

**An Roinn Oideachais agus Eolaíochta
Department of Education and Science**

**Subject Inspection of Science
REPORT**

**Saint Vincent's CBS
Glasnevin, Dublin 11
Roll number: 60400F**

Date of inspection: 10 April 2008

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REPORT ON THE QUALITY OF LEARNING AND TEACHING IN SCIENCE

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in St. Vincent's CBS. It presents the findings of an evaluation of the quality of teaching and learning in Science 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 and the subject teachers.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

The evaluation of Science at St. Vincent's CBS, Glasnevin, was carried out over two days. It began with a meeting with the science teachers at which the objectives and procedures of the evaluation were explained. This was followed by a visit to a double third-year science class. Subsequently, a single Leaving Certificate Applied (LCA) science class, two single first-year science classes and a single second-year science class were observed. A meeting was also held with the principal to discuss whole-school support.

Junior-cycle science classes are streamed. Students are divided, by management, into three streams on entry to the school. The upper and middle streams study Science for their Junior Certificate examination. Students in the third stream, some of whom are in the Junior Certificate School Programme (JCSP),

follow a course in Home Economics. It is recommended that all in-coming first-year students be given the opportunity to study Science in a mixed-ability setting. First-year students are allocated one double and two single periods for Science each week. This is slightly below syllabus recommendations. Students in second and third year are allocated one double and three single periods each week, which is in line with syllabus requirements.

Students are given a free choice of subjects for senior cycle and some choose to follow the LCA programme. These students study the Science elective and are allocated one double and one single period each week. All other students follow the Transition Year (TY) programme before progressing to Leaving Certificate. TY students receive one double and one single period of Science each week. Biology, Chemistry and Physics are all on the Leaving Certificate curriculum. This is commendable in a school the size of St. Vincent's.

There are three teachers of science subjects in the school, and all are currently teaching Junior Certificate Science. Although there is a school policy in operation in relation to continuous professional development (CPD), it is reported that uptake by teachers of in-service courses is low. It is recommended that management put procedures in place to facilitate the release of teachers to the greatest extent possible to attend in-service. Teachers should be encouraged to avail fully of all the opportunities for CPD that in-service can provide. In addition, it is suggested that teachers take up membership of the relevant professional body, in this case, the Irish Science Teachers Association (ISTA), where there is much to be gained through dialogue with peers.

There are two science laboratories in the school. These are in excellent condition, due to a recently completed renovation and modernisation programme and, as a result, they are well stocked and equipped. There is one storage and preparation room which is shared by the laboratories, that includes a small area with a computer station for the preparation of information and communications technology (ICT) resources. There is a second storage area available only to one laboratory. The storage areas are well stocked, well maintained and well ordered. Resources available to the science teachers include an interactive whiteboard in each laboratory, an accompanying laptop computer with a data projector and a range of audio-visual equipment. The laboratories are broadband-enabled. Funding for the purchase of resources for the sciences is provided as requested and teachers report that management has always been very supportive. The provision of such resources by management is to be commended. In addition, the science teaching team are to be highly commended for the extensive amount of work they have done to facilitate the renovation and equipping of the laboratories.

Access to a laboratory for specific classes is planned for in advance and a weekly rota has been drawn up. All double classes are held in a laboratory, along with many, though not all, single classes. It is recommended that the use of the laboratories be maximised at all times. There is an open area in the corridor outside the science facilities. It is intended to develop this area as an identifiable and attractive space for the promotion of the sciences. A variety of posters and charts highlighting topics such as careers in the sciences and relevant current issues should be displayed here. Additionally, student-generated work, which can be changed occasionally in line with the topics being taught, could also be included, in order to highlight students' project work.

A range of health and safety equipment was observed, including a first-aid kit, gas isolation switches, fire extinguishers and fire blankets. It is recommended that an emergency electricity isolation system be installed in each laboratory at an early date. Active management of safety issues during student practical work was evident in one lesson observed, where students were alerted to potential hazards in their practical work and were all given white laboratory coats to wear. Students are required to sign a "Contract of use of the Laboratory," a document which outlines safe practice procedures. In addition, the science teachers have drawn up a "Safe Practice Work Sheet" to reinforce laboratory safety. This good practice is commended. The school has a health and safety statement that was drawn up three years ago. This statement is reviewed annually, with the involvement of the science teachers, as appropriate.

PLANNING AND PREPARATION

There is evidence of a strong sense of collegiality among the science teachers and the level of co-operation is very high. There is a recognised co-ordinator for Science whose duties are part of a post of responsibility. These duties include stock control and ordering of equipment, and liaising with school management. It is recommended that a written job description be prepared and agreed, in order to formalise the work of this post. Very frequent informal meetings of the science teachers take place. This has facilitated the already-mentioned refurbishment of the laboratories. In addition, these meetings are used to share good practice and to develop and share ICT-based resources and methodologies. The members of the science team have developed their expertise in the use of ICT to the extent that they are now providing training for other staff members.

