all lessons, very good and ongoing verbal feedback was given to students during lessons, with praise where deserved or advice where necessary.

A very good number of investigations and experiments were completed by the students. Student practical work was observed during the inspection and students very much enjoyed this part of the learning process. Junior and senior cycle students demonstrated good laboratory skills, including group working skills, and the ability to draw and interpret graphs. More widespread development of students' report-writing skills, by encouraging them to write the report in their own words, is recommended for some class groups.

Very good focus was placed on investigation during the student practical work observed in a LCA lesson and one Junior Certificate Science lesson. The approach was evident in the teacher-student dialogue and the nature of the challenges set for students. For example, in one practical, students gathered evidence without bias to a particular outcome, and in another, the outcome of the first trial was used by students to adjust the procedure to be used in the second trial. In some class groups, however, the investigative approach to Junior Certificate Science needs greater attention so as to better match the requirements of the syllabus. This could be achieved, for example, by shifting the focus away from following a particular prescribed procedure toward involving students in planning and designing their own way of conducting an investigation. More consistent and extensive use of the investigative approach to Science in Junior Certificate is recommended and this should be embedded through on-going department planning.

ASSESSMENT

Revision formed a significant part of the lesson structure for state examination classes. Students were given frequent written work from past examination papers and revision was integrated with this work. Teachers make very good use of official marking schemes when correcting assessments to illustrate to students how to improve their grade outcomes. Peer assessment, as a strategy encountered as part of the TL21 project, was used during one lesson. The strategy was very well applied and used to facilitate pair work as well as to vary the learning experience. This is commended and more extensive use of this technique is suggested for all groups, wherever appropriate. It is also suggested that the use of concept mapping be explored, to provide a differentiated means of facilitating revision among the group. Short 'quick-fire' assessments are used by some teachers at times and this too is worthy of expansion to other class groups as a means of further developing the range of assessment strategies in use.

Homework is allocated regularly. It may be that some students are only noting written homework in their journals. All students should be reminded that all assignments must be recorded so that they develop further good habits of independent study. Students complete their homework to a good standard and their copies and folders contain a good amount of written work including class notes and homework. In-class tests, appropriate to the year group and programme, are

administered regularly. Formal school tests are held at Christmas and summer for non-examination groups and mock examinations are held for the examination classes. Reports on student progress are sent home to parents following the formal tests.

The principal conducts an annual analysis of students' achievements in the subjects in the state examinations and compares them to national norms. This is discussed with science teachers and a record is kept in the subject planning folder so that it can inform planning each year. The evidence is also used at key times to inform parents of the school's performance and give advice on subject choice. These practices are commended.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation of Science and Biology:

- The science subjects are robustly promoted and feature in all curricular programmes.
- Professional development initiatives undertaken by teachers are contributing to pedagogical development and positive outcomes for students.
- Collaborative planning practices are evident.
- A range of interesting ICT resources are used to enhance learning.
- Teachers have appropriately high expectations of their students in relation to participation and commitment to learning, and communicate these clearly.
- Students demonstrate a very positive attitude to learning.
- Very good differentiated teaching and learning strategies are employed.
- Students are given many opportunities to learn through engagement in practical work.
- Teachers are progressively developing a wider range of assessment strategies.

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

- The investigative approach to Junior Certificate Science should be more extensively embedded in the subject plan and more consciously applied to student laboratory work.
- Curriculum plans should be developed further by integrating learning outcomes with teaching methodologies and assessment procedures.

A post-evaluation meeting was 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.

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