Subject Inspection of Science and Biology
REPORT

Saint Thomas’ Community College
Bray, County Wicklow
Roll number: 70770V

Date of inspection: 19 April 2010
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 St Thomas’ Community College. 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. 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 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

St Thomas’ Community College provides the following mainstream second-level courses: the Junior Certificate, the Junior Certificate School Programme (JCSP), a Transition Year (TY) programme, the established Leaving Certificate and the Leaving Certificate Applied (LCA). The LCA is provided in the current 6th year but not in the current 5th year. St Thomas’ is an inclusive school with a very diverse student body. At the time of the evaluation, 143 students were attending the mainstream second-level school, including thirty-two students studying a repeat Leaving Certificate. Around one-sixth of junior cycle students are in receipt of support for special educational needs. Excluding the repeat Leaving Certificate students, just under one-third of students in the mainstream second-level classes are learning English as an additional language (EAL) and are in receipt of lessons in language support in the school. Their profiles and competencies in English are very varied. The school participates in the School Support Programme under DEIS (Delivering Equality of Opportunity in Schools) and receives support from the National Behaviour Support Service. The school’s further education section, Bray Institute of Further Education, offers a very large number of Post-Leaving Certificate (PLC) courses and a number of evening courses. At the time of the evaluation there were 1165 PLC students enrolled in the institute. Mainstream students and PLC students share the same campus and school facilities.

Good provision is made for the subjects on the school’s curriculum. Commendably, Science is a core subject for all students in junior cycle, including those following the JCSP. Science is also provided as a subject for a full year in the school’s optional TY programme. Biology is timetabled for Leaving Certificate and for repeat Leaving Certificate. These groups are timetabled separately. The elective in Science is not currently part of the school’s LCA programme but management is open to considering this for the future.

Biology is effectively compulsory for Leaving Certificate in the school as no other subject is timetabled concurrently with it in fifth or sixth year. Due to the small size of the school’s Leaving Certificate cohort only one subject is provided in three of the four Leaving Certificate subject
option blocks. While the school encourages all students to do seven subjects for the Leaving Certificate, three students in senior cycle have opted not to study Biology and instead go to the school library to study. While it is acknowledged that decisions on the best allocation of resources are made annually and that resources are limited, the provision of other subject options or the LCA programme annually would give wider options for students. In addition, management is urged to ensure the overall tuition time for all students meets the requirements of circular M29/95.

Management maintains class sizes of no more than twenty-four students for the science subjects. As there is only one class group in each year except third year, class groups generally contain a mixture of abilities. The third-year group of nineteen students, however, is split into two class groups for Science with the smaller group containing four students. This is to alleviate classroom management issues as a few students exhibit considerable behavioural difficulties. Given this context, teachers have to manage very carefully students’ experience of practical work in Science and the school is encouraged to continue to ensure that they complete practical coursework.

The appropriate timetable provision is made for the subjects in line with recommendations. Junior Certificate Science is allocated four periods per week, TY Science is allocated two periods and Biology is allocated five periods per week. Each allocation includes one double period in line with best practice. Repeat Leaving Certificate Biology is allocated two double lessons per week.

The school’s two laboratories presented as very stimulating learning environments for the sciences. They share a preparation room and this area is well stocked for practical work in the subjects. Storage is well managed and resources are organised for ease of access during lessons. Very good laboratory safety systems are in place. However, the current system of chemical storage in the preparation room should be updated in line with best practice and additional flame-proof cabinets should be installed in place of a dedicated chemical store. Information on the proper storage of chemicals in school laboratories is available on [http://sciences.slss.ie](http://sciences.slss.ie) under ‘Chemistry and Safety Docs’. The laboratories are fitted with modern information and communication technology (ICT) equipment including data projectors. Audio-visual facilities are available to support the use of educational DVDs in lessons. In addition, the school has a library and this is a valuable resource for students and teachers.

There is excellent access to a laboratory for second-level students as the school has been able to schedule all lessons in Science and Biology in a laboratory. The laboratories are also used for teaching and learning in some of the PLC courses that relate to the sciences. However, priority of access to the laboratories is given to mainstream second-level students.

Management and teachers expressed support for opportunities for continuing professional development (CPD). In-service courses in the revised syllabuses were attended. Management arranges whole-staff CPD and most recently this has included half-day seminars in assessment for learning (AfL), student motivation and supporting EAL students. Teachers reported that the course on AfL had some positive impact on classroom practice. There was mixed evidence, however, during the inspection of the impact of the other two courses on approaches to classroom practice in terms of outcomes for students. This merits some examination by senior management.