It is recommended that the science teachers now turn their attention to the development of a collaborative curricular plan for the teaching of Junior Certificate Science. This plan should list the aims and objectives of the science department, provide information on the manner in which classes are arranged and detail how access to higher and ordinary levels is managed. The plan should contain a list of topics to be completed by the end of each term for each of the three years of junior cycle, drawn up with reference to the Junior Certificate science syllabus. There should be reference to effective teaching methodologies and to differentiation, in the specific context of the school and its students. In addition, planning should be expanded to cover the use of ICT. The website of the Junior Certificate Science Support Service has much useful information in this regard and is at www.jcsss.ie.

Over time, the curricular content of the plan can be further broken down into a monthly list of topics, listing the accompanying mandatory practical work and also the resources to be deployed to support the teaching of each topic. Further helpful advice is available on the School Development Planning Initiative (SDPI) website at www.sdpi.ie and the website of the Second Level Support Service at www.slss.ie.

Objectives should be defined for the various assessments administered during the school year so that appropriate types of examinations can be administered. The inclusion of assessment criteria, appropriate to each age group across a range of skills, would assist teachers and standardise practice. It is recommended that the approach of *Assessment for learning* (AfL) be examined and adopted. Further information about AfL can be found on the website of the National Council for Curriculum and Assessment at www.ncca.ie.

Planning for students following the LCA science elective should focus on the completion of specific chosen modules, taking account of the approaches to teaching and learning that are fundamental to the programme. There should be greater liaison between the science department and the LCA co-ordinator to ensure the appropriateness of the teaching methodologies, to reinforce the cross-curricular elements of the course, and to ensure that there is an appropriate linking and inclusion of aspects of science in the student assessment tasks. It is recommended that focussed in-service be sought by the science department in this regard.

The behaviour of a small number of students in the school can be challenging and it was stated, during the inspection, that this has implications for the safe use of the laboratories. This was also stated as one of the reasons for not having Science on the curriculum for all students at junior cycle. Planning has taken place at whole-school level in order to address such difficulties and the school has a code of behaviour in place. In the context of Science being made available to all students, as recommended above, it is important that lessons are planned so as to anticipate and minimise such difficulties as may arise and that appropriate action should take place when instances of misbehaviour occur. Students should be kept actively engaged in their learning at all times, thereby minimising opportunities for disruption.

In the classes observed there was evidence of short-term planning. Teachers were familiar with the subject matter of their lessons and there was a theme running through each lesson. Materials necessary for class and for student-centred investigative work had been prepared in advance. This preparation contributed to the quality of learning and is praiseworthy.

TEACHING AND LEARNING

In all of the classes visited, there was a disciplined atmosphere. The rapport between teachers and students was good and this is to be commended. Teachers were enthusiastic, patient and considerate of students, and they demonstrated very good classroom management skills. The approach to their work was professional and business-like and a good learning environment was evident in all of the lessons observed. Good progress was made in all lessons. The level of two-way communication in classrooms was relevant to the task at hand. Most students were attentive, interested and anxious to participate in the learning process.

There was evidence of differentiation in the manner in which lessons were conducted and all students were given an opportunity to achieve according to their abilities. The teachers had a high expectation of their students, were affirming of students' efforts and they moved through the classroom assisting, examining and encouraging their students. Student behaviour was very good at all times.

Teachers were very knowledgeable regarding their subject matter, presentations were clear and concise and lessons proceeded at a suitable pace. Ecology, measurement, acids and bases, and flowers were among the topics covered during the lessons. Continuity from previous lessons was good and new information was well linked to previous learning. During the lessons the teachers used language that was appropriate to the needs of their students while maintaining the precision required by the subject matter. This is excellent practice.

A variety of methodologies was observed. These included student practical work, demonstrations, group work, questioning, discussion, teacher talk and the use of ICT. The methodologies were seamlessly integrated into the lessons. There was appropriate use of handouts and student worksheets. Most lessons were well structured and students were kept busy and actively engaged at all times. Best practice was seen where lesson objectives were written on the board at the beginning of the lesson, previous learning was then reviewed and written homework was checked in order to set the stage for moving on. This was followed by the presentation of new material, using appropriate methodologies, and students were provided with opportunities to put the new learning into practice. It is important to review progress in terms of the lesson objectives at the end of the lesson. There was a good balance between active learning methodologies and teacher-centred presentations in most lessons.

