Subject Inspection of Science and Biology
REPORT

Coláiste Naomh Cormac
Kilcormac, Co. Offaly
Roll number: 72520I

Date of inspection: 19 January 2011
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 Coláiste Naomh Cormac. 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 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 the subject teachers. The board of management of the school 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

Coláiste Naomh Cormac is a co-educational post-primary school in the County Offaly vocational education scheme. The current enrolment of the school is 237 students. The school provides the Junior Certificate programme for junior cycle students. Senior cycle students can follow the optional Transition Year (TY) programme and are offered a choice of the Leaving Certificate (Established) programme and Leaving Certificate Vocational Programme (LCVP) for the remainder of senior cycle.

Whole-school support for the sciences is strong. Science is a core subject for all junior cycle classes and the full range of science subjects is offered to students at senior cycle. At present, classes are provided in Agricultural Science, Biology and Chemistry. The school’s Transition Year (TY) cohort also follows a programme in the sciences. The work of the school in maintaining such a wide range of science subjects on the curriculum is commendable.

Transition Year and third-year students are well supported by the guidance counsellor, school management and subject teachers in choosing their subjects for fifth year. Parents are also involved in this process. Students are initially surveyed regarding their choice of subjects. Subject option lines, designed to maximise the number of students receiving their favoured subjects, are then offered to students from which they make their final choice. The number of students choosing Biology is very encouraging.

Time allocation to Science and Biology is in line with syllabus recommendations. All junior cycle science classes are mixed ability and are allocated four periods per week, including a double period. Biology classes, which are also mixed ability, are allocated five periods per week, in the form of one single and two double periods in fifth year and one double and three single periods in sixth year. It is noted, however, that the overall provision of tuition time in the school falls short of that required by circular M29/95. The school was made aware of this shortfall in a previous whole-school evaluation report and school management must now implement a full twenty-eight hour school week as a matter of urgency.
There are currently three teachers of science subjects in the school and all are deployed in line with their qualifications. Teachers are allocated to classes in order to maximise continuity and they continue with their assigned class groups throughout junior or senior cycle, a good practice which facilitates long-term planning.

School management has demonstrated strong and active support for teachers’ continuing professional development (CPD). All teachers are members of the Irish Science Teachers Association (ISTA) and the board of management generously funds teachers’ annual subscriptions. In addition, teachers have, as relevant to their subjects, attended various in-service courses in Science, Biology and the physical sciences. In-school CPD has focussed on a range of topics including special education, differentiation and student motivation.

Science-teaching facilities comprise two laboratories, with a shared storage and preparation room, and an adjacent demonstration room. These facilities are well maintained, very well organised and are fit for purpose. All students of the sciences have weekly access for at least a double period and, commendably, a timetable for the management of laboratory time has been prepared by the science teachers. The school’s information and communication technology (ICT) infrastructure has undergone significant development in recent times and laptop computers and data projectors are available in the laboratories. This storage and preparation room is well stocked and well ordered and chemicals storage is safely managed in accordance with the recommended colour-coded system.

A display of relevant charts and posters, including student work, creates an attractive and appropriate learning environment in the laboratories. It is commendable that similar displays, including notices of upcoming events in the sciences, courses and careers information, topical articles from the media and photographs of relevant student activities and outings, are evident in the corridors immediately outside the laboratories, promoting the sciences and contributing to student motivation.

Teachers encourage students to engage in a range of extracurricular and co-curricular activities including involvement in Science Week activities, entry to science competitions such as SciFest and the Young Scientist Exhibition, ecology field trips and visits to relevant out-of-school events and exhibitions. Speakers are also invited to address students on science-related topics. These activities are available to students in all year groups, as relevant to their studies. Topics where specific overlap with other subjects exists have been noted in the science plan and it is praiseworthy that students are asked to take note of these areas and to interact with the relevant teachers.

The school’s health and safety statement is currently under revision and it is intended to review it on an annual basis. Appropriate safety equipment is available in the laboratories including first aid kits, gas isolation switches, fire extinguishers, fire blankets, eye protection and white laboratory coats. The degree to which students’ attention was drawn to safety issues prior to carrying out practical activities in lessons observed is exemplary. It is recommended that, in order to enhance health and safety provision, simplified safety notices be displayed in a prominent manner in the laboratories.
Planning and Preparation

A progressive and hard-working science department is in place, ably led and co-ordinated by one of the science teachers. This role is rotated amongst the science teachers. The duties of the co-ordinator include liaison with management, convening and recording the proceeds of department meetings, stock control and acquisition of resources and planning. There was evidence of a strong sense of collegiality among the teachers of Science and this is laudable.

There is considerable expertise available amongst the science-teaching team, including experience as examiners for the certificate examinations, experience of working with the support services and the National Council for Curriculum and Assessment (NCCA). The experience that is gained from such work is of unquestionable benefit to the school and the students.

