REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN SCIENCE

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in St Paul’s Secondary School, Greenhills, Dublin. 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 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 and subject teachers of Science. The board of management was given an opportunity to comment in writing on the findings and recommendations of the evaluation, and the response of the board will be found in the appendix to this report.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

Science is offered as an optional subject on the junior cycle curriculum in St Paul’s Secondary School, Greenhills. There are currently three class groups in each year of junior cycle. Students generally retain the same teacher for Science throughout junior cycle and for the science subjects offered at senior cycle.

Modules in Physics, Chemistry and Biology are offered as part of the compulsory Transition Year (TY) programme in the school. Each module lasts ten weeks and offers applied aspects of each subject through activity-based learning. This is commended.

Chemistry and Biology are offered to Leaving Certificate students. Physics has not been offered as a Leaving Certificate subject in recent years due to insufficient numbers of students opting for the subject. It is praiseworthy that modules in Physics form part of TY. Building on students’ TY experience, it is recommended that the school should actively pursue the reintroduction of Physics to the curriculum.

Subject choice is supported at junior and senior cycle with information provided to parents and students. Subject teachers, together with the guidance department, provide good support to students in making an informed choice. Approximately seventy-five percent of students opt for junior science; measures to increase this should be considered and developed. The uptake of Biology is very good and there is one small class group for Chemistry. Some students are facilitated to study Biology at senior cycle despite not having studied Science at junior cycle. It is important that this practice be minimised and ultimately eliminated by providing extra support and advice to students in advance of making their Junior Certificate subject choices.

The timetable allocation to Science at junior cycle and Chemistry and Biology at senior cycle is in line with syllabus requirements. However, the timetabling of two double periods in third year should be avoided in order to facilitate increased frequency of lessons. Each science module in Transition Year is scheduled for one double lesson period for the duration of the module and this
is good provision. The distribution of lessons across the week is generally good. However, the scheduling of lessons on three consecutive days should be avoided.

The school has three well-maintained science laboratories. Access to laboratories for some science lessons proves difficult. The school maximises access for double lesson periods. Equipment and materials are stored in an orderly fashion. The work of science teachers in this regard is highly commended. The purchase of resources for science teaching is approved by management on a needs basis. Information and communication technology (ICT) is provided in each laboratory in the form of data-projectors, computers and broadband access. This is commended. In addition, electronic resources for Science are shared across the school’s computer network. This is very good practice.

The school is encouraged to finalise the current update of the health and safety statement. This policy should be updated annually. Good health and safety practices were observed during lessons and in the organisation of the laboratories. Laboratory rules were on clear display in all laboratories.

Student participation in extra-curricular and out-of-school activities includes involvement in the BT Young Scientist Competition, Science Week activities, and visits to museums. For example, recent Science Week events in the school included the presentation of science fun activities by TY students to first-year class groups. This is very praiseworthy as it raises the profile of Science in the school.

Continuous professional development (CPD) is well supported by school management with teachers being facilitated in attending in-service courses. An induction day is convened for all new teachers and student teachers at the outset of the school year and a cohort of new teachers are currently participating in the National Pilot Project at Dublin West Education Centre. School expertise is well utilised in training staff in ICT and good use has also been made of the support services.

**PLANNING AND PREPARATION**

The science department plan is wide-ranging in that it addresses current provision for Science in the school and addresses the future needs of the subject. Key areas addressed in the document include subject aims, health and safety, planning for students with special needs, teacher professional development, resources and assessment procedures. The section on supporting and sustaining good practice in science teaching and learning is very praiseworthy in that it facilitates team teaching, lesson observation by colleagues and promotes student self-directed learning. The plan also includes agreed schemes of work for each year group. It is recommended that the schemes of work be referenced directly to the syllabus and that these schemes outline methodologies and resources for each section of the course.

The position of science coordinator is voluntary and rotates between three teachers during the year. It is recommended that this role be undertaken on an annual rotating basis, in the interests of continuity of liaison with management and the entire science department. It is commendable that, currently, management facilitates science teachers to meet formally on two occasions during the year and science teachers also meet informally on a weekly basis. Minutes of meetings are maintained and recent items on the agenda include common examinations, ICT planning, laboratory access, subject choice and level, and review of examination results.
The content of the TY plan for Physics, Chemistry and Biology is very good with applied aspects of the subjects promoted and skills development prioritised. This is commended. In further developing the plan it is recommended that it be modified and redrafted in line with Department guidelines on writing a TY programme, Transition Year Programmes Guidelines for Schools. It is particularly important that the TY plan incorporates built-in evaluative procedures so that it can be updated annually with feedback from students and teachers. Reference should also be made to the website of the National Council for Curriculum and Assessment where information on Transition Units can be accessed [www.ncca.ie/transitionunits](http://www.ncca.ie/transitionunits).

Teachers were very well prepared for the lessons observed. ICT and practical equipment were set up in advance and resources including handouts had been prepared. There was also evidence of good planning in the content and delivery of lessons. This is highly commended.

