

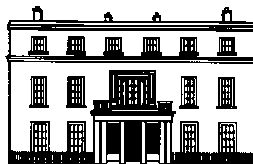
**An Roinn Oideachais agus Scileanna**

**Department of Education and Skills**

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

**Roscommon Community College  
Roscommon  
Roll number: 72290R**

**Date of inspection: 21 April 2010**



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

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

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**SUBJECT INSPECTION REPORT**

This report has been written following a subject inspection in Roscommon Community College. 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 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. 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**

Science is a core subject, taken by all students. Classes, with the exception of third year, are of mixed ability. While the school is in Delivering Equality of Opportunity in Schools (DEIS) to date it has not availed of the Junior Certificate School Programme (JCSP) on the basis that its student retention rate is already high. This is acknowledged and the school should keep the question of offering JCSP under review and should consider making use of JCSP supports as it considers appropriate. At senior cycle level students may take Physics and Chemistry (combined course) and Agricultural Science. As the numbers for these subjects are quite low the school should make use of any opportunities that arise to promote the subjects. The school's guidance department will have a key role here. The overall time allocation for Science is appropriate. The time allocation for Physics and Chemistry and Agricultural Science at four classes each week is inadequate and should be increased to five lessons each week.

The school has a laboratory and a dedicated classroom that has been adapted for science lessons. One of the science teachers is based in each room. It is important to ensure that all science classes have timetabled access to the laboratory for student practical work. The laboratory is large and dates from the 1980s but, following a considerable amount of recent reorganisation work carried out by the science teachers, it is now well organised. The effort and time that has gone into this work is an indicator of the commitment of the teachers. The laboratory is to be renovated over the summer as part of the Summer Works Scheme and this will result in a state-of-the-art laboratory that will meet the school's needs into the foreseeable future. As part of this project attention should be given to having an adequate stock of resources and suitable storage for chemicals.

The school is well-equipped with information and communication technology (ICT). Its current use in science should be greatly extended both in lessons and, in conjunction with the school's forthcoming E-portal project, into planning and organisation of the department.

Both science areas were very attractively presented with lots of stimulating charts and posters on science themes. Perhaps they could be supplemented with samples of students' project and other work. It might be helpful also to include material on science-related careers. As part of the general support of science, the school participates in Science Week, hosts visiting speakers on science themes, and sends its students on tours with a science theme. Such activities have the potential to generate interest in science and so encourage students' achievement in science. Another science-related activity that is growing in strength is the school's Green-schools project.

The school prides itself on the support that it gives students with special educational needs. Students requiring additional support in the sciences receive it through the school's special educational needs department in co-operation with the science department. The department's planning folder includes reports on meetings at which these issues were discussed and provision made for communication between the science department and the special needs and learning-support department. The teachers are directed to the Special Education Support Service (SESS) publication *Science Differentiation in Action* available through its website. The science department's approach and implementation in regard to students with special educational needs is in line with very good practice.

The school is highly supportive of the ongoing professional development of its science teachers and they have undertaken relevant continuing professional development (CPD). In planning for future whole-school and subject-specific CPD there should be a consciousness of the need for further professional development in the areas of mixed-ability teaching and differentiation. This should be closely linked to subject-department planning. The science teachers should also keep in touch with the Department's ongoing programme of CPD in the sciences and should avail of as many opportunities as possible. Information on these is available on the Second Level Support Service (SLSS) website.

Much relevant material on safety issues is included in the department's planning folder. While the school has a current safety statement it needs to be developed further so that it includes school-specific audits of potential hazards. Safety issues in science are included in the subject plan. Due care and attention was given during classes to the active management of health and safety in line with the school's safety statement. To further this and as part of the school's health and safety procedures and to support the regular review of its safety statement, the science staff should carry out annual health and safety audits of the science laboratories. The work should be informed by the Department of Education and Science and State Claims Agency publication *Review of Occupational Health and Safety in the Technologies in Post-primary Schools* (page 25) and the Department of Education and Science publication *Safety in School Science*. The attention of the school is directed to the online courses available through the SLSS website, including *Safety and Health in the Science Laboratory* for teachers.

A notable and recently-introduced feature of the school is its bird sanctuary that is supporting a project to breed pheasants. This is closely linked to the science curriculum. The school's location on a working farm is a big support to agricultural science teaching and learning. It was clear from the planning folder that the science department has plans to extend the use made of the farm in the science education of students.

## **PLANNING AND PREPARATION**

Planning in the science department takes place in the context of the school's overall strategic approach to planning. This approach involves the school deciding what it wants to achieve and the steps that need to be taken to do this. While to date the school has not espoused a subject-department structure, due primarily to its size, in the case of the science teachers there is a cohesive and collaborative approach to the subject that has most of the hallmarks of a subject department. This should be formalised with the appointment of a subject co-ordinator to fill that position on a rotating basis. Clear records are kept of regular meetings of the science team. Recently the meetings have been concerned with planning the renovations of the science laboratory and are concrete evidence of the very good teamwork that is a strength of science provision in the school.

The science team has a subject department folder that includes much information on the way in which the department operates including its planning for students with special educational needs. The school's policy in relation to students with special educational needs is included as part of its admission policy. The school, as part of whole-school collaborative planning, should document its policy in relation to students with special educational needs and the subject department should also document its practices with students requiring additional support. The department should move to include teaching and learning methodologies in more detail in its planning as well as the use that will be made of ICT.

