An Roinn Oideachais agus Scileanna
Department of Education and Skills

Subject Inspection of Science and Physics
REPORT

CBS Tramore Secondary School,
Tramore, County Waterford
Roll number: 64923L

Date of inspection: 12 and 13 October 2010
REPORT
ON
THE QUALITY OF LEARNING AND TEACHING IN SCIENCE AND PHYSICS

SUBJECT INSPECTION REPORT

This report has been written following a subject inspection in CBS Tramore Secondary School. It presents the findings of an evaluation of the quality of teaching and learning in Science and Physics 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 evaluation, and the response of the board will be found in the appendix to this report.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

CBS Tramore Secondary School offers Science as a core subject at junior cycle. Class groups are of mixed-ability. Continuity of teaching and learning is maintained in that class groups generally retain the same teacher throughout junior cycle.

Science provision in the optional Transition Year (TY) programme includes yearly modules in Physics, Chemistry and Biology, each of which is timetabled for a double period per week. Many applied aspects of these subjects are included and the content and skills development of these modules is broadly in line with Department TY guidelines. Science provision at senior cycle is very good with Physics, Chemistry and Biology being offered to students and uptake is good. Good links have been forged with the local girls’ secondary school, whose students may opt to study Physics at CBS Tramore.

Students are well supported in making an informed choice of science subjects for Leaving Certificate. Subjects are sampled during TY. Students receive ongoing support from their subject teachers, the guidance department and senior management when making choices for senior cycle. A meeting for students and parents regarding subject choice for Leaving Certificate is convened annually. As an additional support, students who study a particular combination of subjects at senior cycle may opt for the Leaving Certificate Vocational Programme (LCVP).

Time allocation to junior Science, TY science subjects and senior science subjects is satisfactory. In third year and in senior cycle lessons are well distributed across the week. First-year and second-year students are timetabled for two double periods each week. While this arrangement is adequate time provision, class groups have contact with the teacher on just two occasions per week. In addition, with current laboratory access difficulties, students cannot gain laboratory access for all double periods. Therefore, school management should consider modifying the timetable for these groups with these factors in mind.

There are six teachers in the science department. They have been well supported in attending in-service courses and in following relevant continuous professional development (CPD). The
teachers are generally well deployed in accordance with their qualifications and subject specialisms. Where this is not the case, it is recommended that the school should maximise the deployment of qualified staff to the teaching of Science.

The school has two science laboratories and has been proactive in maximising laboratory access for class groups. There are particular problems in first year where some groups do not gain laboratory access each week. Consideration should be given to reviewing the school’s timetable in this regard and in particular, to reviewing the simultaneous timetabling of Science for some year groups. To relieve some pressure on laboratory access, the school has recently added some laboratory facilities to a classroom and plans to convert another classroom in a similar way. However, major difficulties remain with access to a science laboratory for many students. The laboratories and the preparation and storage areas are well-equipped and maintained with all equipment stored in an orderly manner. Sets of apparatus for particular investigations are neatly stored in labelled boxes for ready access. In addition, the laboratories are enhanced with many relevant posters and charts and students’ work is also on display.

There is a health and safety policy for Science in place with the most recent review and audit of the science facilities conducted in the current year. Good practices are in place for chemical storage. While good health and safety practices are in evidence in the science laboratories, school bags should be stored safely in advance of laboratory practical work in accordance with laboratory rules and science department policy.

Good information and communication technology (ICT) facilities have been provided in the science laboratories and science classrooms. Computers, data-projectors and an interactive whiteboard have been provided and are well utilised by teachers in the delivery of lessons. The school’s computer network should also be utilised to store and share resources within the science department.

Students are encouraged to partake in various co-curricular, cross-curricular and extra-curricular activities. These include participation in the BT Young Scientists’ Competition, Science Week activities, science quizzes and trips to Waterford Institute of Technology. The teachers of Science share a proven commitment to these important activities.

**PLANNING AND PREPARATION**

Formal subject department meetings are organised once per term and minutes of meetings are maintained. This is good practice. Minutes indicate a collaborative approach to planning including laboratory access and the agreed sequence of topics to be taught so that access to laboratory equipment is maximised. The science team also meets informally on an ongoing basis to plan for the organisation and delivery of science education in the school.

