An Roinn Oideachais agus Scileanna

Department of Education and Skills

Subject Inspection of Science and Biology
REPORT

Synge Street CBS
Dublin 8
Roll number: 60470D

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AN ROINN OIDEACHAIS AGUS SCILEANNA | DEPARTMENT OF EDUCATION AND SKILLS

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 Synge Street CBS, Dublin. 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 the 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, examined students' work, and had discussions with the teachers and with senior management. Following the evaluation visit, the inspector provided oral feedback on the outcomes of the evaluation to the principal and deputy principal. 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

Synge Street CBS is a voluntary secondary school for males with a current enrolment of 272 students. Founded in 1864, the school continues to place great emphasis on the vision of Edmund Rice, catering for a broad range of student backgrounds. The school participates in the School Support Programme under DEIS (Delivering Equality of Opportunity in Schools). The curriculum programmes on offer are the Junior Certificate, the Junior Certificate School Programme (JCSP), the Leaving Certificate established and the Leaving Certificate Applied (LCA).

There is a long tradition of science education in the school, of which it is very proud. The school has achieved many considerable successes in the Young Scientist and Technology Exhibition over the years, including overall winner, runner-up and the best group category, in addition to outstanding success in international science competitions.

Science is a core subject for all junior cycle students, including those following the JCSP, providing equality of access for all. For Leaving Certificate, Biology is one of three senior science subjects provided annually, in addition to Physics and Chemistry. It is highly commendable for a school of this size to maintain three senior science subjects on the curriculum. Management carefully monitors uptake in subjects from year to year and makes efforts to increase the numbers taking sciences for Leaving Certificate by liaising with the school's guidance service and providing encouragement at key opportunities. Information evenings are held for parents prior to subject selection. The majority of the current senior cycle cohort has chosen a senior science subject for Leaving Certificate and this includes some students who completed the JCSP. A small number of students study two or three science subjects. Just under one-third of Leaving Certificate students are studying Biology, and this is a reasonable uptake, with approximately one-fifth taking Physics and one-quarter taking Chemistry, and these are very good uptakes. Science is also provided as an elective subject in the school's LCA programme. There are three groups for Science in first, second and third year, one Science class in LCA 1 and one group each of Biology, Chemistry and Physics in both fifth and sixth year.

Very good provision is made for the subjects on the school timetable. Junior Certificate Science is allocated four periods per week and Biology is allocated five periods per week. Each allocation includes one double period in line with best practice. Students are assigned to class groups in the sciences for junior and senior cycle on the basis of mixed ability. Management maintains class sizes of no more than twenty-four students for the science subjects and currently there are no more than twenty-one students in any of the science class groups. The principal ensures that classes retain the same teacher from year to year within cycles.

Good facilities are in place to support the delivery of the subjects, including three school laboratories. Most lessons in the sciences are held in a laboratory. In addition, the school's audio-visual room, with interactive white board, is used at times for science lessons. Infrastructural facilities for the use of information and communication technology (ICT) in the subjects are good in some rooms and developing in others. Broadband internet access has been installed in all rooms. Good use is made of ICT facilities by science teachers. The laboratories and preparation rooms are well stocked for practical work in the subjects and appear orderly. Teachers should, however, ensure that the current system of chemical storage is in line with best practice. Information on chemical storage is available on http://sciences.slss.ie. A good budget is allocated to the subjects and ongoing maintenance work is planned for and executed. Resource provision is carefully monitored by the principal to maximise investment.

The science and biology teaching team comprises three teachers, all of whom teach Junior Certificate Science. Management deploys only one teacher to Biology but there is more than one teacher with qualifications in this subject. In addition, just one of the teachers teaches Science to all of the JCSP groups. While a certain level of continuity and consolidation in the delivery of any subject is desirable, a cyclical rotation of teachers to Biology and to the curricular programmes in future years would ensure that experience and expertise are developed and maintained. This, therefore, is strongly recommended to senior management and the board of management.

Management encourages and facilitates opportunities for continuing professional development (CPD) but not all teachers availed of previous in-service training courses in the implementation of the revised syllabuses. This is regrettable and ought to be addressed by the principal and board through liaison with the Professional Development Service for Teachers (PDST). It is also recommended that ongoing courses for teachers be regularly accessed in the future, particularly those that are provided in Biology and those relating to the investigative approach for Junior Certificate Science.

