

An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Science and Physics and
Chemistry (combined course)**

REPORT

**St Brendan's College
Belmullet, County Mayo
Roll number: 72050U**

Date of inspection: 21 October 2010



**AN ROINN OIDEACHAIS
AGUS SCILEANNA** | **DEPARTMENT OF
EDUCATION
AND SKILLS**

REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN SCIENCE AND PHYSICS AND
CHEMISTRY (COMBINED COURSE)

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in St Brendan's College, Belmullet. It presents the findings of an evaluation of the quality of teaching and learning in Science and Physics and Chemistry (combined course) and makes recommendations for the further development of the teaching of this subject 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 and subject 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

As a member of Delivering Equality of Opportunity in Schools (DEIS), St Brendan's College is a participant in the Junior Certificate School Programme (JCSP). For this reason much additional support is available to students. A significant amount of this additional support is provided by the science teachers and is an indication of their professional approach to their work.

Science is well provided for in the school in terms of the allocation of time. However a double-class period should be included in the timetable for each science class. While every student in the school takes science in junior cycle, after Junior Certificate there is a significant reduction in the numbers taking science subjects. While Biology is strong in senior cycle the take-up by students of the physical sciences is quite low. Science is included in the Transition Year (TY) programme where there are two class groups, one of which has one science lesson each week while the other has two. The school should ensure that each student in TY has the same exposure to Science.

To address the low take up of the physical sciences there should be a concerted effort by the science department to raise the profile of these subjects. As part of this the science teaching team should make a presentation to second and third-year students, in collaboration with the guidance department, on the nature of the physical sciences in senior cycle and the benefits associated with their study. The physical sciences should be incorporated in the TY Science programme, which is now exclusively of a biological orientation. Suitable information is available on the websites of the Institute of Physics and of the Royal Society of Chemistry.

Resources for teaching and learning in the subjects are excellent. The school has two modern laboratories and one refurbished laboratory and they are at present in the course of being equipped. In order that the students of the school have the full benefit of these resources, the

equipping process should be concluded as soon as possible and equipment already acquired should be integrated into the laboratories.

As part of its support of the sciences school management encourages teachers' continuing professional development (CPD) and teachers have availed of this. The science department should consult the Professional Development Service for Teachers (PDST) website for information on relevant support.

Safety is well addressed in the school and is being taken account of in the equipping of the new laboratories. The school's safety statement includes a section on the science area. The science teachers show very good practice in carrying out risk assessments of all teaching areas. These should be included in the department plan. As the remaining chemicals are delivered for the laboratories, the safe storage of these chemicals should be kept under review.

The science department has a dedicated notice board for students. This is a very good way of raising the profile of the subject.

PLANNING AND PREPARATION

The science teachers function as a strong cohesive subject department with regular meetings. Several initiatives have taken place at a department level, including presentations on open nights, and an introduction to science day for primary school pupils. The department has a coordinator who acts as a link between the department and school management. In order to share the task and to give opportunities to other teachers the coordination of the subject department should be rotated from time to time.

Many useful teaching resources, including information and communication technology (ICT) resources, are in use by the members of the department in teaching and learning. In order to gain the fullest benefit of these resources they need to be shared. As part of subject department planning the science teachers should gather their resources into a common folder, perhaps on the schools intranet. The current innovative use being made of the school's website by one of the teachers should be extended.

The science department's subject plan begins with the learning objectives of the science syllabus. In developing its plan for teaching and learning in Science, the science department has shown very good practice in that curriculum aims and objectives have been developed for each year of the science programme. As the department develops its planning for teaching and learning in science, the development of this work should be shared among the members of the department and should be based on the use of learning objectives that include action verbs that are measurable. The curriculum plan should include the content, methodologies, and resources that are required to achieve these learning objectives. The plan should also indicate how the achievement of the objectives will be assessed.

The plan for TY Science should be developed further as suggested. It is noted that the overall programme includes provision for students' active engagement and this accords with the general principles underlying TY.

The physics and chemistry plan reviewed is based closely on the syllabus with the addition of broad timings. The plan should be developed further so as to relate more closely to the taught course and

should refer to methodologies, assessment, more detailed timing and provision for assessment of students' learning.

The subject department plan includes very good material in regard to special educational needs and in regard to facilitating students with specific learning disabilities. To complement this and to further develop its work in regard to teaching and learning, planning should also be carried out for the incorporation of differentiation in teaching and learning through planning for and developing methodologies. As the school is in JCSP, reference to this should be included in the science department's plans including the profiling statements and methodologies that are being used.