Coordination of Science is effective. Currently the most senior teacher undertakes this task and responsibilities include chairing science meetings, consultation with science teachers and senior management and the mentoring of new staff in the science department. To enable science teachers gain some experience at subject coordination level, it is recommended that consideration be given to the creation of a voluntary rotating position of science co-ordinator. Consideration should also be given to the means by which best practice can be shared, senior science subjects promoted and how the development plan for Science can be facilitated. Part of the duties attached to an assistant principal (AP) post held by the most senior science teacher includes responsibility for the science budget and ordering laboratory materials.
A good science plan outlined current science provision in the school. Many areas are addressed including resources, health and safety, homework, assessment and special needs. It is recommended that a long-term development plan be prioritised for Science at all levels, one that will address future needs of the science subjects in the school. Schemes of work for each year group are detailed in the plan, outlining the topics to be taught in the course of the year. The topics in these schemes should be explicitly linked to teaching strategies, methodologies, resources and assessment. A TY plan for each of the senior science subjects is available. While the content is broadly in line with Department guidelines, the plan should be restructured in line with these guidelines. The balance between material on the Leaving Certificate curriculum and school-generated material should be reviewed. The emphasis should be on development of key skills. The school should use the website of the National Council for Curriculum and Assessment www.ncca.ie/transitionunits where resources on Transition Units may be accessed.

There was very effective individual planning in advance of all lessons observed. Practical and ICT equipment were set up and ready to use. Lesson content was well planned which led to successful learning outcomes. Teachers also maintained detailed records on students’ achievements and homework. Very good and well-organised resource folders were in evidence.

TEACHING AND LEARNING

Teaching was of a high quality in almost all lessons observed. Learning outcomes were shared with students in some lessons and this good practice should be extended. Lessons were well structured and the pace was, for the most part, appropriate. In some instances, the lesson progressed without sufficient input or feedback from students. Therefore, it is recommended that formative assessment strategies be incorporated into lessons. A very good atmosphere was maintained throughout lessons. The positive classroom rapport supported student learning and led to successful learning outcomes. Individual and group support was given as necessary and students generally tackled the assigned tasks with confidence and enthusiasm. Affirmation of students was evident in all lessons and this consolidated the positive atmosphere. There was very good lesson development as was the case in a lesson on titration. The aim of the lesson, which was to prepare students for a practical investigation on this theme, was admirably fulfilled. Differentiation methodologies in the teaching of Science were observed in many lessons.

Methodologies were varied and in the main were very effective. The board was well utilised to highlight key words, concepts, formulas and equations. This good practice should be extended to all lessons. ICT was also used effectively as an aid to student learning and understanding. However, its appropriate use as a methodology needs to be planned for more extensively. For example, opportunities presented themselves to use short animation, relevant photographs or slides to enhance learning in some lessons. Worksheets and handouts were distributed to students in some lessons, with some of this material used as appropriate homework assignments. Some methodologies did not make best use of class time and should be reviewed. For example, the use of some games, while useful for revision, would be better replaced with strategies that make more effective use of valuable lesson time.

Practical investigations formed the core of some lessons. Very good practical techniques were in place and students applied themselves well to the assigned tasks. There was good emphasis on health and safety throughout all practical lessons. Students carried out food tests in small groups under the expert direction of the teacher. Practical techniques were clearly discussed and demonstrated in advance of the investigation. Students’ knowledge and skills were well applied to the assigned task. Short practical demonstrations played an effective part in student understanding of concepts in Physics. The factors affecting the force on a current carrying conductor in a...
magnetic field were demonstrated and integrated expertly with the theory and mathematical concepts. Critical thinking skills were encouraged and the thorough analysis of key concepts ensured student learning and skills’ development were prioritised. Opportunities to improve the clarity of some demonstrations and to introduce students to the study and use of graphs should be maximised and planned for in some lessons.

Participation of students was good in the majority of lessons. In some instances, further measures should be put in place to encourage greater levels of student input. For example, the setting of a research task in advance of lessons, the use of a focused worksheet and better management of time would together ensure that students better understand the task in hand and would lead to higher levels of motivation and participation. A minority of lessons had excessive teacher input with few opportunities for students to contribute their ideas. This practice should be reviewed and modified as part of individual teacher planning.

There was effective use of questioning in most lessons observed as an ongoing learning strategy. Interest was heightened in many instances by the use of probing questions. Students, in the main, exhibited confidence in answering questions on their work and student outcomes in terms of skills and knowledge were very good.

