An Roinn Oideachais agus Scileanna

Department of Education and Skills

Subject Inspection of Science and Physics
REPORT

Ballinteer Community School
Ballinteer, Dublin 16
Roll number: 91305L

Date of inspection: 10 and 11 November 2009

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

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Ballinteer Community School, Dublin. It presents the findings of an evaluation of the quality of teaching and learning in Science and Physics and makes recommendations for the further development of the teaching of these subjects 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 subject 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

On entry to Ballinteer Community School students are organised into ability class groups. Science has been offered to the higher-ability class groups for the past two years. All third year students study Science. The school has recently introduced the Junior Certificate School Programme (JCSP) as a measure to strengthen its support for students. This initiative will introduce possibilities for increasing the uptake of Science at junior cycle. Specific resources to support students in learning Science are available on the website, www.jcsp.ie. Continuity of teaching and learning is maintained in that class groups generally retain the same teacher throughout junior cycle. Currently, the school has a high proportion of students with additional needs. The school endeavours to support all students by tailoring the curriculum to meet students' needs.

Good measures are in place to support students in making the correct programme choice for senior cycle. Students choose between Transition Year (TY) and Leaving Certificate Applied (LCA). In relation to the LCA curriculum offered by the school, school management should consider introducing Science as an elective course in LCA, a recommendation made in a previous subject inspection report. Physics, Chemistry and Biology are offered to students as optional TY subjects and each receives a generous time allocation of one double and two single class periods per week. Applied aspects of these subjects are included and the content of these modules is broadly in line with Department TY guidelines. It is recommended that the TY curriculum be restructured so that all TY students complete a science module. For example the inclusion of a module on science research skills, culminating in completion and presentation of a project would ensure that a more balanced TY programme is available to all students.

Science provision is very good for those students taking the established Leaving Certificate with Physics, Chemistry and Biology offered each year regardless of, on occasions, small numbers

taking some of these subjects. There is a good uptake of Physics in fifth year, however much of the student cohort choosing Physics are from overseas and take up a one-year placement in the school before returning home to their original school abroad. This leads to a dramatic fall in numbers taking Physics in sixth year.
Time allocation to junior Science and to senior science subjects is satisfactory. Lessons are well distributed across the week. There are six teachers in the science department in the school. Teachers are well supported in attending in-service courses and continuous professional development (CPD). Teachers are well deployed according to their qualifications and subject specialisms.

The new school building has recently opened with the provision of three modern science laboratories. Each laboratory together with preparation and storage rooms are well-equipped and maintained with all equipment stored in an orderly manner. In addition, each laboratory is enhanced with many relevant posters and charts and students' work is also on display. This is very good practice. Information and communication technology (ICT) facilities have been provided in the science laboratories with networked computers and the provision of broadband facilities. The school is encouraged to further develop ICT facilities in the laboratories as resources permit so that ICT can be further integrated into teaching and learning. Teachers are encouraged to develop a shared bank of ICT resources so that the use of enhanced ICT facilities can be maximised.

There is a health and safety policy in place with the most recent review in 2000. It is therefore recommended that this policy is reviewed in the current year. There are good health and safety practices in the science laboratories as evidenced in the course of the evaluation. However the good practice of storing school bags safely during laboratory work should be extended to all class groups.

Students are encouraged to partake in a number of co-curricular and extra-curricular activities. These include participation in Science Week activities, Scifest, science quizzes and science related trips to third-level institutions. Teachers of Science demonstrate a proven commitment to these important activities.

PLANNING AND PREPARATION

Subject department meetings are facilitated on two occasions during the year and minutes of these meetings are maintained. Many relevant issues discussed at meetings include laboratory resources, special needs provision, science planning, needs analysis and health and safety. The science team also meets informally on an ongoing basis. A science co-ordinator is in place, a position which is held on a voluntary rotating basis. Co-ordination of Science is very effective and current duties include chairing subject meetings, ordering resources, liaising with the principal on science-related issues and dissemination of information from outside agencies to teachers and students.

A very good science plan was made available in the course of the evaluation. The plan outlines current science provision in the school. Many important areas are addressed including; assessment, resources, homework, intercultural education, extra-curricular activities and health and safety. The plan includes a section on planning for inclusion of students with special needs with support strategies also outlined. This is very praiseworthy. Reflective practice is in evidence in the science department with the inclusion of a detailed analysis of strengths, weaknesses, opportunities and threats of the subject provision. This is a very good initiative and such planning

ensures that longer-term action plans are built into the overall planning framework. The science department is encouraged to further plan for the use of ICT in learning and teaching and to further develop support strategies for students with additional needs in completing their assignments. Measures also need to be put in place to raise the profile of Science in the school and to plan for strategies to increase the cohort of students choosing Science at junior cycle and science subjects at senior cycle. A very good plan for Physics is also in place with many areas addressed including aims, delivery, assessment, resources and challenges.

Common schemes of work for each year group at junior cycle are detailed in the subject plan, outlining the topics to be taught to each year group in the course of the year. The scheme of work for Physics is also clearly laid out. Teachers maintain detailed records of work completed, mandatory experiments carried out, attendance, homework and assessment results. The school's 'Pinnacle' records system is very well utilised in this regard. Very good and well-organised resource folders were in evidence in the course of the evaluation.

A TY plan for each of the senior science subjects was made available during the evaluation. While the content is in line with Department guidelines, the layout and presentation of the plan should be restructured in line with these guidelines. The school should consider developing their existing TY science modules into Transition Units. 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.

