

**An Roinn Oideachais agus Scileanna**  
**Department of Education and Skills**

**Subject Inspection of Physics**  
**REPORT**

**The King's Hospital,**  
**Palmerstown, Dublin 20**  
**Roll number: 60272W**

**Date of inspection: 17 December 2010**



**A N R O I N N | D E P A R T M E N T O F**  
**O I D E A C H A I S | E D U C A T I O N**  
**A G U S S C I L E A N N A | A N D S K I L L S**

**REPORT**  
**ON**  
**THE QUALITY OF LEARNING AND TEACHING IN PHYSICS**

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**SUBJECT INSPECTION REPORT**

This report has been written following a subject inspection in The King's Hospital, Palmerstown, Dublin. It presents the findings of an evaluation of the quality of teaching and learning in Physics and makes recommendations for the further development of the teaching of this subject in the school. The evaluation was conducted over one day 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**

Science is a core subject for all junior cycle students at The King's Hospital. At senior cycle, there is very good science provision with Physics, Chemistry, Biology and Agricultural Science offered to students as part of the Leaving Certificate programme. The uptake of Physics has been consistently very good over recent years. Few girls have chosen the subject in the current year, however, and senior management, together with the physics teachers, are urged to explore the possibilities of improving the gender balance in the uptake of Physics. Time allocation to Science at junior cycle and to Physics at senior cycle is in accordance with syllabus recommendations. Physics lessons are well distributed across the week. Class groups are of mixed ability for junior Science and senior Physics.

Students are well supported in making an appropriate choice of science subjects at senior cycle. During the school year a day is dedicated to supporting students in their choice of subjects for Leaving Certificate. The science specialists, guidance counselling service and senior management all play an active part in ensuring that students make informed choices. The subject bands enable the students to study up to three senior cycle science subjects. This is very good practice. Senior science subjects may be sampled in TY with applied modules in Physics, Chemistry and Biology being offered to TY students. The content of these modules is appropriate to the TY programme.

There are six science laboratories in the school and there is good access to them for practical lessons. The laboratories are very well maintained. Equipment is stored in an orderly manner with themed resource boxes well utilised for the conduct of practical activities. The budget for the science department is provided on a needs basis. Information and communications technology (ICT) provision in the laboratories is very good and consists of computers, data-projectors, interactive whiteboard and internet access.

School management supports teachers' engagement with continuous professional development (CPD). The science teachers are facilitated to attend in-service courses. School management also supports teacher membership of the Institute of Physics (IOP) or the Irish Science Teachers' Association (ISTA). Senior management has provided in-school training in subject department

planning. The induction programme and level of support provided to new teachers and student teachers are very good.

The school has a health and safety statement for Science which is signed annually by each science teacher. This is good practice. Health and safety equipment was present in the laboratories at the time of the evaluation. The very good classroom practice in this regard is commended. Laboratory safety rules were clearly on display. The school also exhibits good practice in the storage of chemicals.

Students have participated in many extra-curricular and out-of-school activities including the BT Young Scientist and Technology Exhibition, Science Week activities and SciFest. The profile of Physics is raised through cross-curricular activities, highlighting careers in Physics and through employing outside speakers to share their experiences with students. This is very good practice.

### **PLANNING AND PREPARATION**

Science is co-ordinated effectively in the school. The position of co-ordinator is currently assigned by school management to an individual teacher, whose role includes the organisation of subject meetings, updating the science plan and resource folder, submission of minutes to management and arranging for the ordering of materials in collaboration with the head of academic studies. It is important that there is capacity building within the science department so that more science teachers can gain experience of leading co-ordination and planning at subject department level.

Commendably science department meetings take place at least once per month and minutes of science department meetings show that discussions take place on many issues including planning, equipment, practical work and extra curricular activities.

