

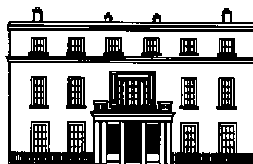
**An Roinn Oideachais agus Scileanna**

**Department of Education and Skills**

**Subject Inspection of Science and Biology  
REPORT**

**Ratoath College  
Jamestown, County Meath  
Roll number: 76088T**

**Date of inspection: 4 February 2010**



**AN ROINN | DEPARTMENT OF  
OIDEACHAIS | EDUCATION  
AGUS SCILEANNA | AND SKILLS**

**REPORT  
ON  
THE QUALITY OF LEARNING AND TEACHING IN SCIENCE AND BIOLOGY**

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**SUBJECT INSPECTION REPORT**

This report has been written following a subject inspection in Ratoath 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 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, deputy 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**

In Ratoath College, the following programmes are available in the senior cycle: Transition Year (TY), Leaving Certificate Applied (LCA), Leaving Certificate Vocational Programme (LCVP) and the Leaving Certificate. TY was introduced to the school in 2008 as an optional programme and twenty-four students are following the programme this year.

Biology, Chemistry and Physics are offered to Leaving Certificate level. The high uptake of Biology in the current fifth year has resulted in the timetabling of a total of three biology classes. It keeping with good practice the subject option blocks are determined by students' choice. The guidance department and the science teachers provide students with advice prior to choosing their subjects. Students and parents are invited to attend an open evening on subject choices and are also issued with a brochure on career paths. In addition, staff members are willing to meet with individual students and their parents to discuss subject choices. The timetabling of the science subjects is appropriate and in line with syllabus guidelines.

There are six teachers of Science in the school. All teachers hold appropriate qualifications and their deployment is in line with their subject expertise. It is commendable that management strives to ensure continuity of teachers through the junior and senior cycles. An induction day is provided for new teachers and they are also assigned to a teacher mentor for their first year in the school. This is praiseworthy. A number of teachers have attended continuing professional development (CPD) courses on a range of science-related activities such as genetics and the use of data loggers.

The school has five laboratories and a demonstration room, all of which are clean, tidy and well maintained. Appropriate health and safety equipment was available in the laboratories and this

included fire extinguishers, fire blankets, eye wash, sand buckets as well as isolation switches for gas and electricity. All laboratories display a code of conduct which is also available in students' mandatory practical books. Students and their parents are required to sign this document.

Cupboards, containing apparatus for use by students during practical work, are clearly labelled. Each laboratory has access to a preparation area and chemical store. Chemicals are organised according to a colour-coded scheme adhering to second level support service (SLSS) advice. However, it is recommended that appropriate custom-made cabinets be obtained for the storage of flammables and toxics as soon as resources permit. Some materials and apparatus were stored in the preparation area while a small number of items were still in boxes. Some members of the science team have begun the good practice of developing box kits for Junior Certificate science practicals. It is recommended that, as a next step in the planning and organisation of the science department, the science team should extend its compilation of kits to all Junior Certificate science experiments. An initial step would be to develop kits for the mandatory experiments to facilitate the operation of seven or eight groups of students within a science class. This could then be extended to include kits for additional experiments and activities. It would be useful if the science team were to catalogue all kits, equipment and materials. Resources are currently provided on a requisition basis and the subject co-ordinator purchases any necessary materials. The cataloguing of all existing resources would enable teachers to see at a glance which materials need to be ordered or replaced. A three-year plan for resources should be incorporated into the science planning documentation. This should identify areas for development and be of assistance in giving timely notice to management regarding the purchase of larger, more expensive items.

All laboratories contained impressive displays of student-generated work as well as commercial posters. These enhanced the learning and teaching environment. There is a science notice board on the corridor which contains displays of students' work such as projects on bulimia, coeliac disease, diabetes and anorexia. Newspaper clippings and information from science websites were also displayed on topical items such as the hydrogen fuel cell car and recent research from University College Dublin on the "speed gene" test for horses. Good photographic displays were also observed.

There is a very good range of information and communications equipment (ICT) in the science department. Two laboratories have an interactive white board and the remaining laboratories have PC and ceiling-mounted projectors. There is also a portable interactive mimeo board and a PC tablet. There are three computer laboratories which are available through a booking system.