With regard to whole-staff CPD, there has been involvement with the TL21 project through National University of Ireland Maynooth. In addition, the principal is involved in an action learning network of DEIS schools that is focusing on improving student achievement. This work is supporting the implementation of the school's DEIS plan. It is suggested that, in planning future in-school CPD events for teachers, a focus be placed on the areas of assessment for learning (AfL) and student self-directed learning.

The school actively and continuously promotes progression to third level in all fields, including the sciences. Current initiatives include participation in a 'Students Learning With Communities' project in conjunction with Dublin Institute of Technology. This has involved science students and their teachers in many ways including visits in and out, practical laboratory work, courses in topics such as energy, and careers promotion in the sciences.

Some students are learning English as an additional language (EAL) and are in receipt of lessons in language support in the school. During their interactions with the inspector, EAL students

displayed notable confidence and capabilities with the English language in their aural and written contributions. The vast majority were able to participate to a good level in their science and biology lessons and were accessing the curriculum appropriately, while others continue to receive more intensive and on-going language support.

PLANNING AND PREPARATION

The school development planning process is building in the school. Within this context, senior management encourages and facilitates subject department planning by scheduling two formal planning meetings per year and providing an agenda and record templates to the groups. The principal reported that a subject plan for Science has been included in the school plan. However, neither the current science plan nor minutes of science department meetings were made available to the inspector.

During the inspection, there was little evidence of collaborative work practices within the whole science department. For example, it transpired that common programmes of work have not been developed and it seems that discussions focus on items such as budgets and organisational matters, rather than planning collaboratively for teaching and learning. It is strongly recommended that future meetings of the subject department take place with the following key aims: to share ideas and resources, to disseminate best practice from CPD events and to discuss and develop pedagogical approaches to key areas of the curriculum.

On the basis of the overall findings of this evaluation, it is recommended that the science plan reflect the school's DEIS plan in that there should be an increased focus on raising attainment in the subjects. To this end, a number of recommendations are made for planning. Primarily, science and biology teachers should establish a number of clear priorities to increase the uptake of higher level and reduce the numbers of E and F grades in the certificate examinations. A set of strategic action plans that are timed and monitored should be set out to achieve this goal. Teachers should also take advantage of in-house expertise in correcting certificate examinations. Study skills, taught as part of lessons in Social, Personal and Health Education (SPHE) should be reinforced in science lessons. Agreements should be reached regarding the frequency of testing students, with students themselves keeping grades on progress charts, and common tests should be used where appropriate. Greater focus should be placed on students doing corrections of their written work and making summaries of topics. Finally, teachers should set higher level as the common level for class work for as long as feasibly possible within the yearly plan and teach that level accordingly. In the interim, it would be useful to make a record of the resources, strategies and assessment modes used, upon completion of each topic. This would provide valuable information for future planning purposes and a basis for curriculum plans. In relation to Junior Certificate Science, the investigative approach to learning Science should be embedded in the planning documents.

Planning and preparation for all lessons observed was found to be generally very good. Lessons included the integration of practical work, questioning and teacher presentations, all of which suited the particular syllabus. In a small number of instances, greater cognisance should be taken in lesson planning of the range of needs and abilities of the students.

TEACHING AND LEARNING

Two double lessons and two single lessons were observed during the evaluation, including Junior Certificate Science and Leaving Certificate Biology. Lessons covered topics such as food testing, pH, ecology and revision. Teachers demonstrated strong competencies in their subjects.

The quality of teaching and learning observed during the evaluation was generally very good and all lessons were characterised by a communicative style and good dialogue. In all lessons, students gave very good responses to teacher questions, demonstrating a very good level of competence in the curriculum and a willingness to build upon each other's answers. All teachers used ICT presentations as well as board work to enhance learning. Some very good digital photographs were used in one lesson to show species within an ecosystem and stimulate interest in the topic and in another lesson well-designed digital slides provided a valuable focal point at key times during the lesson. Text books were used appropriately as reference points for students.

Instruction was integrated with good use of teacher questioning to guide students into vocalising existing knowledge about the topic and to challenge them to contribute further or more accurately, according to potential. Student groups incorporated a wide range of student ability. To facilitate this, teachers differentiated questions to suit the particular needs of individual students and gave encouragement and advice effectively. In the main, lessons were inclusive with all students challenged individually; in a few instances this strategy could have been better applied.