Time is allocated by management each year for three formal meetings of the science department. These are usually held at the beginning of the year to manage planning issues, at the end of the first term and prior to the end of the year, when progress is reviewed. Frequent and ongoing informal meetings also occur at which issues of more immediate relevance are managed.

The science department folder includes comprehensive details on the manner of implementing and supporting the sciences in the school and good long-term plans for Junior Certificate Science and for each of the senior cycle science subjects. It is recommended that the plans be enhanced by the inclusion of a more detailed schedule for the delivery of course content, in the case of Science and Biology, similar to the level of detail provided for the other subjects. In addition, it is recommended that course content be linked to available resources, thus helping to determine suitable teaching methodologies. Additional detail linking assessment techniques to desired learning outcomes for students would also serve to enhance the science plan. It is further recommended that the members of the science department carry out a detailed annual analysis of students’ performance in the state examinations. Using the information gleaned from these analyses, action plans, focussing on how the level of student attainment might be further enhanced, should be drawn up and implemented.

The plan for TY science lists an interesting and creative set of modules which the science department can provide. The modules taught vary from year to year, in keeping with events in the wider world of the sciences, the availability of external speakers and the availability of staff. It is recommended that the additional detail available in teachers’ individual lesson plans, on the methodologies appropriate to the ethos of the TY programme and the assessment modes employed, be included in the plan to underpin the alternative nature of the course content.

The quality of individual lesson planning and preparation was very good in some instances and below what might be expected in others. Best practice was seen where the teacher had given due cognisance to the needs and abilities of students in preparing and delivering lessons. Such preparation resulted in good quality lessons. Required resources were prepared in advance, including electronic resources, and the apparatus required for demonstration and student-centred investigative work. In particular, it was evident that thought had been given to the structure of the lessons and a series of activities, interspersed with teacher inputs and accompanied, as appropriate by individualised supports, was planned which ensured that students were kept busy at all times and which challenged them. It is strongly recommended that such planning and preparation become the norm across the department as a whole.
TEACHING AND LEARNING

The quality of teaching observed was very good in a number of instances. These lessons were purposeful and good progress was made in a caring and supportive learning environment where the teacher had high expectations of students and supported them well to achieve these expectations. Classroom management in these instances was very good and students behaved well at all times. They engaged well with the learning process and there was evidence of good learning.

The quality of lesson structure was very good in a number of lessons observed, but was uneven overall. Best practice was seen where lessons opened with a review of previously learned material, followed by an introduction to new material, at which stage the learning objectives were shared with students and homework was outlined. The lesson then progressed using appropriate methodologies and ended with a review of what had been taught. It is recommended that the practice of sharing lesson objectives with students at an early stage in the lesson be adopted across the department and that, similarly, carrying out a review of the lesson, in terms of these objectives, be done towards the end. This practice will create an expectation of students, give direction to them and facilitate them in monitoring progress, and will also provide an opportunity to assess their learning at the close of the lesson.

The use of a variety of teaching methodologies was in evidence, including the use of questioning of students, teacher presentations and explanations, the use of ICT, demonstrations, student writing, practical work and the use of worksheets and handouts. An encouraging level of student-teacher interaction was evident in some lessons, with students’ input being sought and valued by the teacher. While the balance between teacher-centred and student-focussed phases was good in some lessons, it is recommended that teachers, in some instances, make greater use of methodologies that support student-centred learning.

Questioning of students was well used by the teacher in some lessons to establish levels of prior knowledge and to assess the quality of learning as lessons progressed. In these lessons, there was a good distribution of questions amongst students and a good mix of directed and global questioning techniques was used. Questions ranged from simple, lower-order, recall-type questions to more difficult higher-order questions which encouraged students to think at a deeper level. Students responded knowledgably and with confidence in almost all instances.

The level of differentiation was good in some lessons and teachers tailored and adapted their presentations to accommodate individual students’ needs. There was a good level of teacher movement throughout the classroom apparent in the lessons observed and this served to enhance the level of differentiation through monitoring and supporting individual students as necessary. Some very good use of ICT, in an integrated, non-obtrusive but very effective manner, was observed in a number of lessons. Science-specific and topic-specific terminology was well used in most lessons. Textbook use was minimal and consistent with good practice, with reference to appropriate passages in textbooks being used on occasion to reinforce learning.

In all instances observed, practical work was carried out efficiently and in a safe manner. Students displayed a mature and disciplined approach to their work. Whole-class plenary sessions in advance of practical activities ensured that students were properly prepared for their work. Similar sessions were also facilitated after the bench work had been completed providing students with an opportunity to review the procedures they had followed, to examine their results and to draw appropriate conclusions. Guidelines for recording their work in their laboratory notebooks
were also given to students at this stage and the quality of reporting, as noted by the inspector in these classes, was very good.

