

An Roinn Oideachais agus Scileanna

Department of Education and Skills

**Subject Inspection of Science and Physics
REPORT**

**CBS Mount Sion
Barrack Street, Waterford
Roll number: 64930I**

Date of inspection: 9 and 10 December 2009



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 Mount Sion, Waterford. 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 report, and the response of the board will be found in the appendix of this report.

SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT

CBS Mount Sion offers Science as a core subject. There are currently two science class groups in first year and third year with three class groups in second year. Mixed-ability class formation has been introduced into first year in the current year and will progress across the junior cycle curriculum. Currently there is streaming in second year and third year, with the lower stream in second year following the Junior Certificate School Programme (JCSP). Senior physics classes are mixed ability. Continuity of teaching and learning is maintained, in that class groups generally retain the same teacher throughout junior or senior cycle.

In the current school year, the uptake of Physics, Chemistry and Biology in fifth year is good. Physics was the only senior science subject offered to the current sixth year cohort, due to the small number of students entering fifth year in the previous academic year. It is praiseworthy that there are two sizeable class groups studying Physics in each year of senior cycle.

Students are supported in making an informed choice regarding subjects and programmes with input from the guidance counsellor, the Leaving Certificate Vocational Programme (LCVP) coordinator and with specialist input from the science teachers. It is recommended that students are further supported regarding their suitability for Physics, in an effort to ensure enhanced student attainment.

Time allocation to Science at junior cycle and to the range of science subjects at senior cycle is satisfactory. However, the absence of double science lesson periods for some junior cycle class groups should be addressed and reference should be made to syllabus recommendations regarding structured time allocation to investigative practical work. In addition, while a double period is allocated to Physics in fifth year, the lesson period is interrupted with a break. This is poor timetabling practice and should be addressed.

There are three qualified teachers in the science department in the school. Teachers are well supported in attending in-service courses and in pursuing relevant continuous professional development (CPD) courses.

Three well-equipped laboratories are available in the school. Laboratories are well maintained and well utilised. Equipment is stored in an orderly and safe manner. All laboratories have preparation and storage rooms. In addition, the laboratories are enhanced with many relevant models, posters and charts and students' work is also on display. Information and communication technology (ICT) provision across the science department is good. ICT facilities have been progressively increased in the science laboratories. Teachers are commended for the creation of a stimulating learning environment.

The current school health and safety policy was drawn up in recent months and is in draft form. It is strongly recommended that this policy be finalised and ratified by the board of management. There are good health and safety practices in the science laboratories and appropriate safety equipment was in evidence. However, an audit of chemicals should be conducted following which an upgrade of chemical storage practice and facilities should be implemented in line with best practice and Department guidelines.

Students are encouraged to partake in co-curricular and extra-curricular activities including visits to workshops and events in third level institutions. An increased awareness of competitions, possible activities during Science Week and science-related events would help to further raise the profile of Science in the school.

PLANNING AND PREPARATION

Formal science department planning meetings are convened on one occasion each year. Consideration should be given by school management to facilitating further meetings of the science department. In addition, it would be good practice to record minutes of these meetings. Science teachers also meet informally on an ongoing basis to collaborate on many aspects of science provision. Coordination of Science is effective and duties of the coordinator include: chairing of subject meetings; ordering laboratory materials and looking after the induction needs of new teachers. It is suggested that this position be rotated so that all teachers can gain some experience of the responsibility pertaining to this role.

An agreed common science plan was made available in the course of the evaluation. This plan is wide-ranging and addresses many aspects of science provision including class organisation, resources and health and safety. The plan should be updated to include an expanded section on teaching Science to students with special needs and on cross-curricular planning. In addition the science plan should include an analysis of state examination results so that student trends in uptake and attainment can be monitored within the science department. The plan also outlines schemes of work for each year group. The schemes of work for Science would benefit from the inclusion of active methodologies, resources and formative assessment strategies for each section of the course. The science plan should be further broadened to include longer term action plans for the subject over the coming years to include development of ICT in teaching and learning and the sharing of best practice following in-service. A good physics plan and scheme of work for each year group are in place and could be further developed along the lines outlined above for Science.

There was very effective planning in evidence in advance of lessons observed. Practical and ICT equipment were set up and ready to use. Lesson content was well planned which led to successful learning outcomes as evidenced during the evaluation.

TEACHING AND LEARNING

Lessons were well structured and lesson objectives were shared with students at the outset. Lesson progression was very good and short clear teacher inputs ensured that effective learning was progressed and reinforced. A very good atmosphere, pace and rapport were in evidence in all lessons evaluated. Affirmation of students was evident in all lessons and this consolidated the positive atmosphere. Teachers are commended in this regard. In many cases, student learning was incrementally built upon and continuously reinforced.

Methodologies were varied and frequently involved students in active learning. This led to successful student learning outcomes. The use of a well-designed worksheet in some lessons is recommended as it would have streamlined the learning experience and would have led to enhanced outcomes for students. In one lesson on the theme of acids and bases a combination of very effective methodologies ensured that student learning was well supported. The use of revision cards and teacher feedback sheets was particularly effective. The board was used very well to highlight key words during the student learning process and this good practice should be extended to other lessons. ICT was used effectively, deployed to consolidate learning and as a backdrop to stimulate student discussion on the theme of the lesson. The use of calculators by students in class at appropriate times would have been beneficial to students during some physics lessons.

