An Roinn Oideachais agus Scileanna

Department of Education and Skills

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

REPORT

St Nathy’s College
Ballaghaderreen, Co Roscommon
Roll number: 68067P

Date of inspection: 26 April 2010
REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN PHYSICS AND PHYSICS AND CHEMISTRY (COMBINED COURSE)

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in St Nathy’s College. It presents the findings of an evaluation of the quality of teaching and learning in Physics and in 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 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 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

St Nathy’s College is currently celebrating its two-hundredth anniversary and the science department, as a key subject department in the school, has played its part in this. A further context factor for this report is the inspection of Science and Biology that was carried out in 2005.

The school prides itself on its very broad science curriculum that includes Physics, Chemistry, Biology, and Physics and Chemistry at senior cycle level. Of these Biology and Physics and Chemistry (combined) are quite popular while Physics does not have sufficient students opting for it each year to form a class. In the 2009/10 academic year the school offered Physics in sixth year and Physics and Chemistry in fifth year. While for a school of its size the numbers taking the physical sciences are comparatively low, the school feels that this is accounted for to some extent at least by the range of other subjects competing for students’ attention on the curriculum. The school states that its draws to the attention of students the value of the physical sciences and that the guidance department is very conscious of the opportunities that arise from a study of the physical sciences. In line with good practice the selection of optional subjects by students is based on an initial open choice. It is suggested that the school consider making interventions in relation to the physical sciences in second year classes where research appears to indicate that students begin their decision-making process.

In September 2011 the school is planning to reinstate Transition Year (TY) following a lapse of several years and it intends using the TY curriculum to give students an opportunity to sample the physical sciences. The website of the Royal Society of Chemistry http://www.rsc.org/Education/Teachers/Resources/index.asp has a section with material that would be useful for TY. The Institute of Physics (IOP) website also includes some ideas and material that should be referred to when planning for Physics in TY:
Both the physics and the physics and chemistry classes were of mixed ability and the time allocation and double class period allocation for each was adequate.

Records of continuing professional development (CPD) of science staff included in the departmental plans did not include recent professional development. However school management actively supports and encourages staff to avail of CPD and members of the science department do avail of such CPD. The outcomes of the CPD undertaken by science teachers should be shared formally with other members of the department through the subject-department structure.

The school has two functioning laboratories and one other room that is not equipped to function as a laboratory but which appears to have been a laboratory at some point in the past. The school also has a demonstration room. The laboratory provision for the sciences is inadequate and addressing this should be a priority of the school’s board of management. This recommendation was also made in the 2005 inspection report. Given the current shortfall in laboratory resources, the laboratories should be used for science subjects only. This is not currently the case. The 2005 report recommended that each science class should have weekly access to a laboratory for the purpose of students carrying out investigative work as required by the science syllabuses. School management confirms that this is now the case with room arrangements being made by the science faculty themselves.

The school has recently equipped itself for use of information and communication technology (ICT) in its laboratories and other teaching areas. The science department, as part of its collaborative planning, should plan for the acquisition and use of ICT in all the science subjects. While there were displays of students’ work and of science charts and posters in the teaching areas, there is scope for these displays to be extended and to include information on science-related careers, and large periodic tables as appropriate. As part of its work the science department should review the adequacy of the equipment available for science, in particular to enable student laboratory investigative work.

The school’s safety statement refers to the science laboratories and includes general recommendations with regard to the amelioration of risks. 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 the 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 science department has been active in its involvement in Scifest and encourages students through visiting speakers and science-related visits. This is an indication of the dedication and commitment of the science teachers and is supported by school management.

**Planning and preparation**

Subject-department planning is facilitated by senior school management through the arrangement of a schedule of departmental meetings for each subject throughout the school year. It is noted that the outcomes of these meetings are notified to the principal. Subject planning for Physics and
for Physics and Chemistry takes place within the context of planning for the science department as a whole. The department has a subject coordinator whose position is a post-holder duty that principally involves the chairing of departmental meeting. Topics discussed at three recent departmental meetings included planning for the science department’s role in the school’s anniversary celebrations, and for the development of ICT resources and skills within the department. The level of formal collaboration among the members of the science department needs to be greatly increased and as part of this records of departmental meetings should be stored on the school’s intranet to facilitate access by all members of the department. The advantages to the running of the department that could accrue from rotating the role of departmental coordinator should be considered.

The 2005 inspection report refers to the extent of individual subject planning that was taking place and the collaborative planning taking place with regard to first-year students. The question of extending that planning to other year groups was raised. On the basis of a review of the science department plan for Science in junior cycle this has not yet happened. While there is a very broad plan for first year, laid out in terms of chapter headings of the textbook used, from second year the content to be covered is at the discretion of the individual teacher. The science department plan should be reviewed so that it is more supportive of the work of individual teachers. Common agreed content for each year should be laid out as teaching plans under learning objectives to be achieved for each topic heading. A planning folder should be initiated that would include, as well as curricular matters, the department’s policies, teaching and learning in the department, departmental resources and teachers’ CPD. Discussion of these areas should take place at departmental meetings.