Good practice was observed during a practical lesson that had a clear learning intention that students be able to classify substances as acidic, basic or neutral. Students followed proper investigative procedure at all stages, collaborated well, recorded their results clearly, tidied up, completed the handout given and discussed the outcome of the investigation with their teacher. It was evident from examination of students' laboratory notebooks that they are required to write reports independently. It was also clear that a very good number of investigations and experiments were completed by students over their course in both Science and Biology. In addition, students earn ten percent of the overall grade given in school reports for their laboratory work. These are good practices. In many instances, students' report-writing skills were effectively developed through constructive written feedback from teachers. This approach is recommended for all groups.

Good discussions arose during some lessons on contemporary issues and these were well managed and facilitated. Students demonstrated a good level of interest in the subjects. Student literacy was observed to be quite good and this included the JCSP class groups. In many classes, students keep good quality notes on topics and this is commended. However, in other classes it would be beneficial to learning if teachers explored the techniques of note-making and concept-mapping with their groups.

Students were respectful of their teacher and the dialogue was often impressive. In almost all instances, teachers managed the classroom dynamic very carefully, ensuring positive relationships and a high level of engagement. In the few instances where this was not the case, firmer classroom management should be combined with better planning for the range of abilities. Only some teachers circulated effectively among students during lessons. For example, in a few instances, teachers needed to be more vigilant about the quality and progress of individuals with their written work, particularly during plenary corrections of homework when some students did not accurately record the correct answer. On the whole, however, students of the school are expected to participate productively and consistently and they do so. This was observed throughout the evaluation.

ASSESSMENT

Assessment practices vary from teacher to teacher, and it is necessary to bring some consistency to this area through subject department planning. Some class groups are given frequent class tests, in line with good practice. However, other groups, some of which were facing certificate examinations this year, were only given two tests to date this year, specifically the formal school examinations. This is unsatisfactory. Students should be tested regularly so they can place themselves on a continuum of development through the course, learn to direct their own learning and achieve successful outcomes. In addition, only some certificate examination groups were familiar with the application of marking schemes and this is recommended for all examination year groups.

Homework was observed to be assigned regularly. However, it was often not completed by many students in the class group, creating difficulties for lesson progression. This needs to be addressed through whole-school planning. Students who completed their homework did so to a good standard. As with testing, the levels and type of monitoring of student written work varied from teacher to teacher and this too ought to be more consistent. It is recommended that an assessment policy for the sciences be developed and implemented. This should be informed through a review of current assessment procedures with consideration given to the application of a range of strategies balanced with appropriate amounts of external teacher comment and advice.

Good formative feedback was given to students during questioning and there were instances where tips were given to students on how to study well, answer well and write good laboratory reports. For example, very good practice was observed with the class group receiving regular tests in that the teacher asked everyone to aim for ten percent higher than their last test and gave them encouragement and advice to achieve this fitting personal goal.

Formal school tests are held at Christmas and summer for non-examination groups, and mock examinations are held for the examination classes. Reports on student progress are sent home to parents following the formal tests. JCSP statements are regularly completed with the class groups.

In most class groups visited, student absenteeism was noticeably high, with approximately two-thirds of students in attendance. It is important that absenteeism continues to be closely monitored by the school and that the school's attendance strategies are rigorously administered.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation of Science and Biology:

- The science subjects are robustly promoted and feature in all curricular programmes.
- The quality of teaching and learning was good.
- Lessons were characterised by a communicative style and good dialogue.
- Students participate productively and knowledgeably in their lessons.
- Students are given many opportunities to learn through engagement in practical work.

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

- A cyclical rotation of teachers to the subjects and the range of curricular programmes is strongly recommended so that experience and expertise are developed and maintained.
- Continuing professional development opportunities for science and biology teachers should be regularly accessed.
- Subject department planning should aim to share and develop good practice.
- The immediate focus of collaborative subject department planning should be to raise attainment among all students.
- An assessment policy for the sciences should be agreed and implemented.
- In a few instances, greater cognisance should be taken of the range of student abilities in lesson planning, lesson delivery and in checking individual progress during lessons.

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

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