Questioning of students was frequently used to check on levels of knowledge and understanding, which is to be commended. Best practice was seen where students were given time to formulate their answers and were encouraged to put up their hands before a respondent was chosen. Good use of questioning is also a useful tool for drawing out those students who would otherwise participate minimally in class. Questions ranged from the factual, testing recall, to questions of a higher order that were more challenging and encouraged students to think at a deeper level. All teachers are encouraged to give thought to their use of questioning as a strategy in order to enhance the quality of learning opportunities for students.

The practical work that was undertaken was efficiently organized and implemented. In one class visited, an excellent example of how to implement an investigative approach to student practical work was observed. This approach is highly commended. The students worked in groups of two and demonstrated a mature approach to their work. Best practice was observed where the teacher facilitated plenary sessions before and after the experiment, thus ensuring that the students clearly understood the purpose of the practical work and had an opportunity to discuss and rationalize their findings afterwards. This is laudable.

Good practice concerning the minimal use of textbooks was apparent during the lessons. Homework, where given, was appropriate to the lesson content, was varied as to type and was designed to assist the student in learning and understanding the topic in question. However, practice was uneven. Best practice was seen where giving homework was integrated into the lesson and reference to this homework was made at several points during the lesson, thus making the homework a central part of the learning process. All the science teachers should carry out this excellent practice.

ASSESSMENT

Students demonstrated a positive attitude towards Science as evidenced by the level of engagement and interest observed during the lessons visited. Students displayed a good level of knowledge, understanding and skills during interaction with the inspector. Formative assessment of student learning is carried out on an ongoing basis by questioning in class, through correction of homework and through the excellent level of teacher movement and observation of students during class that was noted by the inspector.

Junior Certificate students kept laboratory workbooks up-to-date as evidence of practical work being carried out. This is a very important aspect of new and revised syllabuses in the science area. While the quality of reporting in some of the workbooks was excellent, others were of a lesser quality, and overall there was some variation. The level of attention that teachers give to examining and correcting notebooks is uneven, and it is recommended that all teachers check and annotate laboratory notebooks on a regular basis. This is an excellent means of encouraging students and of pointing the way towards improvement. Additionally, LCA students should complete the appropriate Key Assignments at the end of each module of their course, without which they cannot be given credit for their coursework. They should also be given regular feedback on all exercises they complete and on all practical work they report on.

All classes are assessed by means of a Christmas examination. Formal assessments are held for non-certificate examination classes in the summer. Questions on mandatory practical work are included in these examinations. Certificate examination classes sit mock examinations in the spring. In most cases, the students' scripts are assessed by their teachers. Additional testing is at the discretion of individual teachers. Records of assessment are held in teachers' own diaries and in the school office.

Results of assessments and progress reports are communicated to parents by means of Christmas and summer reports for non-certificate examination classes, and following Christmas and mock examinations for third-year and sixth-year students. Communication with parents is achieved by means of parent-teacher meetings and through parents' nights where relevant. In addition, the student journal, that all students are required to keep, is used to communicate with parents. The school operates an open door policy and parents are encouraged to contact the school if they have any concerns regarding their children's performance.

There was evidence of record keeping by teachers, covering such areas as student attendance, assessment records and homework. This is good practice. The recorded information can be used to build up student profiles and can form the basis of very useful evidence in communicating student progress to parents and in advising both students and parents on choice of subjects at senior level and on what level of examination paper to choose in certificate examinations.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- A professional approach is taken to the teaching of Science in St. Vincent's CBS.
- Science is well supported by the good provision of resources.
- There is good rapport between teachers and students. A positive atmosphere was observed in all the classes visited. Students were motivated and eager to engage in learning processes.
- Lessons observed were planned to ensure continuity and progression and with careful advance preparation of the necessary resource material.

- A range of carefully considered teaching methodologies was used to good effect. This stimulated interest and helped to motivate students. The ICT resource material used in lessons was produced by the teachers and was of a high quality.
- Student practical work was observed with further evidence in the students' laboratory notebooks.
- Health and safety issues were actively managed during practical work.

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

- All in-coming first-year students should be given the opportunity to study Science in a mixed-ability setting.
- Management should put procedures in place to facilitate the release of teachers to the greatest extent possible and to encourage teachers to attend in-service.
- The use of the laboratories should be maximised at all times.
- An emergency electricity isolation system should be installed in each laboratory at an early date.
- A written job description should be prepared and agreed for the post of co-ordinator of Science.
- The science teachers should now turn their attention to the development of a collaborative curricular plan for the teaching of Junior Certificate Science.
- All teachers should check and annotate laboratory notebooks on a regular basis.

Post-evaluation meetings were held with the teachers of Science 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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