An Roinn Oideachais agus Scileanna
Department of Education and Skills

Subject Inspection of Science and Biology
REPORT

Ursuline Secondary School
Blackrock, Cork
Roll number: 62650P

Date of inspection: 8 February 2011
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 Ursuline Secondary School. 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 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 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

Provision for junior cycle Science is good. Science is studied by all first-year students and the time allocated each week is one single lesson and one double lesson. It becomes an optional subject in second and third year. Option blocks are created following a survey of students’ preferences. This results in a yearly variation within the option blocks for subject choice. In this academic year half of the second-year cohort and two-thirds of the third-year cohort are studying Science for their Junior Certificate examination. In second year and in third year students receive weekly tuition time of two single lessons and one double lesson. This is consistent with the recommendations in the curriculum guidelines. Junior cycle science classes are mixed ability.

Following junior cycle, students enter the compulsory Transition Year (TY) programme. Three weekly single lessons of Science are provided to the students as part of this programme. The allocation of a double lesson to replace two of the single lessons should be considered for future timetabling of this subject to facilitate completion of practical work.

Biology, Chemistry and Physics are optional science subjects for the students at Leaving Certificate. The time allocation for these is currently one double lesson and three single lessons in both years one and two of Leaving Certificate. This allocation is within curriculum guidelines. The predominant science subject in the school currently is Biology with over half of year one and all of year two Leaving Certificate students studying the subject. All Leaving Certificate science classes are mixed ability.

Each science teacher has their own designated laboratory. All science classes take place in a laboratory, an arrangement which enhances students’ experiences. The science team in the school currently comprises three members. One member of the team has taken a lead role in the delivery of junior cycle Science in the school. While aware of the timetabling constraints currently in the school, nevertheless it is recommended that management endeavours to timetable all science
teachers for some junior cycle science classes in future years. Two members of the team are involved in the delivery of both the TY and Leaving Certificate biology programmes.

The science facilities in the school are modern and very good; they comprise three laboratories with an associated shared preparation area and chemical store. There is also one demonstration room available to the science team. The laboratories are all designated for the teaching of Science. All the facilities viewed were well maintained. The organisation of materials and equipment should be reviewed in some of the laboratory spaces. Key to effective organisation is that students are aware of where the items are stored and that they are easily accessible to them for their work.

During the evaluation visit, materials such as posters, models and charts were observed and these enhanced the visual stimulus within the laboratories. To increase their effectiveness, the materials on display should reflect what is currently being covered in the lessons and used as an aid in the learning process for the students. To help with the delivery of the sciences, the science team also has access to televisions, overhead projectors, video resources, DVDs, data projectors, cameras, data logging equipment, computer room facilities and laptops. Some of these are permanent resources available to the science subjects and this is commended.

The school has a health and safety statement. It was prepared in consultation with in-school management, teachers, parents and the board of management. Teachers were consulted through the use of staff meetings and working groups in the preparation of this statement. Management stated that the statement is annually reviewed with the last review six months ago. There is a good level of safety equipment such as fire extinguishers, safety blankets and safety glasses, in the laboratories.

Opportunities for continuing professional development (CPD) in differentiated learning and teaching methodologies, Delivering Equality of Opportunity in Schools (DEIS) planning and subject-related in-service have been availed of by the teachers. Management encourages attendance at in-service courses both during and after school time. Literature on CPD is given to staff and also placed in the staff folder in the staff room for all to access.

In addition the students are also benefiting from attendance at, and participation in the BT Young Scientist and Technology Exhibition, science week activities, industrial visits, ecological fieldtrips, quizzes and competitions. Students also participate in CIT Science for Life which involves laboratory work at Cork Institute of Technology and three experimental workshops in school each year. The benefit of these experiences to the students must not be underestimated as a means of reinforcing and enhancing their learning. Such activities are to be commended and encouraged for all science students.

**PLANNING AND PREPARATION**

Common plans have been devised for all year groups, which is good practice. The development of all plans in an electronic format is recommended. The programmes of work for Science and Biology should be expanded to include learning outcomes and these should be linked to timeframes, resources, teaching methods and assessment. It is suggested that the selection and inclusion of a number of self-reflection and self-evaluation criteria in the area of teaching and learning would be a most valuable addition to this work. The use of keywords, and particularly how it is incorporated into subject department plans and translated into classroom practice to
enhance and support whole-school literacy initiatives, needs to be explored by the science department

In addition, the science team could also consider the inclusion in their planning material, information in relation to practical and project work and assessment practices for the students in each year. Especially beneficial would be the identification of the key skills that students should be attaining in each year in relation to practical work and the associated write up of the investigations. These skills should be built on during junior cycle and should provide a platform for further development at senior cycle.

A separate biology programme has been developed for the TY students. This is good practice. The inclusion of more specific details under the course content headings in this plan is recommended, with the desired learning outcomes for the students outlined.

A subject co-ordinator is appointed from the science team. The team could consider the merits of rotating this role among all members in the future. This would contribute to the professional development of all of the teaching team over time. The team meets each term formally and the many informal meetings are acknowledged. Resources are provided by management for the sciences. The team should as part of their planning not only concentrate on the maintenance of the resources but make the further development of the resources a planning objective.

