

An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Science and Biology
REPORT**

**Loreto Secondary School, St Michael's
Navan, County Meath
Roll number: 64370T**

Date of inspection: 20 October 2010



**A N R O I N N | D E P A R T M E N T O F
O I D E A C H A I S | E D U C A T I O N
A G U S S C I L E A N N A | A N D S K I L L S**

REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN SCIENCE AND BIOLOGY

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in Loreto Secondary School, St Michael's, Navan, 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 Biology 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, deputy-principal and subject teachers.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

Science and Biology are well supported in Loreto Secondary School, St Michael's. Science has been a core subject at junior cycle since 2008. In the senior cycle, there is an optional Transition Year (TY) programme in which Science is provided. At Leaving Certificate level, Biology, Chemistry and Physics are offered. While Biology is the most popular, there is good uptake of Chemistry and Physics as well. The number of class periods provided to the sciences at junior and senior cycle is appropriate; however, it is recommended that the allocation at junior cycle level be amended from two double periods to one double period and two single periods in order to provide a better spread of classes throughout the week. Teachers generally retain the same science class from one year to the next and this level of continuity is commendable.

The school has three laboratories which are clean and well maintained. Two laboratories are linked by a common preparation area. This area is tidy and well ventilated. It contains a fireproof cupboard to house flammable chemicals which is appropriate. However other chemicals such as toxics and corrosives are stored on open shelves. It is recommended that appropriate lockable storage be arranged for toxics and corrosives in the preparation area. The third laboratory is older and does not have a preparation area. The school currently has plans to build a fourth laboratory and this will help alleviate some of the demand for laboratory access and chemical storage. All three laboratories have emergency shut-off points for gas. It is essential that all team members be aware of the location of the shut-off point for electricity as well. These matters were brought to the attention of the science teachers at the time of the evaluation.

A code of conduct for the laboratory was displayed in all laboratories and it is provided as a contract to students. The school has a health and safety statement which has recently been reviewed. Appropriate health and safety materials such as fire extinguishers, fire blankets, first aid kits and safety goggles are provided in all laboratories. A list of telephone numbers for the emergency services is also displayed.

Members of the science team have benefited from the continuing professional development (CPD) provided by the Biology Support Service (BSS) and the Junior Certificate Support Service (JCSS) for the revised Science and Biology syllabuses as well as more recently in the coursework B area of the Junior Certificate Science syllabus. The science team is facilitated in disseminating this information through the provision of time for a team meeting following attendance at in-service courses. Management is commended for this commitment to CPD.

The school has achieved first place in the intermediate category of the Social and Behavioural section of the BT Young Science and Technology Exhibition in 2010 and the school has an entry in the 2011 competition of the current school year. Science is also promoted in the school through competitions such as Science Spins, SCIFEST and through science week. There is a science notice board on the corridor outside the preparation room and the science team has recently set up a science website: loretonavanscience.weebly.com on which students have access to class notes as well as up-to-date science related news articles. Teachers have also organised trips to W5 in Belfast and to Dublin Zoo. The science team is commended for the level of time and commitment to these activities.

PLANNING AND PREPARATION

The science team consists of six teachers and they adopt a collegial approach to the planning for Science in the school. The position of co-ordinator is rotated among the team. Planning meetings are held at the start and end of the school year. Management also facilitates planning meetings as part of staff meetings during the school year. It is noteworthy that regular informal planning meetings also take place during the year.

Planning folders were provided for Junior Certificate Science, TY Science and Leaving Certificate Biology. They all contained an outline of topics to be taught over the duration of the programme. In some instances, the topics were linked to activities and teaching methodologies, while in some programmes, the learning outcomes for each topic were outlined. All programmes of work should now be further developed to include a suitable timeframe for each topic, the associated learning outcomes linked to appropriate methodologies and modes of assessment. It is recommended that the science team discuss best practice in this area and develop a common template for the programme of work which can be utilised by all teachers of science.

A TY plan for Science was provided which outlined a range of interesting and innovative topics to be taught throughout the year. These included forensic science, diseases, cosmetic science and the science of sport. It is commendable that resources from the National Centre for Excellence in Mathematics and Science Teaching and Learning (NCE-MSTL) and the Schools Information Centre on the Irish Chemical Industry (SICICI) are utilised in planning the course as well as booklets from such medical organisations as the British Medical Journal. There is scope for the template for the programmes of work recommended earlier to be adapted and used in planning the TY science programme. The section on assessment should be further developed in order to provide assessment criteria and performance indicators for the activities listed. These criteria should be shared with the TY students.

Good examples of differentiated practices were observed in a number of lessons and this should be reflected in the planning documentation. Planning for differentiation is an area which could be further explored among all members of the science team and should be included for discussion at planning meetings. A number of students are in receipt of subject-specific learning support in the sciences. Some of these supports are provided by members of the science team. The science team

should collaborate further with the learning support department in planning for these students. This could include the provision of detailed programmes of work and of subject-specific terminology for the topics under study.