Student achievement in Science and Physics is very good for higher level and ordinary level students. Higher-level uptake for Science and Physics has also been very good over recent years.

**ASSESSMENT**

The school homework policy encourages good practice and the homework procedures outlined in the science plan help ensure the implementation of this policy. Students are encouraged to record homework assignments in their school journal and this practice was evident.

Common formal examinations are agreed and set for all junior cycle class groups. Third and sixth-year students sit trial certificate examinations in February. TY students sit examinations at Christmas and summer and their work is continuously monitored and assessed throughout the year. Regular class testing including mid-term tests helps to ensure that students and teachers receive feedback on progress. It is good practice that credit is given for mandatory practical activities in the school’s Christmas and summer examinations.

Parents receive reports from the school following Christmas, summer and pre-certificate examinations. Communication with parents is maintained through the annual parent-teacher meetings, the student journal and by telephone or appointment, if necessary. The sixth-year parent-teacher meeting follows the October mid-term test and this is deemed to be particularly effective in communicating and providing valuable feedback on levels and grades to sixth-year parents early in the school year.

Students with additional needs are well supported. Planning for students with special needs in a mixed ability setting would be a valuable addition to the overall science plan.

Practical notebooks examined in the course of the evaluation were generally of a good standard with detailed teacher feedback in many cases. This is very good practice. Records of practical work completed are maintained by students individually and are also stored in the laboratory. To further improve the quality of students’ written practical records, it is recommended that notebooks are further monitored to ensure that students take full cognisance of teachers’ annotation.
SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- Science provision is very good. Science is provided as a core subject at junior cycle and at senior cycle Physics, Chemistry and Biology are offered each year. TY science provision is also very good with modules in Physics, Chemistry and Biology.
- Good collaborative planning practices are in place in the science department.
- A good science plan has been documented. Science department planning meetings are convened regularly.
- Students are well supported regarding subject choice at senior cycle.
- A very good atmosphere was maintained throughout lessons. The positive classroom rapport supported student learning and led to very successful learning outcomes. Affirmation of students was evident in all lessons and this consolidated the positive atmosphere.
- Teaching was of a high quality in almost all lessons observed. There was effective individual planning in evidence in advance of lessons.
- Assessment practices are very good with common assessment at junior cycle and common assessment as appropriate in senior cycle.

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

- Consideration should be given to modifying the school timetable to improve laboratory access for students and to allow for better lesson distribution across the week.
- The school should maximise the deployment of qualified staff to the teaching of Science.
- The post of coordinator of Science should be available on a voluntary rotating basis.
- A long-term development plan for Science should be prioritised with the inclusion of more comprehensive schemes of work.
- All TY science modules should be structured and planned in line with Department guidelines on writing the TY programme.
- Strategies should be put in place to ensure that students are more active in their learning. Formative assessment strategies should be part of all lessons.
- ICT should be incorporated more extensively into lessons where appropriate and effective use can be made of this resource.
- Practical notebooks should be further monitored to ensure that students take full cognisance of teachers’ annotation.

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

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Appendix

School response to the report

Submitted by the Board of Management

Area 1: Observations on the content of the inspection report

The Board of Management welcomes the very positive report on the teaching and learning of Science and Physics in the school. It reflects the excellent tradition and provision of the teaching of Science in the school and of the high standards of the Science Dept. The report was very fair and balanced and is a comprehensive overview of the quality of teaching and learning of Science and Physics in the school. In particular the Board welcomes the generous acknowledgement of the provision of Science at Junior and Senior Cycle. The Board of Management wishes to congratulate the Principal and the teaching staff of the Science and Physics Dept.

Area 2: Follow-up actions planned or undertaken since the completion of the inspection activity to implement the findings and recommendations of the inspection

The Board of Management has recently converted and equipped two classrooms into dry Science Labs, at its own expense, in order to improve access for students to laboratories, following refusal of an application for a third Science Lab from the Department of Education & Skills. The Board will continue to seek resources, on behalf of its students, that will increase the availability of laboratory access.

The Board of Management will continue to provide the necessary support and resources that will facilitate the Principal and Staff in the implementation of the findings and recommendations given the resources available to it.

The Board also wishes to acknowledge the courteous and professional manner in which the Inspector carried out the subject inspection and is of the opinion that the inspection process and outcomes will benefit the school in its SDP.