## **PLANNING AND PREPARATION**

School management facilitates planning through the provision of time for formal science meetings on a termly basis. Minutes of these meetings are recorded and electronic copies are circulated to the members of the science team as well as to senior management. Many informal meetings also take place.

The school is broadband enabled and every teacher has access to the central share point server system. This facilitates the sharing of resources and promotes communication. Science teachers can log into the science department folders which contains the programmes of work for each year group and a range of resources which include worksheets, PowerPoint presentations and downloaded clips from Youtube and other internet sites. The science team regularly adds items to this folder and it is commendable that the level of collaboration has now progressed to the

development of common end-of-unit tests which are also available on the site. It is noteworthy that a number of sixth-year students also have access to the students' folder on the server. This development is being piloted by management and, so far, it is working well.

The science department is co-ordinated effectively by a subject convenor. This position is filled on a rotational basis and this is good practice as it promotes devolved leadership and promotes a sense of ownership within the subject department. A two-year cycle of co-ordination is suggested. The duties of the co-ordinator are agreed with senior management and include liaison with senior management, ordering of stock and chairing team meetings. It is praiseworthy that a co-ordinator has also been assigned to senior-cycle Biology

Collaborative planning is well advanced. Common lists of topics for each year group have been compiled and the associated programmes of work have been developed. It is good practice that planning documentation contained appropriate learning outcomes which were linked to practical activities and experiments to be completed, in a suitable time frame. Plans also contained clear aims and objectives, a list of possible teaching methodologies and details of liaison with the learning-support department and outside agencies. It is recommended that the programmes of work be extended to link the learning outcomes to the methodologies used and to modes of assessment.

Teachers' individual planning was good and specific lesson plans were provided for some lessons observed. All materials and apparatus had been set out in advance.

## **TEACHING AND LEARNING**

Good quality teaching and learning was evident during the evaluation. In all lessons observed, teachers shared the learning outcomes with students at the outset. Best practice was evident in those lessons where the learning intentions were re-visited during the lesson and students were provided with opportunities to state what they had learned. Classroom management was effective in all lessons seen. A clear code of conduct had been established and students responded positively to it.

There was good continuity with prior learning and lessons were consistent with the planned programme of work. Lessons were well structured and the pace was appropriate to the class group. The seating arrangements were conducive to a safe, orderly and participative learning environment. The classroom atmosphere was positive and conducive to work. A good rapport was seen to exist between students and their teacher and among the students themselves. Teaching was generally enthusiastic and students enjoyed the subject. Teachers regularly provided praise and affirmation for students' contributions as well as for effort.

Learning activities were well managed and there was an appropriate balance between clear instruction and student-centred activity. Teachers paid good attention to the development of literacy in lessons and sustained efforts were made to ensure students' understanding of key terminology.

Teachers were generally aware of the varying abilities of the students in their classes. The differentiation measures observed included questioning at different levels and providing more support to students experiencing difficulties. It is important that subject department planning documentation incorporates details of the differentiation practices that are agreed for use in

supporting the teaching and learning of the subject. In keeping with good practice, the school uses team teaching in order to support students in need of extra assistance as well as to ensure they stay within their mainstream group for science lessons. Team teaching was observed in one lesson and it was very effective in providing support for all students. Both teachers had input to the lesson at various stages and the transition between them was seamless. In some lessons, a special-needs assistant provided valuable assistance for a small number of students.

In some lessons observed, very good efforts were made to link the new material with students' own experiences, such as applying their calculations of work done to their own situation when lifting their schoolbags. Another example was the displacement of water from a cylinder and the growth of micro organisms. This very good practice of linking Science to the students' lives is to be encouraged as it enhances students' understanding and supports learning.

A variety of resources was used to appeal to a range of learning styles. These resources included handouts, worksheets, video clips, quizzes, cloze tests and material downloaded from various internet sites. Commendably, in some classes, the learning environment was enhanced by models of the digestive system which students had created. This provided a good visual aid to the lesson as well as a stimulus for discussion. The range of methodologies used to engage students in their learning included teacher demonstration, pair work and small group work.