The classes observed were each well planned and the required resources were available in each case.

TEACHING AND LEARNING

Teaching and learning was good or very good in each of the lessons observed. Each lesson was introduced through stating the topics that would be covered during it. In one case the lesson was introduced through using the aims that were to be achieved. In further developing this good practice teachers should begin to make use of student learning outcomes or objectives to introduce and complete each lesson, as provided for in their subject plan. This practice has the potential to help students and their teachers in bringing about a focus on student learning. In addition the use of learning objectives for lessons can be refined so as to provide for the differentiation of lessons in order to meet the learning needs and abilities of each student.

Very good use was made of ICT in the lessons observed and in each lesson a range of teaching methodologies was employed. Among these methodologies were use of the board, discussion in one lesson, teacher demonstration and student practical work. In some classes the extent of students' involvement was quite low, with the teacher carrying out most of the activity of the lesson. In order to encourage a greater level of student activity in lessons, and thus aid students' learning, such strategies as questioning of students using a range of question types should be used as well as the encouragement of students' contributions. Given the school's participation in JCSP and the range of student abilities in each class, greater use should be made of keyword lists in teaching and learning.

Students' work, both homework and practical work records, is regularly monitored by all teachers. This is good practice and is part of the assessment of students' work that is aimed at providing information to teachers on students' learning. Along with this good practice teachers should continually emphasise the assessment of students' learning through questioning, asking them for ideas, and giving them independent work to carry out.

Classroom management in each lesson was very good and there was a very good teacher-student relationship evident also. The evident engagement of students with the topics of each of the lessons was helped by the atmosphere in each class.

It was clear that in all of the lessons observed there was a good level of student learning. Evidence for this was the contributions made by students to lessons, the questions they asked, their answers to questions, and their overall engagement with the lessons.

Although being slightly hampered in the short-term by the building and equipping of the new laboratories it is clear that student practical work is a regular feature of students' experience of

Science in the school. However in organising and carrying out that work, the investigative approach to student practical work needs to be developed further. The investigative approach can also be developed through engaging students in project work. For example, in first year or second year it is suggested that students carry out small-scale independent projects that would help them in developing project-work skills. As well as providing preparation for the Junior Certificate Coursework B science project, this could also lead to their participation in Scifest.

ASSESSMENT

The school has an assessment policy that provides a framework for assessment within the science department. The school shows good practice in that the results gained by its students in the Leaving Certificate examination are analysed annually. Perhaps this could be extended to the Junior Certificate examination. The science department also has the practice of awarding credit in end-of-term examinations for students' performance of practical work.

The proportion of students taking Junior Certificate Science at higher level shows scope for further development as does the level of attainment of students in this examination. For this reason a key objective of the science department work should be raising students' expectations and attainment in Science. In order to build up the confidence and expectations of students the assumption should be made that as far as possible all students will take Science to higher level. As part of this, from first year students' homework and examinations should include higher-order questions to develop students' capacity to take the examination at higher level.

In monitoring students' work teachers should include brief comments that praise aspects that are well done and that suggest in simple and direct ways what students can do to improve their work. Such formative assessment practice accords with the advice given by the National Council for Curriculum and Assessment on its web site (Assessment for Learning). Teachers should follow up on comments made by them on students' work.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- Resources for teaching and learning in the science subjects are excellent.
- The science teachers show very good practice in carrying out risk assessments of all teaching areas.
- The science department has a dedicated science notice board for students.
- Very good use was made of ICT in the lessons observed.
- Teaching and learning was good or very good in each of the lessons observed.
- It was clear that in all of the lessons observed there was a good level of student learning.

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

- To increase the take up of the physical sciences in the school there should be a concerted effort by the science department and the guidance department to raise the profile of these

subjects and, as part of this, the physical sciences should be incorporated in the Transition Year Science programme.

- Teaching resources including information and communication technology resources (ICT) should be shared by the members of the subject department.
- In organising and carrying out student practical work, the investigative approach should be developed further.
- A key objective of the science department work should be raising students' expectations and attainment in Science in order to raise the level of students' participation in Science at higher level.

A post-evaluation meeting was held with the teachers of Science and Physics and Chemistry and the principal at the conclusion of the evaluation when the draft findings and recommendations of the evaluation were presented and discussed.