

An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Science and Physics
REPORT**

**Stratford College
Zion Road, Rathgar, Dublin 6
Roll number: 61020A**

Date of inspection: 14 and 15 September 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 Stratford College, Rathgar, 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. The board of management was given an opportunity to comment in writing on the findings and recommendations of the report, and the response of the board will be found in the appendix of this report.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

Stratford College, with an enrolment of 128 students, offers Science as a core subject at junior cycle. There is one mixed-ability class group in each year of junior cycle. Continuity of teaching and learning is maintained in that class groups generally retain the same teacher throughout junior cycle.

Science provision in the compulsory Transition Year (TY) programme includes ten-week modules in Physics, Chemistry and Biology. In line with Department TY guidelines, many applied aspects of these subjects are included within the content of these modules. Science provision at senior cycle is very good with Physics, Chemistry and Biology offered each year, even in the context of small student numbers taking some of these subjects. This is commended. There is a good uptake of Physics in fifth year, however, the entire cohort of senior physics students in the current fifth and sixth year groups are boys. The college is encouraged to explore measures to promote the subject in such a way that the gender imbalance may be addressed. Students receive ongoing support from their subject teachers, the guidance department and senior management when making choices for senior cycle. Each senior science subject is offered in a separate band so that students may choose more than one science subject which strengthens science provision at senior cycle.

Time allocation to junior Science, TY science subjects and senior science subjects is satisfactory. Lessons are well distributed across the week. It is praiseworthy that recommendations regarding timetabling matters from a previous subject inspection report in Science and Biology in 2005 have been fully addressed.

There are three teachers in the science department in the college. Teachers are well supported in attending in-service courses and in following relevant continuous professional development (CPD), including membership of a professional association. New teachers are supported by a staff

induction policy. Teachers are well deployed according to their qualifications and science specialisms.

The laboratory and the preparation and storage room are well-equipped and maintained with all equipment stored in an orderly manner. In addition, the laboratory is enhanced with many relevant posters and charts and students' work is also on display.

There is a health and safety policy for Science in place. Good health and safety practices were observed in the science laboratories in the course of the evaluation. Many good practices are already in place for chemical storage. However, it is recommended that an upgrade of chemical storage practice and facilities be implemented in line with Department guidelines. It is praiseworthy that school management has prioritised health and safety by completing fireproofing of the laboratory area. However, the school's health and safety policy was last reviewed in 2006. It is therefore recommended that this policy be reviewed.

Very good information and communication technology (ICT) facilities have been provided in the science laboratories. School management is praised in fulfilling a recommendation regarding ICT from a previous science inspection report. The laboratory has been provided with a laptop computer, data-projector and data logging equipment, and is networked to the school's internet facilities. This is commended and provides a valuable teaching resource. The computer room, which is adjacent to the laboratory, is also well utilised by science teachers.

Students are encouraged to partake in a number of co-curricular and extra-curricular activities. These include participation in the BT Young Scientists' Competition, Science Week activities, trips to W5, a science exhibition centre, in Belfast and science quizzes. Guest speakers from third-level institutions provide insights to science careers for senior students. This is a praiseworthy part of guidance provision in the college and the teachers of Science demonstrate a proven commitment to these important activities.

PLANNING AND PREPARATION

Subject department meetings are facilitated on four occasions throughout the year and minutes of these meetings are maintained. The science team also meets informally on an ongoing basis. In order to streamline the planning for Science into the future, it is suggested that a coordinator of Science together with Mathematics be agreed on a voluntary rotating basis. As the science team of teachers also teaches Mathematics, this arrangement may suit the context of a small school environment. Possible duties may include the chairing of meetings, distribution of correspondence, sharing of best practice, promotion of senior science subjects and facilitation of the development plan for Science.

A good science plan was made available in the course of the evaluation. The plan outlines current science provision in the college. Many areas are addressed including; resources, homework, assessment, teaching and learning strategies and special needs. Similar topics are addressed in the physics plan. Schemes of work for each year group are detailed in the science subject plans, outlining the topics to be taught to each year group in the course of the year. The topics in these schemes should be more explicitly linked to teaching strategies, methodologies, resources and assessment. A good TY plan from the content point of view for each of the senior science subjects was made available during the evaluation. However, the structure of the plan should be revised in line with Department TY guidelines. It is also important that the TY science plan be drawn up by the science department as a whole. Very good and well-organised resource folders

were in evidence in the course of the evaluation. To augment the good planning work completed to date, it is recommended that the science teachers formulate a long-term development plan for science addressing the future science needs of the college.

There was very effective individual planning in evidence in advance of all lessons observed. Practical and ICT equipment were set up and ready to use. Lesson content was well planned. Teachers also maintained detailed records on students' achievements and homework.

Students with additional needs are well supported with close liaison between science teachers, parents, school management, the learning support and guidance departments. It is praiseworthy that the science department has included a section on special educational needs in its plan. Class material is adapted and modified as necessary with a good familiarity among teachers with differentiation methodologies in the teaching of Science.