**Planning and Preparation**

Subject department planning is facilitated by school management and a subject plan has been developed for the science department in St Thomas’. The plan lays out very brief information on
the science department, text book choice, provision for students in need of learning support and sections on curriculum and teaching methodologies for each year group.

There is significant scope to develop the subject plan to ensure that the focus is on learning as well as on teaching. While the teaching methodologies listed in the plan for each year group include fundamental aspects such as discussion and practical work, the first two teaching methodologies listed for every year group are lecturing and demonstration. These latter methodologies may not suit the learning styles of all students. Nor are they particularly applicable to the revised syllabuses in Science or Biology. The list should be carefully examined so that the methods and approaches chosen have a greater focus on learning and support the achievement of the learning outcomes and objectives of the syllabuses. In particular, student investigation should be included in the list of methodologies for Science.

There is a pressing need to make the science plan more specific to the school context, which includes students with a very broad range of learning styles and significant numbers of EAL students. Much greater attention to planning for these students in the science subjects is required. It is necessary to plan for methodologies that ensure that all class work and student participation is productive. Improving student attainment and outcomes should be the motivation of all course planning and delivery. To this end raising student attainment should be set as a goal in the science plan with an accompanying set of strategic actions to achieve this goal. It is strongly recommended that a clearer and more detailed subject plan be drawn up, giving an appropriate emphasis to supporting varied learning styles, planning for differentiated lesson delivery for EAL students, planning for productive student participation, and setting goals for development. This would enable the plan to be more of a working document that supports overall development and effects good teaching and learning. The plan should be evaluated and reviewed annually.

In addition to the subject plan, teachers keep schemes of work for class groups on their laptop computers and these detail the sequencing and timing of topics. Progress with the scheme in third years is good as the group has been following a course of revision since Easter. The completion of the full set of student practical work is carefully recorded by teachers on well-designed sheets which show completion of each practical by the class group and by individual students.

The current TY plan for Science was recently compiled by a newly appointed teacher for the Easter to June school term. The plan is designed around the theme of health and fitness and promotes a practical experience of Science for students. The plan is cross curricular in nature with Physical Education and Mathematics and this is commended. It is reported that for the school year up to Easter, the TY Science plan was based on modules in Physics and electronics. It is recommended that all science teachers participate annually in planning for the TY Science programme for their school and discuss the principles and content of the programme. It is recommended, therefore, that the plan be redesigned into a yearly TY Science plan to include diverse modules and inter-disciplinary topics while continuing with the cross-curricular aspects. A set of learning objectives that are based on opportunities for self-directed learning, student-centred learning and broad skills development should be included. The revised plan should then be reviewed annually following an evaluation by students and teachers.

ICT is used effectively to prepare teaching and learning resources for lessons, to source visual material and to keep records on student attendance and notes on daily lessons. The range of resources for teaching and learning in the subjects includes ICT presentations, educational games and revision booklets. As well as generating their own presentations, teachers explore and make use of a range of teaching and learning resources available on-line, including those from the support services, in their lesson planning.
TEACHING AND LEARNING

Two double lessons and one single lesson were observed during the evaluation. Lessons covered topics such as ecology, enzymes, photosynthesis, germination, digestion, and included revision. The quality of teaching and learning observed varied considerably but there were instances of very good practice.

The structure and pace of lessons was generally good. One lesson began with the overview of the learning intention of the lesson and its place in the week’s schedule of work. Students had a clear understanding of what was expected of them and could to some extent determine their own progress with the course. This is good practice and should be extended to all lessons.

In all lessons, teachers incorporated some student activity into the structure of the lesson and this ranged from a short practical activity during a single lesson to a commendable range of very many activities during a double revision lesson. Activities included practical work, educational games, discussion, note-taking, group work and the completion of written tasks including worksheets and questions from past examination papers. Students responded very well to active learning in all instances. Some activities in particular supported the students’ inquisitive nature and these were very well enjoyed by students when combined with strong encouragement from the teacher. ICT slides, graphs and colour photographs of plants and animals were effectively used in lessons to provide visual reference and stimulus for discussion.

Practical investigations and experiments are completed by the students in small groups during weekly double lessons. Student practical work was observed during the inspection and students very much enjoyed this part of the learning process. Junior and senior cycle students demonstrated good laboratory skills, including group working skills, the ability to draw and interpret graphs and the ability to write good quality laboratory reports. There is a need in one class group to ensure all the laboratory reports are bound into one complete document.

All students were very well behaved and respectful. The classroom atmosphere and student-teacher dynamic observed during the evaluation varied from lesson to lesson. Very good instances were observed where the teacher’s enthusiasm for the subject and interest in the students’ progress made for hugely enjoyable lessons and good learning opportunities. This is commended.