The department has an outline plan for Science in terms of topics and years that has been developed to include more detail on the topics and activities, the resources required, and reference to the learning objectives. As the science plan is being reviewed the learning objectives should be developed further to help with classroom planning. Similar planning was evident for Physics and Chemistry that also showed very good practice. The department has shown great flexibility in the necessary adaptations that it has made in the third-year programme to address possible deficiencies in the previous learning of students. Reflection and self-evaluation is evidently an integral part of subject-department planning. In line with very good practice the department has carried out a self-evaluation and come up with areas in which improvement is desired.

Several relevant school policies are included in the department's planning folder. These policies are in need of review and this review should take place on a whole-school basis, under the guidance of the board of management. In particular the school's student behaviour policy should be reviewed so that it takes account of the NEWB guidelines for schools.

## **TEACHING AND LEARNING**

Learning and teaching in Science and in Physics and Chemistry take place in a context of providing the best possible science education for students. Each lesson was well planned and prepared for thoroughly and the necessary resources were to hand. A characteristic of each of the classes observed was the wide spread of student abilities within them. This places particular demands on teaching, in particular differentiating the teaching. The emphasis of teachers on helping students to build up a folder for the subjects to assist them in their learning is appropriate as it will help students to manage their learning.

The topic and objective of each of the lessons observed was clear and it was evident that students were learning. To complement the greater use of learning objectives in subject planning teachers should introduce lessons through the use of the student learning outcomes that are being targeted. These should be on the board or screen and should be referred to as the lesson progresses and used in summarising the lesson at its close. To target more effectively the learning needs and abilities of each student, the learning objectives could be differentiated, that is a number of learning objectives or targets should be given that would each make different demands on students.

There was good continuity with prior learning in each lesson. In one lesson exemplary practice was seen in relation to assessing students' knowledge prior to developing the topic of the lesson. In this case the teacher used the data projector to give students a multiple-choice test and made use of the results of this to inform the subsequent teaching. It was evident from the ease with which this was set up that this is a regular feature of the teacher's work. In another lesson the lesson commenced with a student in the class outlining to his classmates the progress he was making in hatching some eggs of pheasants that are destined for the school's wildlife sanctuary. This is a very good example of a student leading the learning of his classmates in an area that is highly relevant to the science curriculum.

While the lessons observed were quite teacher centred, a range of methodologies was in use in each, including teacher presentation using the data and overhead projectors, teacher demonstrations, student practical work, and student pair work. Such a range of methodologies is good practice. In some lessons more use could have been made use of the board to highlight key points. In each lesson it was evident that teachers were attentive to the needs of individual students. In their curricular and lesson planning, teachers need to address to a greater extent student learning as the objective of lessons.

There is a need to increase the extent to which differentiation is in use both in planning and in teaching. In order to address the needs of students who may have literacy difficulties the use of keywords should be routine with all classes. To assist students in meeting the learning objectives of Science with regard to preparation of their own accounts of student investigative activities the development of these skills should become an objective of first-year classes, even at the expense of a small reduction in content covered. Having a small project to be carried out by students in second year could serve as a preparation for the Junior Certificate third-year project.

Classroom management in the lessons observed was of a high standard and the teachers in each lesson succeeded well in engaging the interest and attention of their students. Students were responsive and were participating in each lesson. Relationships between the teachers and students were good and were conducive to learning.

## **ASSESSMENT**

It was evident that regular assessment of students' progress was taking place in each of the subjects inspected. The assessment and homework procedures used in science are included in the subject department plan. They envisage close supervision of students' homework and regular assessment to determine students' progress. These are very good practices. There is a need to incorporate differentiation in the assessment practices used, both for in-class and written assessments. In checking students' work, teachers should give brief written guidance as to the strengths of that work and advice as to how it can be improved. In that way students are assisted in gaining an insight into their progress. An example of this seen in one notebook was: "Well

done. Questions well laid out. Units included.” There should be follow up with students on their addressing of teachers’ comments.

The science department should consider including marks for homework, practical work and other work carried out during the term in students’ marks in end-of-term assessments. The school and the science department should analyse the school’s State Examinations Commission science results each year in terms of students’ performance and their uptake of levels. Setting targets for achievement by individual students and by the school as a whole should become a part of the school’s culture. To that end there needs to be a consistent policy on the part of all in the school community of encouraging students to develop high expectations.

## **SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS**

The following are the main strengths identified in the evaluation:

- Learning and teaching in Science and in Physics and Chemistry takes place in a context of providing the best possible science education for students.
- The effort and time that has gone into the recent reorganisation of the laboratory is an indicator of the commitment of the teachers.
- Both science areas were very attractively presented with lots of stimulating charts and posters on science themes.
- The science department’s approach and implementation in regard to students with special educational needs is in line with very good practice.
- The school’s recent development of a bird sanctuary is a support to the science education of its students.
- The very good teamwork among the science teachers is a strength of the science provision in the school.
- Reflection and self-evaluation are an integral part of science subject-department planning.

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

- In planning for whole-school professional development (CPD), the areas of mixed-ability teaching and differentiation should be prioritised.
- In their curricular and lesson planning, teachers need to address to a greater extent student learning as the objective of lessons.
- Setting targets for achievement by individual students and by the school as a whole should become a part of the school’s culture as part of a policy of encouraging students to develop high expectations.

Post-evaluation meetings were held with the teachers of Science and 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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