Short-term planning was evident in the lessons observed. This was reinforced by the written documents presented, the thorough preparation for the lessons and the observed familiarity with the subject matter presented. The teachers also maintained records of work and assessments completed to date for the different class groups. Materials required for the lessons were also available and ready for use. In addition, planning for the use of other resources within the lessons observed included the use of information and communication technology (ICT), whiteboard, textbook and various types of handout material. A constant factor for team planning into the future should be the development of strategies to increase students’ participation within lessons when and where appropriate. Such strategies help to encourage the development of students’ responsibility for learning.

**TEACHING AND LEARNING**

Teaching practices observed ranged from fair to good. Good practice was observed where the aims of the lesson were outlined to the students at the outset and where there was careful prior organisation of resources including materials for practical work. In most cases the lesson content was linked to a previous lesson. In many lessons, homework was corrected at the start of the lesson. Other teaching and learning methods observed included practical work, teacher demonstrations, use of ICT presentations, whole-class discussions and the use of worksheets. The pacing of lessons was generally good.

Teachers maintained discipline in a sensitive manner and this resulted in a good rapport between students and their teacher. In most lessons, there was a good level of enthusiasm among students to volunteer answers and to participate in lesson activities. This enthusiasm was encouraged by the teacher and it contributed to the positive learning environment.

Questioning was also observed in the lessons. The majority of questions centred on the recall of information. Use of higher-order and probing questioning to help ascertain students’ learning is to
be encouraged. All students participated as fully as they were asked to in the lessons observed and they were co-operative, respectful and responsive.

In each lesson, learning was contextualised for the students concerned. There was a clear purpose to most of the lessons observed. It is recommended that teachers share the intended learning outcomes with students at the start of each lesson, set them out on the whiteboard and check with students at the end of the lesson whether they have been achieved. This practice would strengthen students’ partnership in the learning process. In addition the board or posters could also be used to record key learning points and key words for the students and could be linked into the learn check for the students during the lesson and at completion.

ICT resources are located in all laboratories and were used in some lessons observed. The further development of the use of these resources is recommended as ICT can be effective in displaying visual images, providing short video clips and animations, and highlighting main points. The organisation of a shared science ICT folder that could be used by the science team should also be discussed.

Students’ skills in practical work were developed in lessons and good progress has been made with the set of prescribed practical activities with each group. In the main materials were easily accessible and organised for students’ use. It is important that students become aware where basic equipment is located in the laboratory so valuable time is not lost during practical activities trying to locate relevant materials. Greater emphasis should be placed on planning for an investigative approach to practical work in Science. Investigations should be used for students to seek information about a particular concept or process in a manner that is not predetermined in procedure or outcome. Students should also be encouraged to make observations during practical work and note their results in their laboratory copies or worksheets. The approach taken to the writing of laboratory reports by students needs to be adjusted so that students are encouraged to write these up in their own words and thus develop their report writing skills. It is recommended that standardised procedures for developing and achieving these objectives be set out in the science plan.

**ASSESSMENT**

The school has a homework policy. Homework is set regularly and is corrected as part of the following lesson. Routine monitoring of copybooks and notebooks should be carried out by all members of the science team. It is recommended that the science team develop common correcting practices and put in place some procedure to encourage students to follow up on corrections and comments made in all notebooks. Good practices should be discussed at the next planning meeting with a view to developing an agreed assessment policy for the sciences.

Teachers maintain records of attendance, homework and class tests. These are used to inform discussions at parent-teacher meetings which are held annually for each year group. Formal assessments are held at Christmas and for non-examination classes at the end of the summer term. It is recommended that teachers include a percentage of the marks for the standard of student notebooks or for the write-up of particular practical work in the final formal assessment grade at Christmas and at the end of the summer term. Third-year and sixth-year students sit pre-examinations in the second term. Reports are issued to parents following formal assessments.

An analysis of results obtained in the certificate examinations is carried out annually. This can provide useful information to teachers in relation to learning outcomes and can be used to
facilitate future planning. It is therefore recommended that the science teachers use this analysis in planning for the teaching and learning of Science and Biology.

**SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS**

The following are the main strengths identified in the evaluation:

- Three modern well-resourced laboratories and a demonstration room are available for teaching the sciences in the school.
- All science and biology lessons take place in a laboratory.
- The science department has good access to information and communication technology.
- In the lessons observed, teachers maintained discipline in a sensitive manner and this contributed to a good rapport between students and their teacher.
- In the lessons observed, good links were created with prior learning and concepts were put into context for the students.
- Management has facilitated subject planning within the sciences.
- Common plans have been developed for the teaching of Science and Biology.

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

- The programmes of work for Science and Biology should be expanded to include learning outcomes and these should be linked to timeframes, resources, teaching methods and assessment.
- The science team should discuss best practice for the assessment of students’ work and develop an assessment policy for the sciences in the school. The agreed assessment policy should then be implemented by all members of the science team.
- The learning intention of each lesson should be shared with students at the outset.
- Greater emphasis should be placed on planning for an investigative approach to practical work in Science and for the development of students’ laboratory report writing skills.

Post-evaluation meetings were 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.

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