During practical classes, the students worked with well-established routines for the setting up and clearing away of apparatus. They were competent in carrying out the experiments and showed an appropriate level of skill. Students worked with due regard for health and safety precautions. Teachers regularly moved around the classroom checking, assisting and encouraging students in their work. Students shared results of experiments readily with classmates when asked by their teacher and they offered well thought out explanations for results when questioned by the inspector.

Questioning was used as a methodology by all teachers and it was used particularly effectively in differentiating questions for differing ability levels. A variety of questions was used from direct recall to those which promoted the higher-order thinking skills of analysis and synthesis. It is commendable that one lesson made good use of a traffic lights system as a strategy for students to highlight their level of understanding of the topic. It is noteworthy that students reported to the inspector that they considered this learning strategy to be very effective. Students were active in their own learning, in their questioning and in their responses to questions. Students' written work indicated good progress and the majority of students were seen to be well organised and purposeful in their work. Good use of ICT was observed in all lessons. Teachers used the white board, PC and data projector appropriately to enhance the lesson content.

## **ASSESSMENT**

The science department makes good use of a range of formative and summative assessment modes. Common tests are held at Christmas and summer. Results of these tests are conveyed to parents in school reports. The science team should consider allocating a percentage of the marks in the common in-house junior cycle examinations for the completion of coursework or for the standard of mandatory notebooks.

A school assessment and homework policy has been developed. Homework is regularly set and corrected. Student notebooks were generally of a good standard. They were neat and well maintained. Mandatory practical books contained an appropriate number of write-ups. There was

evidence of checking and annotation in the homework and class work notebooks observed. The school has had recent in-service on *Assessment for Learning*. Some teachers make good use of assessment for learning practices such as the traffic lights system and the use of formative feedback and comments in student notebooks. These good practices should be adopted by all members of the science team.

It is recommended that the science team should encourage students to check and follow-up on corrections in their notebooks. A common strategy could be agreed at science planning meetings and then included in the science department's assessment policy. The science department is in the process of collating a bank of end-of-topic tests and these are available to all science teachers on the common server.

It is very good practice that the results achieved by students in the certificate examinations are analysed, discussed at subject department level and used to inform planning for the following year. It is notable that since the school opened in 2005, the uptake of Science at higher level in the Junior Certificate has been above the national average. The current sixth-year group will be the first group in the school to sit the Leaving Certificate.

#### **SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS**

The following are the main strengths identified in the evaluation:

- The school has five laboratories and a demonstration room all of which are clean tidy and well maintained.
- The school is broadband enabled and every teacher has access to the central share point server system.
- Collaborative planning is well advanced.
- Good quality teaching and learning was evident during the evaluation.
- Learning activities were well managed and there was an appropriate balance between instruction and the active participation of students.
- Teaching was generally enthusiastic and students displayed enjoyment of the subject.
- A variety of resources was used to appeal to the range of learning styles.
- The science department makes good use of a range of formative and summative assessment modes.
- The results achieved by students in the certificate examinations are analysed, discussed at subject department level and used to inform planning for the following year.

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

- Appropriate, custom-made cabinets be obtained for the storage of flammables and toxics in the preparation rooms as soon as resources permit.
- As a next step in the planning and organisation of the science department, the science team should extend their compilation of kits to all Junior Certificate science experiments.
- The subject department should further develop the programmes of work for Science and Biology to link the learning outcomes to methodologies used and to modes of assessment.

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.

*Published December 2010*

# **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 of Ratoath College are delighted with an excellent report, which outlines the high standard of teaching and learning that is currently taking place within the school.

The Board wishes to thank all members of the Science Subject Team who have worked really hard over the past five years to build the Science Department. The report itself commends the teachers for their collaborative planning and high quality teaching. It praises the variety of resources used in the classroom (hand-outs, video clips, quizzes etc.) all of which enhance the student learning. It identifies the excellent facilities in the 5 laboratories-interactive White boards, ceiling mounted projectors, PCs and Tablet PCs.

Ratoath College prides itself on its progressive and modern approach to teaching and learning. This approach was given due recognition in this report.

### **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 recommendation of the inspector in relation to the custom-made cabinet was implemented immediately.
- Every effort is being made to extend the compilation of kits for Junior Certificate science. This process will take up to 5 years due to financial and time constraints
- The science department welcomes the recommendation in relation to developing programmes of work and they will continue to implement this practice.