**TEACHING AND LEARNING**

There was a good atmosphere for learning in all lessons. Affirmation played a key role in instilling student confidence and support. Lessons were, in the main, well structured. Some lessons would have been further enhanced by sharing learning objectives with students at the outset, by reducing the pace of the lesson, and by allowing students time to respond. In addition, in some instances, students would have gained more benefit from being delegated greater autonomy, especially during some practical lessons. Some short demonstrations could have been carried out by students while working in groups. Lesson material was delivered with clarity. Differentiated practices were effective in that there was a good balance between whole class, small group and individual support. Students were actively engaged in learning in the majority of lessons and were given clear instructions regarding their assigned task.

Challenging tasks were set for students and critical thinking skills were encouraged in many lessons. Student participation was very good. Lesson material was introduced, progressed and consolidated by the expert use of probing questions. In all instances, the questioning strategies adopted ensured that students’ critical thinking skills were developed. Questions were sufficiently challenging and had the effect of consolidating student learning and building on students’ knowledge and understanding. Students were generally very confident at answering questions on their work and student responses were of a high quality. Science was made interesting and relevant due to the deliberate efforts of the teachers to link the lesson content to students’ everyday experiences.

Methodologies were varied in all lessons and this enhanced the student learning experience. ICT was very well utilised in many lessons. For example, during a lesson on the theme of current electricity, ICT was very well employed in conjunction with a worksheet to consolidate the stated lesson objectives. The relevant use of ICT in the form of short animations, applets or video clips would have enhanced and reinforced concepts in other lessons. The board and screen were used to highlight key words and concepts during many lessons visited and it is recommended that this practice be extended in an effort to consolidate student learning. Student research skills could be developed by assigning relevant tasks to students in advance of the introduction of a new topic in the classroom.

Demonstrations played a key role in the development of student learning. In one lesson visited a model of the human skeleton was expertly utilised as an aid to teaching and learning. Completion of a relevant worksheet by students consolidated their learning on this theme. During another lesson on the theme of force and pressure, a series of well planned demonstrations used together
with probing questioning strategies ensured that students had a very positive and worthwhile learning experience.

The uptake of higher-level for Science and the portion of students achieving a good grade in this subject are high and have been consistently high over recent years.

**ASSESSMENT**

Common Christmas and summer examinations take place at Christmas and summer for first-year and second-year students. Junior and Leaving Certificate classes sit ‘mock’ examinations in February. TY students present their five best pieces of work for interview during portfolio assessment. Class tests are ongoing and teachers maintain good records of student progress. Reports are sent to parents on two occasions throughout the year. TY students, however, receive reports on four occasions. Contact with parents is also ongoing through the student journal, parent-teacher meetings and parent information evenings.

Homework was assigned at the conclusion of all lessons visited. Students were reminded to record homework assignments in their journals. Homework was relevant and in accordance with the lesson content. The assigned homework could also include elements of student research as outlined earlier in this report.

There was very good monitoring and ongoing annotation of students’ practical notebooks by teachers. Records of practical work were generally maintained to a good standard. However, in some individual instances the quality could be improved upon. It is recommended that teachers monitor corrections in student notebooks ensuring that students are given the responsibility of maintaining a high quality record of their work.

Learning support procedures are in place for students with additional needs. Links between the science department and the resource and learning support departments are good. Teachers utilised differentiated learning and group work and gave individual support to students.

**SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS**

The following are the main strengths identified in the evaluation:

- Science is offered as an optional subject at junior cycle. Physics, Chemistry and Biology modules are offered in TY and Chemistry and Biology are offered for Leaving Certificate.
- The school has three modern and well maintained science laboratories.
- Opportunities for CPD are well supported by school management and availed of by teachers.
- A very comprehensive science plan is in place. The promotion of good teaching practice within the science plan is praiseworthy.
- Lesson material was delivered with clarity. Differentiated practices were effective.
- Lesson content was frequently linked to students’ everyday experiences.
- Teaching methodologies were varied and this enhanced the student learning experience.
- Investigative practical work was used effectively.
- Critical thinking skills were promoted through the use of well designed worksheets and through homework assignments.
As a means of building on these strengths and to address areas for development, the following key recommendations are made:

- The school should actively pursue the reintroduction of Physics to the curriculum.
- Teachers’ schemes of work should be referenced directly to the syllabus and should outline methodologies and resources for each section of the course.
- The TY science plans should be restructured in line with Department guidelines.
- Students should be actively involved in their learning in some lessons by setting advance research tasks, by direct involvement in practical activities and by participating in classroom discussion.
- It is recommended that teachers monitor corrections in student notebooks ensuring that students are given the responsibility of maintaining a high quality record of their work.

A post-evaluation meeting was held with the teachers of Science, together 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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Appendix

School response to the report

Submitted by the Board of Management

Area 1: Observations on the content of the inspection report

The Board of Management notes the positive findings outlined in the report and will endeavour to act on the recommendations.

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

Since the subject inspection and in the light of the new guidelines, the school has finalised a review of the Safety and Health statement. This policy was ratified by the Board of Management on 10th March 2011.