Teacher questioning was generally used effectively during lessons to engage students and to determine their level of understanding of the topic. In one lesson where students were revising the complete course for the certificate examinations, a very effective approach was taken by the teacher to questioning that enabled students to integrate a wide range of concepts from the course. In some instances teachers were very affirming of students’ efforts and worked hard to ensure lessons were inclusive. In other instances, teacher input tended to dominate during questioning and instruction. Students whose style of learning matched this latter style of teaching engaged very well, while others did not and became disengaged. It is evident that a very broad range of learning styles and levels of motivation for learning exists in each class group, resulting in considerable challenge when planning and delivering classes. In order to ensure that all class work and student participation is productive and suited to the abilities of all students in the group, it is recommended that ongoing attention be paid to planning the structure of lessons and the teaching and learning methodologies to be used.
Student ability, level of engagement and motivation varied considerably. In some lessons, students responded capably when questioned by the teacher and the inspector and they participated constructively in whole-class discussions. The quality of student response in some instances, however, was less than satisfactory. For some students, this may have related to their proficiency in English. For example, a few students had very carefully written out the procedure for practicals in their laboratory notebooks but could not describe to the inspector how to conduct that practical. In the case of other students, lack of response may have related to their motivation and standard of learning. For example, a few students gave very poor answers or struggled to give any answer to the inspector on simple recall questions on basic course topics. It is acknowledged that the profile and characteristics of some students presents challenging circumstances for teachers. This should continue to be met through the provision of and engagement in dialogue with management, on-going CPD in relevant areas and subject department planning. In addition, serious consideration needs to be given during lesson planning to changes in classroom practices to meet the needs of all students during all phases of lessons. Strategies such as student note-making, study skills, approaches that promote student self-esteem, the promotion of elements of autonomous learning, and the setting of consistent expectations for student participation, should be progressively developed. At the same time, differentiated strategies and language skills development for EAL students should improve their academic progress. It is recommended that teachers access and make use of resources for English language support on the EAL section of the National Council for Curriculum and Assessment web site (www.ncca.ie). It is also recommended that management review current EAL support for students to ensure that, in addition to teaching strategies that help EAL students to engage with the curriculum and participate in lessons, subject specific matters, including vocabulary, are also addressed.

It is recommended that future CPD courses for teachers focus on learning styles and supporting autonomous learning. In addition, further development should take place as an outcome of earlier seminars on student motivation and support for EAL students. To best ensure follow-through activities on these professional development courses so that they transfer into more tangible outcomes for students and changes in classroom practice, it is strongly recommended that new teaching and learning approaches and goals for development be laid out in the subject plan and that systematic monitoring and review of both the plan and the implementation of the plan be conducted annually.

**Assessment**

Homework is allocated fairly regularly and is challenging in nature. Past questions from the state examinations are frequently allocated as homework for students in the examination year groups and these are corrected using the official marking schemes. This is good practice and gives students practice in examination technique. Most students complete their homework to a good standard and their copies contain a good amount of written work including class notes and homework. Teachers are encouraged to vary the mode of homework correction at times and use peer correction periodically.

In-class tests are administered frequently and this is commended. Formal school tests are held at Christmas and summer for non-examination groups and mock examinations are held for the examination classes. Reports are sent home to parents on student progress following the formal tests. The repeat Leaving Certificate students are given monthly progress reports and this is commended. In some class groups the students keep all previously completed tests and worksheets in a folder allowing them to keep track of their own progress over time. This is good
practice. Very useful revision booklets are distributed to Leaving Certificate students in the final term.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

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

- Strong whole-school support is provided for the subjects through very good timetabling, laboratory access and resources for teaching and learning.
- Very good and ongoing use is made of ICT to plan lessons, source ideas and visual material and to prepare teaching and learning resources.
- Many lessons incorporated elements of active student learning including practical work and coursework.
- Practical investigations and experiments are completed by the students in small groups during weekly double lessons
- Students are given frequent opportunities for assessment through questioning in class, homework and tests.

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

- The school’s science plan should be more specific to the school context. A clearer and more detailed subject plan should be drawn up with new teaching and learning methodologies. These should give appropriate emphasis to supporting the wide range of learning styles and planning for differentiated lesson delivery for EAL students as well as setting goals for raising student attainment. Systematic monitoring and review of the subject plan should be conducted annually.
- While the profile of some students presents challenging circumstances for teachers, in a few instances, student motivation and student learning ought to be addressed.
- Future professional development courses should focus on learning styles and supporting autonomous learning. Significant further development should take place as an outcome of earlier seminars on student motivation and support for EAL students.
- A collectively designed programme for TY Science that incorporates a series of diverse and interdisciplinary modules should be developed.
- The current system of chemical storage in the preparation room should be updated in line with best practice.

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.

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