

An Roinn Oideachais agus Scileanna

Department of Education and Skills

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

**Scoil Mhuire, Strokestown,
County Roscommon
Roll number: 65100S**

Date of inspection: 1 December 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 Scoil Mhuire, Strokestown. 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 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 and subject teachers. The board of management of the school 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

The school has a strong curricular programme in the sciences with Science being taken by almost all students at junior certificate level and Physics and Chemistry (combined), Chemistry, Biology, and Agricultural Science available to leaving certificate level. There is a good uptake of the science subjects in senior cycle.

The time allocation for each of the science subjects is adequate. There is an adequate allocation of double-class periods for student practical work. Because of the requirements of the teachers of the other subjects in the subject option blocks in senior cycle, each senior science subject has two double-class periods each week. The need for and the benefits of having two double-class periods each week should be reviewed as it reduces the number of weekly exposures of students to the subjects.

The science teachers are well qualified and are active outside the school in regard to science education. They are highly professional and competent in their approach to their work. The department has very high standards in relation to furthering its skills and knowledge. As well as whole-school continuing professional development (CPD) the science teachers have undertaken subject-specific CPD. Members of the department have been involved in science education at international and national levels.

The laboratory facilities for science in the school are currently adequate having been recently refurbished and the overall facilities will in the near future be considerably improved with the completion of two new science laboratories and the refurbishment of a third as part of a major building project. The existing laboratories are in good condition and are well maintained and

presented. In conjunction with the upgrading of the laboratories the need for secure chemical storage in the remaining existing laboratory should be taken into account.

The present system for acquiring laboratory stock and keeping that stock up to date is an informal one and it works because the laboratories are near each other and there is good teamwork evident among the science teachers. With the inception of the new laboratories it will be necessary to formalise this aspect of the operation of the science department. As part of this the department should have a breakages book, a stock requirements list, and an incident book.

The science department has a due regard for safety, and documentation in relation to safety in science is included in its planning folder. The safety notices in each laboratory reflect this. As it develops further its safety practices, annual risk assessments of the science teaching areas should be carried out by the teachers. Records of these assessments should be included in the department planning folder.

Science is included in the school's transition year (TY) programme with a double-class period each week for TY Science for each TY class group. The TY curriculum for one class alternates between Biology and Agricultural Science and the curriculum for the other group is based on Physics and Chemistry. When reviewing and planning for next year the school should try to include elements of all four science subjects in the programme of each transition year group.

A reflection of the high level of commitment of the science teachers to the progress of their students in the science subjects is the extent of student participation in the Young Scientist and Technology Exhibition each year and in other projects.

PLANNING AND PREPARATION

Formal departmental planning takes place at meetings held each term and convened by the departmental co-ordinator. The records kept of these meetings indicate that their principal function is organisational, for example planning for the new laboratories. These are being carefully planned for by the department.

This school has a significant number of students with special educational needs, almost all of whom take science. Teachers are aware of the needs of the students and are inclusive in their classroom approaches. In this regard very good work is reflected in the material on differentiation and assessment for learning and other areas included in the science plan. The plan also refers to differentiation as a factor to be considered in class planning.

The school and the subject department are well-equipped for the use of information and communication technology (ICT). The department should set up an electronic departmental folder so as to have ease of access to common resources. It should also develop the use of ICT for linking between teachers and students.

The subject plan includes a skeleton long-term programme that includes the content for each year and that is reviewed each year by the department at its planning meetings. This good practice should be developed further through basing curricular planning for Science to a greater extent on the syllabus and the learning objectives that are contained in the syllabus. This should involve linking the learning objectives to the curriculum content, to the teaching and learning activities, and to the resources required and assessment. Such a document or plan could be easily reviewed each year.

The curricular planning reviewed for Physics and Chemistry was very comprehensive and it was evident that it was the product of a considerable amount of thought and preparation. In the case of TY Science the curriculum, including assessment, for each TY group should be documented and included in the subject department planning folder.