It is praiseworthy that Science and Physics were frequently made relevant to students' everyday experiences in the course of lessons visited. In one lesson on the theme of waves, ICT was used very effectively as an aid to teach students the concept of polarisation of light and the properties of ultra violet radiation. Everyday applications of these phenomena were presented. The mixing of paints and colours was also very well presented and expertly explained during the lesson.

Practical investigations formed part of some lessons evaluated. In one lesson, students carried out an investigation on finding the pH of a range of substances. Groups were well organised and good scientific principles were encouraged and applied throughout the investigation. Students were very well supported as they worked. The task was well organised and students worked in a collaborative way to reach the desired learning outcomes. Learning was purposeful and students were actively engaged in the learning process.

Student participation was good in some lessons. However, in other lessons, the lesson sometimes progressed with very little student input. It is therefore recommended that lessons be planned and delivered in such a way that the maximum number of students can achieve enhanced ownership of the lesson material and so that student participation can be built into the lesson at appropriate intervals. For example, a research assignment in advance of the lesson or the organisation of group work rather than whole class teaching may help to enhance student participation.

Students presented with a wide variation in abilities and those with additional needs were well supported throughout lessons. However, further differentiated practices should be introduced so that students are better enabled and supported to study lesson material at an appropriate pace. Assessment of students followed by forming the class into higher and ordinary level groups at an appropriate time would help to further support students in reaching their achievable potential.

Trends in students' academic achievement and the uptake of higher-level Science and Physics have varied considerably from year to year. The proportion of students receiving a good grade in these subjects at both higher and ordinary level has also varied over recent years. It is important that each student is supported to reach a level of attainment commensurate with their own potential. Further awareness of trends in student attainment among parents teachers and students will support this process.

ASSESSMENT

Teachers maintain good records of student completion of homework, assessments and attendance. Some class groups utilise progress report cards and this system of ongoing monitoring of student progress is very good practice. All classes sit formal examinations at Christmas and summer with an additional mid-term test for first-year students. Third and sixth year classes sit pre-examinations in February. In addition, there is continuous assessment of students on completion of each section of the course.

A parent-teacher meeting is held annually for each year group. Reports are sent to parents after each formal examination. Homework journals examined during the evaluation were in the main not well utilised and maintained by students. The current use of journals should be reviewed as they can be a very useful aid to support and consolidate learning and are a useful tool for communication with home.

Assigned homework was a feature of many lessons visited. Students with additional needs are well supported with close liaison between science teachers, parents, school management and the learning support and guidance departments. In one lesson visited, classroom assistants provided additional and valuable support to students.

Further monitoring and annotation of homework copies and practical notebooks would help to improve student attainment in Science and Physics. Formative assessment practices should be expanded across all class groups. It is recommended that students are assigned a portion of the marks allocated to school examinations for the satisfactory completion and recording of assigned practical activities. Some class groups had not completed any mandatory practical work at the time of the evaluation. It is recommended that hands-on practical work be initiated as early as possible in the first term for both junior science and senior physics class groups. It is very important that students would be exposed to scientific investigative principles and practices at an early stage in their course.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

The following are the main strengths identified in the evaluation:

- There is good science provision with Science offered as a core subject at junior cycle and Physics, Chemistry and Biology offered at senior cycle.
- The uptake of Physics at senior cycle is very good.
- An agreed common science plan was made available in the course of the evaluation. This plan is wide-ranging and addresses many aspects of science provision.

- Lessons were well structured and lesson objectives were shared with students at the outset.
- Lesson progression was very good and short clear teacher inputs ensured that effective learning was progressed and reinforced.
- Very good atmosphere, pace and rapport were in evidence in all lessons evaluated.
- Affirmation of students was evident in all lessons and this consolidated the positive atmosphere.
- Science and Physics were frequently made relevant to students' everyday experiences.
- Methodologies were varied and frequently involved students in active learning.
- Some class groups utilise progress report cards and this system of ongoing monitoring of student progress is very good practice.

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

- The absence of double science lesson periods for some junior cycle class groups should be addressed as should the splitting of the double physics lesson periods in fifth year.
- The draft health and safety policy should be finalised and ratified by the board of management without delay. An audit of chemicals should be conducted following which an upgrade of chemical storage practice and facilities should be implemented.
- The science and physics plans and schemes of work should be updated and expanded.
- It is recommended that lessons be planned and delivered in such a way that the maximum number of students can achieve enhanced ownership of the lesson material and so that student participation can be built into the lesson at appropriate intervals.
- Further differentiated practices should be progressed so that students are better enabled and supported to study lesson material at an appropriate pace.
- It is recommended that students are assigned a portion of the marks allocated to school examinations for the satisfactory completion and recording of assigned practical activities.
- It is recommended that hands-on practical work be initiated as early as possible in the first term for both junior science and senior physics class groups.

Post-evaluation meetings were held with the teachers of Science and Physics, together with the principal, at the conclusion of the evaluation when the draft findings and recommendations of the evaluation were presented and discussed.

Appendix

School response to the report

Submitted by the Board of Management

Area 1: Observations on the content of the inspection report

We accept the Report as fair and accurate and will respond to suggestions made.

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

In the school year 2010/2011 will address the issues raised in the recommendations made on page 6 of the Report.