Subject Inspection of Science
REPORT

Scoil Aireagail
Ballyhale, Co. Kilkenny
Roll number: 70570N

Date of inspection: 1 May 2009
THE QUALITY OF LEARNING AND TEACHING IN SCIENCE

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Scoil Aireagail, Ballyhale, Co. Kilkenny 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 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.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

Science is a core subject at Scoil Aireagail, Ballyhale. This is commended. Classes are of mixed ability and teachers generally retain the same class group throughout junior cycle. Science is also a core subject in the optional Transition Year (TY) programme.

The school provides a very wide range of science subjects for Leaving Certificate; Biology, Chemistry and Agricultural Science are currently timetabled. This range of science subjects was recently expanded; Agricultural Science was provided in response to the identified student need for the subject and Chemistry was provided in the aftermath of a previous subject inspection report. This is highly commended. There is one class group for each senior science subject with a good uptake in each subject.

Third-year and TY students are well supported in making an informed choice about subjects for senior cycle with input from the guidance counsellor, specialist input from the science department and good support from school management. Information is disseminated to parents at the parents’ information evening on subject and programme choice.

Weekly time allocation to Science at junior cycle is one double and two single class periods. This meets syllabus recommendations. One first year group receives four single lesson periods. The school should endeavour to provide each class group with a double period for Science in light of the practical requirements for the subject. TY science is allocated one double class period. This is adequate provision. In all but one instance, the science subjects at senior cycle are allocated two double and two single class periods per week. This is generous provision. In the exceptional instance where one senior class group was not provided with a double lesson, it is recommended that school management ensure that the provision of a double class period in the laboratory is prioritised annually when arranging the timetable. There is good deployment of the qualified teachers of Science and the distribution of class periods across the week provides for regular contact with the subject.

Senior management supports attendance of science teachers at in-service courses and at ongoing continuous professional development (CPD). Some of these courses have been of a whole-school
nature and others have focused on particular aspects of junior and senior science provision including health and safety and information and communication technology (ICT).

The school’s science laboratory is well maintained with equipment stored in an orderly and safe manner. The laboratory has an adjacent preparation and storage room. In addition, the laboratory is enhanced with many relevant models, posters and charts and students’ work is also on display. Each double period is timetabled in the laboratory, however, the majority of the science lessons take place in a classroom. In light of increased pressure on the laboratory and the expansion of science provision in the school, the board of management has made a recent application to the Department of Education and Science for the provision of an additional laboratory.

Health and safety practices and procedures in the laboratory were good at the time of the evaluation. Safety equipment was in place, school bags were stored safely during practical work and laboratory rules were on display. However, it is recommended that all chemicals be stored in the chemical storage room adjoining the laboratory preparation room and that the gas cut-off valve be upgraded in line with best practice.

ICT facilities provided in the laboratory include a computer, data projector and data logging equipment. Broadband internet facilities are available but it is reported to be slow and unreliable. It is recommended that ICT facilities be upgraded as resources permit.

Students are encouraged to partake in a number of co-curricular and extracurricular activities. These include participation in and visiting the BT Young Scientists’ and Technology Exhibition, the organisation of school activities during Science Week, and visits to exhibitions, museums and galleries. A dedicated science notice board keeps students informed of activities, exhibitions and competitions.

**PLANNING AND PREPARATION**

A good collaborative science plan is in place. The provision for Science is clearly outlined with details on many areas, including methodologies, resources, assessment procedures and provision for students with special educational needs. It is praiseworthy that an action plan for Science is included, with details of what is working well and what could be improved in the science department. Needs identified include further ICT provision and enhanced laboratory access. The scheme of work, which is included in the plan, outlines the programme followed for each year group. It is praiseworthy that the schemes of work have been expanded to all year groups following a previous subject inspection report. It is recommended that this plan be further expanded to include the development of Science over coming years, including measures to improve the uptake of Science at higher level and monitoring the uptake of senior cycle science subjects. Each scheme of work could also be developed further and should reference each topic to the relevant syllabus section with resources, methodologies and assessment procedures linked to each part of the course. A good TY plan for Science is in place with an emphasis on applied aspects of Physics, Chemistry and Biology.

The science department is effectively co-ordinated and duties include convening meetings, ordering stock and leading the review of the subject plan. However, in the interests of good practice, it is recommended that the role of science co-ordinator be rotated between members of the science department on an annual or biennial basis.
Very effective planning took place in evidence in advance of lessons observed. Practical and ICT equipment and resources were set up and ready to use. Lesson content was well planned which lead to successful learning outcomes as evidenced during the evaluation.

