

**An Roinn Oideachais agus Scileanna**

**Department of Education and Skills**

**Subject Inspection of Science and Biology  
REPORT**

**Mount Temple Comprehensive School  
Malahide Road, County Dublin  
Roll number: 81002H**

**Date of inspection: 20 October 2009**



**AN ROINN | DEPARTMENT  
OIDEACHAIS | OF 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 Mount Temple Comprehensive School conducted as part of a whole school evaluation. 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 acting principal and deputy principal.

**SUBJECT PROVISION AND WHOLE SCHOOL SUPPORT**

All first-year science classes are of mixed ability. Science is a core subject and almost all students continue with it to Junior Certificate level. A taster programme for optional subjects operates in first year. The composition of first-year classes is rearranged at the end of the year to accommodate student subject choice. However, although science does not form part of the taster programme, the composition of first year science classes is also rearranged at this time. This disrupts the continuity of teachers. Best practice would be to retain the same mixed-ability class composition and teacher for the duration of the junior cycle. It is recommended that management, in planning for the next year's timetable bear this in mind.

In the senior cycle, students can follow the Transition Year (TY) programme which contains optional half-year modules of Biology, Chemistry, Physics and Forensics. Prior to entry to their fifth year, students can choose from the established Leaving Certificate, the Leaving Certificate Vocational Programme (LCVP) or the Leaving Certificate Applied (LCA). Biology, Chemistry and Physics are available to Leaving Certificate level. All students have access to Biology and option blocks containing the other science subjects are generated based on student choices. Overall, this is very good provision.

The allocation of class periods to Science and Biology is in line with the syllabus recommendations. The majority of science classes are held in a laboratory. Some non-science classes are held in laboratories. This should be avoided if at all possible on grounds of health and safety and in the interests of maximising access to the laboratories for science classes. Members of the science team negotiate laboratory access among themselves at the start of the school year. Some science classes are held in classrooms where science teachers endeavour to carry out some of the science 'dry' practicals. This results in boxes of materials and equipment being carried from the laboratory to the classrooms. It is recommended that all non-laboratory science classes be timetabled to one particular classroom in an attempt to provide a base for materials and equipment.

The school has four laboratories. Maintenance issues were evident in almost all of the laboratories but most prevalent in the oldest laboratory in the original school building. Benches and seating are well-worn, a number of cupboard doors are missing and there are a number of exhibits of graffiti. Three of the laboratories are found in the science block and have adjacent preparation rooms and chemical stores. The fourth laboratory, the one in the original school building, has a separate chemical store room as well as a store room for materials and teachers books. This storeroom is also linked to a classroom adjacent to the laboratory. This link classroom is ideally located to be used as a base classroom for those teachers who are not laboratory based.

Chemicals in all chemical stores are found on open shelves and organised into their groups. It is recommended, as a priority, that toxics and flammables be stored in appropriate custom made cupboards. The science department benefits from the services of a laboratory assistant who is employed by the school for ten hours per week. This post is funded by the parents' association and is a welcome addition to the science department. Duties of the laboratory assistant include preparation of materials and resources for experiments and the ordering of stock.

A range of health and safety equipment was observed, including first-aid kits, fire extinguishers, fire blankets, fume cupboards and gas and electricity isolation switches. A code of conduct for the laboratory was also displayed in all laboratories. This should also be circulated to parents and students at the beginning of the school year. In the event of an accident, a report sheet is compiled and sent to the secretary's office. All teachers have a template of this report sheet. A health and safety statement has been developed by the science department based on the school's health and safety statement of 2007. This is now an opportune time to review this statement and conduct a health and safety audit of the science department. Revisions to the health and safety statement should be framed on the Safety, Health and Welfare at Work Act of 2005. All laboratories have isolation switches for gas and electricity. However, the gas taps do not work on a number of laboratory benches and others do not have a full complement of functional sinks. Recent low-level maintenance work has been carried out in some laboratories by teachers themselves. It is acknowledged that the school has an application with the planning and building unit of the Department of Education and Skills for a new school building. Nevertheless, management should explore potential interim solutions to remedy these resource issues as they limit the number of workstations available for practical work.