There was very good individual planning in evidence in advance of all lessons observed with practical and ICT equipment 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 positive classroom rapport supported student learning and the good atmosphere created was maintained throughout lessons. Students generally applied themselves to the assigned tasks with confidence. Teachers were acutely aware of the broad range of student abilities and adapted their teaching approaches to suit individual needs. Students were in the main active in learning and it is very praiseworthy that on many occasions lesson material was made relevant to students' everyday experiences. Concepts were clearly explained with feedback from students dictating, on occasions, the resulting pace of the lesson.

Methodologies were varied and in the main were effective in lesson progression. Group work, practical work, practical demonstrations and various questioning strategies were just some of the methodologies employed in lessons. Opportunities for the effective use of ICT presented themselves in many lessons and teachers are encouraged to plan for the use of this technology as an effective student learning strategy. For example, the use of appropriate animations, applets and websites would have enhanced and consolidated student learning. Participation of students was very good in the majority of lessons. In some instances, further measures should be put in place to encourage greater levels of student participation. In some lessons, the assignment of a student research task would have contributed to greater participation levels at an earlier point in the lesson and therefore would have led to enhanced learning outcomes. The board was used effectively in many lessons to highlight key words, diagrams and ideas and as an aid to focus lesson material. It is recommended that this good practice be extended across all lessons. Worksheets and handouts were distributed to students in some lessons. Customised worksheets would have played a significant part in the consolidation of student learning in some lessons and

it is recommended that these be developed for use in class. There was effective use of questioning in most lessons observed. Interest was heightened in many instances by the use of probing questions.

Practical investigations formed the core of many lessons. Good practical techniques were in place and students applied themselves well to the tasks assigned. In one lesson on the theme of digital electronics, TY students developed critical thinking skills and applied themselves to the assigned task with interest and motivation. In another lesson, students successfully measured the volume of a piece of rock using an overflow can. Students were very well prepared for this task and were encouraged to estimate the volume by comparison to a standard shape before carrying out the investigation. There was clear emphasis on health and safety throughout all practical lessons.

Activity-based learning and short demonstrations played an important part in the student learning process. In one lesson, students successfully tested the reactivity of various metals in water and dilute acid. In another lesson, students investigated the human circulatory system and carried out the task of taking their own pulse before and after jogging. Students enjoyed the learning experience and exhibited a good knowledge of the material. During a physics lesson, students actively used a spectrometer to observe interference fringes of monochromatic light, having been clearly presented with the mathematical concepts in advance. In another physics lesson, students learned about critical angle and total internal reflection, undertook hands-on activities on this theme and observed a series of demonstrations.

The uptake of higher level for Science and Physics and the proportion of students achieving a high grade has varied substantially over recent years. In the main, students have shown good success rates commensurate with their ability. It is recommended that further measures are put in place to ensure that students achieve success and can reach their potential in accordance with the school's mission statement.

ASSESSMENT

The school has an assessment and a homework policy in place. Students are encouraged to record each homework assignment in their school journal and this practice was evident in the course of the evaluation. Homework was assigned at the conclusion of some lessons visited. Evidence was available to indicate that there are difficulties regarding collection of authentic homework from some students. Therefore, further homework strategies should be put in place by the science department, in line with the school homework policy, to ensure that homework becomes a regular feature of class assignments.

First, second, TY and fifth-year students sit formal examinations at Christmas and in the summer. Third and sixth year students sit pre-examinations in February. All classes also undergo tests at the end of each topic completed. Physics students are also assessed with the aid of worksheets, which are completed as an examination task by students in class and returned to students with marks and comments. Students are encouraged to file these worksheets for revision purposes and this practice of formative assessment is very good. Reports are sent to parents on two occasions during the academic year. A parent-teacher meeting, which affords parents with the opportunity to discuss students' progress, is held annually for each year group.

Students with additional needs are well supported with close liaison between science teachers, parents, school management, the learning support and guidance departments. Differentiated practices, as outlined in the science plan, were in evidence during the evaluation.

Practical notebooks examined in the course of the evaluation were generally of a good standard. Records of practical work completed are maintained by students individually and are also stored in the laboratory. In an effort to further improve the quality of students' written practical records, it is recommended that notebooks are further monitored to ensure that students take full cognisance of teachers' annotation and that a portion of marks in school examinations be allocated to the completion and accurate recording of mandatory practical investigations.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- There is very good science provision for those students pursuing the established Leaving Certificate with Physics, Chemistry and Biology offered each year.
- The school endeavours to support all students by tailoring the curriculum to meet students' needs.
- The new school building has recently opened with the provision of three modern science laboratories. Each laboratory and the preparation and storage rooms are well-equipped and maintained with all equipment stored in an orderly manner.
- Very good plans for Science and Physics were made available in the course of the evaluation. Reflective practice is in evidence in the science department.
- Teachers maintain detailed records of work completed, mandatory experiments carried out, attendance, homework and assessment results.
- The positive classroom rapport supported student learning and was maintained throughout lessons.
- Teachers were acutely aware of the broad range of student abilities and adapted their teaching approaches to suit individual needs.
- Good assessment practices were in evidence.

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

- The JCSP will introduce possibilities for increasing the uptake of Science at junior cycle.
- The TY curriculum should be restructured so that all TY students complete a science module.
- School management should consider introducing Science as an elective course in LCA.
- Teachers are encouraged to plan for the use ICT as an effective student learning strategy.
- The health and safety policy should be reviewed in the current year.
- It is recommended that a portion of the marks for school examinations be allocated to the completion and accurate recording of mandatory practical investigations.
- Further homework strategies should be put in place by the science department.

Post-evaluation meetings were held with the principal, deputy principal and subject teachers at the conclusion of the evaluation when the draft findings and recommendations of the evaluation were presented and discussed.

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