**TEACHING AND LEARNING**

A good classroom atmosphere for learning was maintained in all lessons. Student-teacher and student-student relationships were good and the short clear teacher inputs supported periods of active learning by students. Individual support was given to students who needed extra help and this methodology was particularly appropriate in the mixed-ability setting. Lesson progression was good. Affirmation of students’ work and contributions was a praiseworthy feature of all lessons.

Lesson structure was good in the main with very good plenary sessions at the conclusion of lessons. However, the sharing of learning objectives with students would have further enhanced student learning and it is recommended that this approach be adopted. In addition, it is recommended that students be requested to research a new topic in advance of its discussion in class, and that they be encouraged to provide further input to lessons, particularly where a new topic is being introduced.

Methodologies were in the main varied and this led to effective student learning. Further opportunities for the effective use of ICT should be explored. It is recommended that anytime ICT is used that its effectiveness in lessons be evaluated. The board was used effectively to focus student learning and to highlight key words and important concepts. Many references were made to everyday life applications of Science. Revision sheets and student worksheets were distributed during lessons. However, the effectiveness of the worksheets could have been improved by providing students with the opportunity for group task work, requiring them to complete part of the assignment and to provide feedback to the whole class.

Students conducted practical investigations in a safe environment and worked in small discrete groups. In one lesson visited, students were investigating compounds and mixtures using sulfur and iron filings. Students were given individual and group support as needed. In another lesson visited, students revised energy through a series of short demonstrations and a classroom discussion.

Interest was heightened in many instances by the use of probing questions to develop the concept. Questioning was used as an ongoing learning and teaching strategy. Students 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.

The uptake of higher-level Science in Junior Certificate examinations has decreased over recent years. It is recommended that this matter receives urgent attention. Those students who chose higher-level have generally achieved good grades. It is important that students are constantly challenged to meet their potential and that lessons be pitched at a sufficiently high level to ensure that those students capable of higher-level Science can achieve at this level. Not all lessons were sufficiently challenging for higher-level students in the course of the evaluation, therefore it is recommended that teaching strategies be reviewed to address this issue.
**ASSESSMENT**

Assessment and homework criteria are clearly set out in the science plan. Homework was assigned in all lessons visited. Good records of student assessments and attendance are maintained. Students are tested on completion of each section of the course. First-year, second-year and fifth-year students sit Christmas and summer examinations, while third-year and sixth-year students sit mock examinations in February. TY students sit formal examinations at Christmas and their project work is assessed on an ongoing basis. Students are also given credit for practical work as recommended in a previous subject inspection report in Science. This is good practice. State examination results are analysed by school management and compared to national norms. This information is made available to subject departments.

Two reports are sent to parents, each one following formal examinations. A parent-teacher meeting is held annually for each year group. Further communication with parents takes place through the school homework journal which is well utilised. It is very praiseworthy that meetings with first-year and sixth-year parents take place twice throughout the year.

Practical notebooks examined in the course of the evaluation were of variable standard. 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.

Students with additional educational needs are well supported and good links have been developed with the learning support department. Support in literacy and numeracy is also available to students in small groups and on an individual basis.

**SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS**

The following are the main strengths identified in the evaluation:

- Science is a core subject at junior cycle and in TY. Biology, Chemistry and Agricultural Science are currently offered as Leaving Certificate options.
- There was very effective planning in evidence in advance of lessons observed.
- A good classroom atmosphere for learning was maintained in all lessons.
- Active student learning was facilitated.
- Individual teacher support was given to students during the lessons, as appropriate to the mixed-ability setting.
- Affirmation of students’ work and contribution was a praiseworthy feature of all lessons.
- Questioning was used as an ongoing learning and teaching strategy.
- Assessment and homework practices are good.
- Good records of student assessments and attendance are maintained.

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

- All chemicals should be stored in the chemical storage room and the gas cut-off valve in the laboratory should be upgraded.
• ICT facilities could be upgraded as resources permit and opportunities for the effective use of ICT should be explored.
• The science plan and the schemes of work for each group should be developed.
• The role of science co-ordinator should be rotated periodically.
• Learning objectives should be shared with students at the outset of lessons.
• Consideration could be given to other means of utilising student worksheets, including opportunities for group work.
• The uptake of higher-level Science in the Junior Certificate examination should receive urgent attention.
• Students should be constantly challenged to meet their potential and lessons should be pitched at a sufficiently high level to ensure that those students capable of higher-level Science can achieve at this level.
• Student practical notebooks should be further monitored.

Post-evaluation meetings were 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.

*Published November 2010.*