A good range of resources is available to the science team and these resources are listed in the science department's planning folder. They include CD-ROMs, DVD's, Science magazines and science-related literature. All three laboratories are equipped with lap-top computers and a data projector.

TEACHING AND LEARNING

The quality of teaching and learning observed in all lessons observed was good. Teachers regularly shared the learning intention with students. In some instances, the learning intention was noted on the whiteboard and returned to as part of the conclusion to the lesson. This proved very effective in keeping the students on task, in giving the lesson structure and indicating to students what is expected of them at the outset of the lesson.

Teachers went to great lengths to ensure that the learning environment was stimulating and encouraging. Students responded very positively when they were given opportunities to actively participate in lessons. One example of this occurred where a circuit of experiments was used to revise the topic of light. Students worked in groups to set up the experiments and one student remained with each experiment while the remainder of the group moved on to another station. The remaining student acted as 'mentor' to the incoming group at that station. This mentoring role is rotated so that all students had at least one opportunity to act in this role. The science team should look into ways of sharing many of the good methodologies used by the individuals in the team and consider observation of a colleague's class as a means of disseminating good practice. In order to accommodate students' diverse and preferred learning styles, and bearing in mind the benefits of more actively involving students in their learning, it is recommended that a greater variety of active learning methodologies should be incorporated by teachers into all lessons.

A positive teacher-student rapport was evident throughout the classrooms visited, particularly during the many discussions which took place. Praise was appropriately used to affirm students' efforts.

A very good level of practical skills was evident in a number of lessons. Students displayed commendable ability to work in teams and good routines had been established for setting up and putting away of apparatus. These practical activities observed were well managed. Students worked with good regard for health and safety measures and there was a focus on how the skills being developed were applicable in students' everyday lives.

Good practice was evident where teachers moved around from group to group, providing direction, monitoring work and ensuring that students remained on task. As well as enabling the teacher to check student learning, it also provided opportunities for students to seek individual help in a supportive structure. Some teachers differentiated their teaching which helped to make the subject accessible to all students. Methodologies used included the use of differentiated tasks, balancing the composition of teams and groups depending on ability, as well as the provision of additional teacher attention for those experiencing difficulties.

Students displayed a good understanding of the knowledge and concepts taught. They were keen to interact with the inspector and could give good accounts of the work they had completed. In

some lessons, very good emphasis was placed on the development of students' oral and literacy skills. Key words and science-related terminology were noted on the white board. Students were encouraged to contribute to all discussions and the teachers placed good emphasis on correct pronunciation. In all classrooms visited, good visual displays of students' work and subject-specific posters were evident.

ASSESSMENT

A range of assessment modes was observed and these were both formative and summative in nature. Summative assessment takes the form of formal in-house assessments at Christmas and summer, as well as mock examinations in February for students undertaking Certificate Examinations.

Good practices in formative assessment were evident. A range of questioning strategies was employed in the lessons observed. Best practice in the use of questioning occurred where students' higher-order thinking skills were developed.

Student notebooks and exercise books were examined in a number of lessons and they contained evidence of teacher correction and annotation. Best practice was observed where teachers affirmed student effort and gave feedback on how the work could be improved. When exercises have been checked and commented upon by the teacher, it is important that students act on these corrections in order to consolidate the learning process. The science team should discuss and develop procedures to encourage students to follow-up on exercises that have been checked and annotated by the teacher. These procedures could then be included in the science department's homework and assessment policies.

There was evidence that, in some classes, students were encouraged to complete their writing-up of experiments in their own words. This approach helps the development of students' literacy skills as well as promoting higher-order thinking skills.

Teachers keep good records of students' attendance, completion of work and achievement in assessments. Parents are informed of students' progress via reports issued following in-house examinations. An analysis of the results achieved by students in the Sciences in the certificate examinations is carried out by the science team and is included in the planning documentation. It is commendable that this contains comparisons with national averages at both Junior Certificate and Leaving Certificate level. Students in this school achieve good outcomes in Science and Biology in the Junior Certificate and the Leaving Certificate. It is positive to note that the number of students taking the higher level is good.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- Science has been a core subject at junior cycle since 2008.
- The school has three laboratories which are clean and well maintained.
- Students displayed a good understanding of the knowledge and concepts taught.
- Students demonstrated a very good level of practical skills in a number of lessons.
- A positive teacher-student rapport was evident throughout the classrooms visited.

- In the main, the learning environment was stimulating and encouraging.
- Best practice was observed where teachers affirmed student effort and gave feedback on how written work could be improved.
- Teachers keep good records of students' attendance, completion of work and achievement in assessments.

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

- The allocation at junior cycle should be amended to one double period and two single periods in order to provide a better spread of classes throughout the week.
- Appropriate lockable storage for chemicals should be arranged in the preparation area.
- The science team should develop a common template for the programmes of work which can be adapted by all teachers of science.
- A greater variety of active learning methodologies should be incorporated into all lessons.

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