In one lesson observed, students were not consistently engaged and a number of students were disruptive and frustrated attempts to progress the lesson. These students frequently interrupted lessons with irrelevant comments and questions. In order to minimise opportunities for such disruptive behaviour, it is recommended that the class teacher plan in detail to ensure that lessons are appropriately structured and paced and that students are kept busy and actively engaged at all times. Appropriate teaching methodologies and resources should be chosen to motivate and engage students. It is equally important to ensure that the class teacher is not distracted or diverted from carrying out the lesson plan by unwarranted interruptions, questions and comments. Instances of misbehaviour should be documented and dealt with firmly, in accordance with the school’s code of behaviour. Senior in-school management, under the direction of the board of management, is responsible for ensuring that effective learning opportunities are provided for all students and it is recommended that appropriate supports be put in place, at whole-school level, for both students and teachers as appropriate, to safeguard this provision.

**ASSESSMENT**

An appropriate system of formal assessment and reporting is in use in Coláiste Naomh Cormac. Students in first, second and fifth year are formally assessed at Christmas and prior to the summer break and a progress report is sent to their parents on each occasion. Common examinations are administered on occasion for first and second years and it is recommended that their use be maximised. Certificate examination classes sit pre-mock examinations in November and mock examinations in the spring and progress reports are issued following these assessments. Additional testing is carried out at the discretion of individual teachers. TY students are assessed on the basis of their project work and their general effort and demeanour. All TY students receive a formal report at Christmas and at the end of the school year. Parent-teacher meetings are held annually for each year group and the school maintains an open door policy in relation to additional contact with parents.

The quality of learning, in most lessons, was good, as evident from level and quality of students’ interactions with their teacher, the questions they asked and the quality of their answers when questioned, and their overall level of engagement with the learning process. Students successfully carried out the different tasks assigned to them during the lessons observed and they displayed a good level of knowledge and understanding during interaction with the inspector. In addition, the outcomes for students in the Junior Certificate science and Leaving Certificate biology examinations in recent years have been very encouraging.

Teachers used questioning, examination of homework and general observation of students, to assess students’ progress during lessons. Students were frequently affirmed for their efforts. It is equally important that students’ written work is affirmed and that their copybooks and laboratory notebooks are regularly monitored and feedback provided in order to encourage improvement. The quality of students’ laboratory notebooks was very good in some cases. However, overall, the quality was uneven and the level of monitoring and provision of feedback was not consistent. It is recommended that teachers agree common standards for students’ written work and implement a common approach to monitoring and correcting this work and to providing quality feedback to students.

Practice by teachers in relation to keeping records of work completed, and in recording student attendance and attainment, ranged from very good to poor. It is recommended that all teachers
record sufficient information to enable them to provide appropriate advice to students and their parents regarding subject choices, and to provide accurate and comprehensive reports to parents and others as relevant.

**SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS**

The following are the main strengths identified in the evaluation:

- Whole-school support for the sciences is strong. Science is a core subject for all junior cycle classes and the full range of science subjects is offered to students at senior cycle.
- School management has demonstrated strong and active support for teachers’ CPD. Teachers encourage students to engage in a range of extracurricular and co-curricular activities.
- A display of charts and posters, including student work, creates an attractive and appropriate learning environment in the laboratories and in the corridors immediately outside.
- A progressive and hard-working science department is in place and a science-department folder which includes comprehensive details on the manner of implementing and supporting the sciences in the school has been prepared.
- The quality of individual lesson planning and preparation and the quality of teaching and learning was very good in some instances.
- The quality of lesson structure was very good in a number of lessons observed and the use of a variety of teaching methodologies was in evidence.

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

- School management must implement a full twenty-eight hour school week as a matter of urgency in compliance with the terms of circular M29/95.
- It is recommended that the Science and Biology plans be enhanced by the inclusion of a more detailed schedule for the delivery of course content, that course content be linked to available resources and that additional detail linking assessment techniques to desired learning outcomes be included.
- It is recommended that the additional detail available in teachers’ individual lesson plans, on the methodologies appropriate to the ethos of the TY programme and the assessment modes employed, be included in the plan to underpin the alternative nature of the course content.
- It is recommended that class teachers plan in detail to ensure that lessons are appropriately structured and paced and that students are kept busy and actively engaged at all times. Instances of misbehaviour should be documented and dealt with firmly, in accordance with the school’s code of behaviour.
- It is recommended that the practice of sharing lesson objectives with students be adopted and that, similarly, a review of the lesson, in terms of these objectives, be carried out towards the end.
- It is recommended that teachers, in some instances, make greater use of methodologies that support student-centred learning.
- Senior in-school management, under the direction of the board of management, is responsible for ensuring that effective learning opportunities are provided for all students and it is recommended that appropriate supports be put in place, at whole-school level, for both students and teachers as appropriate, to safeguard this provision.
• It is recommended that teachers agree common standards for students’ written work and implement a common approach to monitoring and correcting this work and to providing quality feedback to students.

Post-evaluation meetings were 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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Appendix

School response to the report

Submitted by the Board of Management
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 requirements of circular 129/95 will be met in the 2011-2012 Academic year.