The science department has one laptop computer and data projector. A number of the laboratories have PCs which are internet enabled. Unfortunately, some are not CD ROM compatible. Access to the computer room is through a booking system. However, it was reported that it is rarely used by science classes.

The science team has benefited from opportunities for continuing professional development (CPD) during national in-service training. In addition, recent whole school in-service has been provided in positive behaviour management, student motivation and mixed-ability teaching. Management is commended for facilitating this CPD.

Science teachers engage in a number of extracurricular and co-curricular activities to promote the sciences in the school. Fifth-year biology students have created a photo story of their Ecology practicals and this is displayed on the Biology Support Service (BSS) website. TY students have been involved in a Real Care Baby Project and have also visited Dublin Zoo. Chemistry students have attended DC laboratories. In 2009, two first-year students achieved success in the BT Young Scientist and Technology Exhibition. A number of first-year students attended the Salter's Festival of Chemistry in Trinity College Dublin while some third-year science students have

attended the Salters Chemistry Camp at the University of Ulster in Coleraine. The teachers and parents involved are commended for their commitment in facilitating these activities.

## **PLANNING AND PREPARATION**

A co-ordinator for the subject has been appointed and the position is rotated annually. Meetings are held and minutes are recorded as appropriate. It is recommended that a copy of these minutes be provided to management. In addition, there is regular informal liaison between members of the science team and this is praiseworthy.

Common long-term plans were available both for Junior Certificate Science and for Leaving Certificate Biology. These were broadly based on the school development planning initiative (SDPI) template. They contained reference to the syllabus aims and objectives as well as information on subject provision in the school, links with the learning support department, and arrangements for subject choice and the timetabling of the subjects.

Curriculum planning for junior cycle science contains a schedule of topics for each year and their associated programmes of work. It is very good that they are based on the learning objectives from the revised Junior Certificate Science Syllabus, set in appropriate time frames and linked to activities and methodologies as well as the means of assessment to be used. At the next review of these plans, it is recommended that they be extended to include scope for students' personal reflection and self-evaluation.

Planning documentation for Biology includes a common sequence of topics for both fifth year and sixth year. It is recommended that these plans be expanded to form programmes of work in appropriate time frames. The programmes should include learning objectives linked to appropriate methodologies and methods of assessment.

Planning documentation contains reference to the links with the learning support department which includes liaison regarding individual students. The science team has been provided with a list of students with specific learning needs and corresponding strategies and methodologies which can be employed by teachers in class. Procedures are in place where class teachers can refer a student to the learning support department if they are experiencing difficulties. The science teachers should also provide the learning support department with a list of science-specific key words and scientific terms to support their science students who are experiencing difficulties.

In the lessons observed there was evidence of good short-term planning. Appropriate materials and resources necessary for each lesson had been prepared in advance. This level of preparation contributed significantly to the high quality of teaching and learning that was evident and this is noteworthy

## **TEACHING AND LEARNING**

A record of attendance was taken at the start of all classes visited. The lessons observed had clear aims and these were communicated to students at the outset. A number of resources were used to enhance teaching and learning and these included the use of worksheets, overhead projector

(OHP) transparencies, laboratory apparatus, textbooks and the data projector. Very effective practice was observed in one lesson where a range of equipment used to measure length had been set out and students were asked to measure the length of a number of structures in the laboratory. Students worked in pre-assigned groups to use equipment such as trundle wheels, opisometers, metre sticks and callipers. There was good emphasis placed on the use of appropriate units of measurement and this was also linked to students' mathematics lessons.

Classroom management was effective and students responded positively to clear class rules and teacher instructions in all classrooms visited. Teachers regularly checked that learning was taking place through questioning and the assignment of short tasks. Students displayed a mature attitude to their learning and the majority showed good understanding of the concepts and facts taught. Instruction in all lessons was clear and particular attention was paid to encouraging the use of subject-specific language.

A range of methodologies was incorporated into the lessons and teachers tried to maintain a good balance between teacher instruction and student activity. One example of this good practice was observed in a lesson on sound where, after a short teacher input, students were asked to demonstrate echoes to the class using long cardboard tubes. The inclusion of peer tutoring and paired work is recommended in some classrooms in order to further enhance the good teaching and learning observed.