Subject plans for Physics and Physics and Chemistry were reviewed. In the case of Physics and Chemistry the subject plan, contained in two documents, gives a detailed list of the topics to be covered each year. The two documents should be merged to form one subject plan and some more detail on the timing of the coverage of the topics on the syllabus should be included. In time to plan should be extended to include information on assessment, student practical work and resources, including ICT resources. The lack of any information on the course content or coverage in the physics subject plan was a drawback when a change of teacher took place recently. The physics subject plan should be reviewed so that there is a detailed list of topics to be covered along with their timing, assessment methods and material, and resources including ICT resources.

**TEACHING AND LEARNING**

One class each in Physics and Chemistry and in Physics were observed. In both classes the syllabus was being adhered to and the course coverage was appropriate. The lessons were well planned and prepared for. In both classes the course was being addressed in a competent manner by the teachers. While in each case the topic of the lesson was communicated to students at the outset of the lesson, this should be done using the board or screen and where appropriate should state what students should be able to do following the lesson.

As would be expected given the time of year the physics lesson was focused on examination questions with students and teacher co-operating in revising. In the physics and chemistry class the topic being addressed was oxidation and reduction. The principal teaching methodology being used was answering of examination questions with the teacher working at the board. The class was also illustrated by a brief practical demonstration of oxidation and reduction. In both lessons
there was good discipline and attention by students. Teachers had a good relationship with their classes.

Though the lessons were quite teacher-focused students participated well. While from their engagement in the lessons it was evident that students were learning, that learning might have been greater were there to be a greater balance between coverage of course content and a focus on student learning. A greater level of student activity in lessons should also be facilitated. In order to further incorporate the continual assessment of students in lessons there should be a greater emphasis on questioning of students, making use of a range of question types.

While the emphasis on answering of examination questions as part of the class is appropriate where examinations will shortly be undertaken, it should not be the sole or dominant methodology used. It is necessary that in all classes a high value should be placed on the development of students’ enthusiasm for the subject. Doing this, as well as fostering students’ enjoyment of learning, will have a positive effect on their engagement with and interest in the subject.

For the study of both Physics and Physics and Chemistry student investigative work is an important part of the development of students’ skills. This is not being adequately addressed in the school. Course planning and school facilities and equipment need to be harnessed more effectively to address this deficit. While teacher demonstration is a suitable means of engaging students with experimental work, it should not replace the carrying out of such work by students working together.

**Assessment**

Students are set homework on a regular basis. Homework and other written work completed by students is checked for its completion and examined in class. As the completion of assigned work and the presentation of that work is a key skill in learning Physics and Physics and Chemistry, teachers should take up that work on a regular basis to check it. In assessing students’ work students should be given feedback on the positive elements of that work as well as advice on what they should do in order to improve their work. Students should be encouraged to present their work in an organised manner and to keep their notes in a manner that will be of use to them.

The school adheres to good practice in the use that it makes of its annual analysis of the results achieved by its students in the state examinations. The outcomes of this analysis are shared with the school community.

**Summary of Main Findings and Recommendations**

The following are the main strengths identified in the evaluation:

- In line with good practice the selection of optional subjects by students is based on an initial open choice.
- The school is planning to reinstate Transition Year (TY) following a lapse of several years and intends using the TY curriculum to give students an opportunity to sample the physical sciences.
• The school has recently equipped itself for use of information and communication technology (ICT) in its laboratories and other teaching areas.
• The science department has been active in its involvement in Scifest and encourages students through visiting speakers and science-related visits.
• Subject department planning is facilitated by senior school management through the arrangement of a schedule of departmental meetings for each subject throughout the school year.
• In both lessons there was good discipline and attention by students. Teachers had a good relationship with the class.
• The school adheres to good practice in the use that it makes of its annual analysis 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:

• As also recommended in the 2005 science inspection report, improving laboratory provision for the sciences should be a priority of the school’s board of management. Laboratories should be used for science subjects only.
• The level of formal collaboration among the members of the science department needs to be increased and extended to include all aspects of the provision of science education in the school. As part of this the outcomes of continuing professional development of individual science teachers should be shared formally with other members of the department.
• To improve further students’ learning in Physics and in Physics and Chemistry there is a need for a greater balance between coverage of course content in classes and a focus on student learning. A greater level of student activity in lessons should also be facilitated.
• Course planning and school facilities and equipment need to be harnessed more effectively so that the role of student investigative work in the development of students’ skills in Physics and Physics and Chemistry can be fully addressed.

A post-evaluation meeting was held with the teachers of Physics and Physics and Chemistry (combined course) 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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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 thanks the Inspectorate for a comprehensive inspection report. The Board acknowledges the good work of the Departments of Physics and Physics & Chemistry (combined course) and welcomes the findings of “well planned lessons” being delivered in “a competent manner by the teachers”. It also welcomes the findings of “good discipline and attention by students”, as well as the teachers “good relationship with their classes”. The Board is aware of, and is grateful for, the high level of staff commitment to extra-curricular activities in Science.

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

In light of the recommendations made in the report, the following have been implemented:

An application for a laboratory refurbishment has been submitted to the Department of Education & Skills. The Board is of the opinion that an additional refurbished Science laboratory will greatly enhance and facilitate the teaching of practical Science in student-centred manner.

A Transition Year has been reintroduced for the 2010 – 2011 school year. With a view to increasing the uptake at Senior Cycle, Science is a core element of the T.Y. programme.

Subject Department planning is also progressing in line with the recommendations of the inspection report.