TEACHING AND LEARNING

The quality of teaching and learning observed was very good. A very good atmosphere was maintained throughout lessons. Individual and group support was given, as necessary, and most students applied themselves the assigned tasks with confidence and enthusiasm. Affirmation of students was evident in all lessons and this consolidated the positive atmosphere. Students were, in the main, active in their learning and motivation and interest were maintained throughout. The positive classroom rapport supported student learning and led to successful learning outcomes.

Methodologies were varied and in the main were very effective. Practical work, practical demonstrations, the use of models and the use of information and communication technology (ICT) were just some of the methodologies employed in lessons. ICT was utilised particularly effectively in a physics lesson where students were investigating the properties of curved mirrors. Concave and convex mirrors were distributed to students for investigation, while at the same time an animation of the formation of images in such mirrors was projected onto the board. Students were actively encouraged to discuss the outcomes, while a good handout, relevant to the assigned task, consolidated the learning experience. In a science lesson on the theme of the human skeleton, an X-ray of a human hand and wrist were projected onto the board at the outset of the lesson. This methodology was particularly effective, as it linked the theme of the lesson to students' experiences. Students were directed to relevant websites as an assignment to further consolidate their learning experience.

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, with some of this material used as appropriate homework assignments.

Practical investigations formed the core of many lessons. Very good practical techniques were in place and students applied themselves expertly to the mathematical problem-solving tasks. Critical thinking skills were encouraged, especially as students received individual help and support. There was clear emphasis on health and safety throughout all practical lessons. Students carried out an investigation on the measurement of the speed of sound in air during one lesson visited. The board was used expertly as an aid to introduce the topic with very good emphasis on the theory, mathematical calculations, precautions, possible errors and units. Students applied their knowledge and skills very well to the task in hand. A short hands-on demonstration together with a well-chosen video clip ensured that the concepts were taught, reinforced and understood.

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. For example, the more extensive use of group work, the setting of a research task in advance of student practical work and the use of a focused worksheet would together ensure that students better understand the task in hand and would lead to higher levels of motivation and participation.

There was effective use of questioning in most lessons observed. Questioning was used as an ongoing learning strategy. Interest was heightened in many instances by the use of probing questions. Students, in the main exhibited good confidence in answering questions on their work during the lessons observed and student outcomes in terms of skills and knowledge as observed were very good.

Academic student achievement is good for higher level and ordinary level students. The uptake of higher-level for Science and Physics has been good over recent years.

ASSESSMENT

The school homework policy encourages good homework practice by consolidating classroom learning, by providing the opportunity for focused feedback and by encouraging parents to monitor assigned homework tasks. Students are encouraged to record each homework assignment in their school journal and this practice was evident in the course of the evaluation.

The school assessment policy provides detailed information on the college's formative and summative assessment practices. Third and sixth year students sit pre-examinations in January with reports sent to parents in February. All other students sit formal school examinations in January and May following which reports are issued to parents. In addition, written progress reports are sent to parents on two occasions during the academic year. The focus of these reports is both on student's progress and application in class, attitude, participation and behaviour, as well as on academic progress. There are ongoing class tests on completion of individual sections of the course. A parent-teacher meeting, which affords parents with the opportunity to discuss students' progress, is held annually for each year group.

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. A copy of this record is sent to parents together with reports on two occasions during the year. 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.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- There is very good science provision at junior cycle with core Science and at senior cycle with Physics, Chemistry and Biology offered each year.
- Teachers are well deployed and distribution of class periods across the week is good.

- A good science and physics plan was made available in the course of the evaluation. Science department planning meetings are convened regularly.
- There was effective individual planning in evidence in advance of lessons observed.
- The quality of teaching and learning observed was very good.
- The positive classroom rapport supported student learning and led to very successful learning outcomes.
- Affirmation of students was evident in all lessons and this consolidated the positive atmosphere.
- Assessment practices are very good.

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

- An upgrade of chemical storage practice and facilities should be implemented in line with Department guidelines.
- To augment the good planning work completed to date, it is recommended that the science teachers formulate a long-term development plan for science addressing the future science needs of the college.
- All TY science modules should be structured and planned in line with Department guidelines on writing the TY programme.
- Further measures should be put in place to encourage greater levels of student participation.
- Practical notebooks should be further monitored to ensure that students take full cognisance of teachers' annotation.

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

Appendix

School response to the report

Submitted by the Board of Management

Area 1: Observations on the content of the inspection report

The College is very satisfied with the promotion of and planning for the sciences both within the school and with neighbouring primary schools through its Access Science Day.

Area 2: Follow-up actions planned or undertaken since the completion of the inspection activity to implement the findings and recommendations of the inspection

Having dealt with the issues which were raised in our current Health and Safety Statement we will be seeking its review next year.

A fire proof chemical storage press has been provided since this inspection.