Teachers made good use of questioning in many lessons. Questioning strategies were varied and appropriate to the lesson content. They included directed and open-ended questions. Some higher-order questioning was also used to promote critical and analytical skills and further use of this methodology is recommended. Teachers encouraged students to listen to each other and chorus answering was discouraged immediately. Questioning was also effectively used in summarising and recapitulation at the end of the lessons. Teachers expressed interest in expanding the range of information and communications technology (ICT) used in course delivery as a method of promoting student research and independent learning. It is recommended that the existing ICT facilities be utilised and plans be put in place for the enhancement of the ICT facilities available to the science department.

The atmosphere in all lessons visited was positive and conducive to work. This helped to promote a secure and supportive learning environment. In one genetics lesson, students were regularly asked to check their own answers against those of the teacher on the whiteboard and interactions showed that students willingly took control of their own learning. Students' participation in all classroom activities was closely monitored by the teacher. Attention was given to the learning needs of individual students as well as to communication with class groups. The science department have received a resource pack on differentiation in Science from the Special Education Support Service (SESS). Some differentiated methodologies were evident. In one lesson, differentiated worksheets were employed as a means of making the lesson material more accessible to all students. This practice can have very beneficial effect on the quality of learning for all students. It is recommended that this aspect of course delivery be further developed.

In the practical lessons observed, appropriate health and safety regulations were adhered to and students displayed good routines for setting up and clearing away apparatus. The development of such routines is good preparation for practical activities and it can help to ensure good management of time in lessons. In the majority of lessons, the students worked with a pre-assigned laboratory partner. It was evident that students had developed appropriate skills in practical work and teachers encouraged an investigative approach where practicable. Good practice was observed where the teacher encouraged discussion of results, the suitability of the

methodology and the process of using a control to compare results at the end of the lesson. This provided a thorough summary to consolidate learning.

## **ASSESSMENT**

Formal common student assessments are carried out at Christmas and before the summer holidays. The results of these are conveyed to parents through school reports. Teachers keep records of attendance, homework completed and test results. Homework is regularly set and corrected by teachers. Feedback and corrections are provided to students. The tone of feedback is positive and encouraging. Good standards of genuine effort as well as high achievement are affirmed.

The Junior Certificate science mandatory practical books observed were well maintained and contained an appropriate number of write-ups. Senior cycle biology students recorded practical activities in hardback copybooks and these were of an appropriate standard. It is good practice that students are encouraged to write up the procedure they have just followed in their own words at the end of a practical activity. Teachers should encourage students to follow-up on any corrections made during the checking and annotation of notebooks. Students have separate notebooks for homework exercises and class work notes.

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

The following are the main strengths identified in the evaluation:

- The weekly allocation of class periods to Science and Biology is in line with the syllabus recommendations.
- The science team facilitates a number of extracurricular and co-curricular activities to promote the sciences in the school.
- A co-ordinator for the subject has been appointed and the position is rotated annually.
- During the evaluation, classroom management was found to be effective and students responded positively to clear class rules and teacher instructions.
- Instruction in all lessons was clear and particular attention was paid to encouraging the use of subject-specific language.
- The atmosphere in all classrooms visited was positive and conducive to work.
- In the practical lessons observed, appropriate health and safety regulations were adhered to and students displayed good routines for setting up and clearing away apparatus.

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

- It is recommended, as a priority, that toxics and flammables be stored in appropriate custom made cupboards.
- Revisions to the school's health and safety statement should be framed on the Safety, Health and Welfare at Work Act of 2005.

- Management should explore potential interim solutions to remedying resource and maintenance issues in the laboratories as they limit the number of workstations available for practical work.
- It is recommended that plans for Biology be expanded to form programmes of work to be delivered within appropriate time frames.
- It is recommended that differentiation of teaching methodologies to take account of variations in students' abilities should be further developed as an aspect of course delivery.
- Teachers should encourage students to follow-up on any corrections made during the checking and annotation of notebooks.

Post-evaluation meetings were held with the teachers of Science and Biology and with the acting principal and deputy principal at the conclusion of the evaluation when the draft findings and recommendations of the evaluation were presented and discussed.