Each lesson observed was very well planned and prepared. All necessary materials were to hand. It was evident that each teacher had given considerable attention to the planning and preparation of their work.

TEACHING AND LEARNING

Teaching and learning of a high standard were seen in the science lessons and in the physics and chemistry lessons observed. The high quality of advance planning of lessons meant that each lesson was well structured. All lessons were introduced through stating the topics to be covered in them. Consideration should be given to the use of learning objectives in introducing lessons so as to help teachers to differentiate the lessons and to facilitate assessment of students' learning during and at the conclusion of lessons. Very good practice was seen in one lesson where, as homework, students were asked to explain to their parents what they had learned.

A range of teaching and learning methodologies was observed. The main methodology used in most lessons was teacher talk and questioning of students. Most questions directed to students were of the closed variety with a single correct answer although some good examples were seen of open questions where students had the opportunity to put forward their own ideas. The use of a variety of question types and where students were given a short time to think before answering questions supported a focus on student learning. Good use was made of ICT in several lessons to present material and to relate the content of the lesson to students' lives. There is scope for the further development of ICT in the classroom to assist also in assessment of students' learning and in helping student learning. Overall there is a need to increase the proportion of lesson time spent on student activity so as to increase the emphasis on student learning in lessons. A further area to be addressed is the use of keyword charts in all lessons given the mixed-ability nature of each class.

Student practical work observed was very well planned. It was evident as students worked purposefully that they were learning from each other. An area that should be developed in relation to student practical work is having a greater involvement by students in setting up their practical work. There needs to be a greater emphasis on incorporation of the investigative approach with regard to student practical work by having a greater level of student participation in planning, carrying out, and reviewing laboratory work. While taking this approach to student practical work will take more time initially, it has been shown to be effective in arousing students' interest in Science. In one lesson elements of this were seen where the class discussed the experiment using their laboratory books. In the case of the physics and chemistry lesson observed very good attention was given to an analysis of potential sources of error in the experiment. This helped students' understanding of the experiment.

Classroom management in each lesson was very good as was the class atmosphere and student-teacher relationships in each class. Students participated very well in each of the lessons. The learning environment in the case of each of the laboratories was attractive with relevant displays that would help students' learning.

It was clear that students were learning in each of the lessons seen. This was evident from their engagement in the lessons, their interactions with the teachers, and the very good attention they gave to each aspect of each lesson.

ASSESSMENT

The subject department shows very good practice in the analysis that it carries out each year of the results achieved by its students in the state examinations. Students of the school achieve very good outcomes in the state examinations.

A range of students' notebooks and records of practical work carried out were examined. In most cases students' written and other work is checked regularly by each teacher. In some cases checking of students' work should be developed further through the use of formative assessment; students should be given written positive feedback on their work, and clear guidance on how they can improve it. This practice should also apply to mandatory experiments. In conjunction with this and as part of subject department planning, the science department should establish consistent procedures regarding the role of students' notebooks, their homework books, and their practical work records. These should include procedures regarding checking them, giving feedback, and following up on corrections.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- The school has a strong curricular programme in the sciences.
- The science department has very high standards in relation to furthering its skills and knowledge.
- The school and the subject department are well-equipped for the use of information and communication technology (ICT).
- The curricular planning reviewed for Physics and Chemistry was very comprehensive.
- Teaching and learning of a high standard were seen.
- The subject department shows very good practice in the analysis that it carries out each year of the results achieved by its students in the state examinations.

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

- The need for secure chemical storage in the remaining existing laboratory should be taken into account in conjunction with the inception of the new laboratories.
- When reviewing and planning for next year the school should aim to include elements of the four science subjects in the programme of each transition year group.
- There needs to be a greater emphasis on incorporation of the investigative approach with regard to student practical work.

A post-evaluation meeting was held with the teachers of Science and Physics and Chemistry (combined course) and 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 School is satisfied with the findings of the report.

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

The teachers are working on the recommendations of the inspection particularly in relation to the inclusion of elements of the four sciences in TY and putting greater emphasis on incorporation of an investigative approach in regard to students' practical work.