A collaborative subject plan is in place for Science. A very good plan for Physics has also been drawn up to comprehensively cover provision for the subject. The plan is well thought out and addresses all key areas needed for the planning and development of Physics. Areas covered include safety, assessment, learning support, teacher professional development, the use of technical language in Science, promoting Physics and the utilisation of resources including ICT. This approach to planning is highly commended. It is recommended that future planning priorities include the focused sharing of ICT resources and a review of TY planning to ensure that the TY plan for the science subjects is agreed, documented and draws upon the expertise of the entire science department while recognising and maintaining the individual skills and interests of teachers in the delivery of the programme. It is further recommended that the each physics topic in the scheme of work be linked to assessment strategies, methodologies and resources. It is also important that review and evaluation become an integral part of this plan.

The content and delivery of lessons were very well planned in lessons observed. Practical equipment, ICT, teaching resources and handouts were ready in advance of lessons.

Students with additional learning needs are well supported. Strategies for inclusion are documented in the physics department plan. For example specialist teachers work with some students to support and consolidate whole class teaching. Differentiated teaching practices and higher order questions are well utilised to support student learning.

## TEACHING AND LEARNING

The quality of teaching and of the student learning experience was very good. A sense of enthusiasm and student motivation permeated all lessons and led to very successful learning outcomes. Perceived difficult physics concepts were taught with clarity and purpose so that student understanding was enhanced. Physics was linked to students' everyday experiences and the key references to the historical aspects of Physics all ensured better understanding, relevance and interest. There was a very good atmosphere of learning created in all lessons with positive student-teacher and peer rapport. The affirmation of students contributed to very successful learning outcomes. The emphasis on the wonder of physics in some lessons worked very well as an effective teaching strategy.

As a result of the very good planning, lessons observed were very well structured and paced. Learning objectives should be shared at the outset of lessons to ensure student focus on the goals to be achieved. Questioning, when used as a teaching strategy, was probing and challenging with good use being made of higher order questions. Students were confident at answering questions on their work and many demonstrated good problem-solving skills.

The varied methodologies observed enhanced student learning. ICT was particularly well utilised in some lessons with the use of short video clips, applets and animations to support the teaching of particular concepts. In other lessons, ICT could have been utilised for analysis and graphical representation of data collected by students. During a lesson on the theme of the electron, various methodologies contributed to effective student learning. A short video stimulated initial interest in the theme of the lesson.

Demonstrations were effectively employed to reinforce abstract concepts. Short, concise and well planned demonstrations were utilised to good effect in raising students' interest and motivation and in clearly explaining important concepts in Physics. For example, a cathode ray tube was well utilised to demonstrate the wave nature of electrons and the electroscope was used very effectively to demonstrate the photoelectric effect. Students were encouraged to grasp the significance of these demonstrations and actively participated in lively discussion regarding these phenomena. Focused questioning of students ensured that the pace of the lesson was appropriate. To further consolidate learning, it is recommended that a focused worksheet on the theme of the lesson be given to students as an assignment.

Practical work formed the core part of some lessons. Students' observation and measurement skills were developed throughout. During one lesson visited, students were assigned the task of investigating the relationship between the acceleration of a trolley and the force applied to it as it travelled on a runway. Critical analysis skills were developed through the investigative process and there was very good emphasis on precautions, experimental error and units. Students worked in large groups while carrying out the experiment and then divided into smaller groups while analysing the ticker tape and calculating the acceleration of the trolley. The number of students in the original groups was too large for each student to gain valuable 'hands-on' experience of using the apparatus. It is therefore, recommended that a rota system be put in place for those mandatory experiments for which there are not class sets of apparatus.

## **ASSESSMENT**

Homework and assessment procedures are outlined in the relevant school policies. Assessment strategies in the classroom were very good. Relevant homework was checked and assigned in all lessons. These assignments consolidated the classroom learning experience. Peer assessment is utilised in the checking of practical records. This is good practice. Records of students' practical work were maintained to a good overall standard. Further monitoring is necessary to ensure that suggestions for improvement are taken on board by individual students. This formative assessment strategy should further improve student outcomes. It is praiseworthy that practical assessment forms a portion of the marking allocation for school examinations.

There is ongoing continuous assessment. The school's monthly marking system for effort and behaviour has proven to be successful in supporting each student to work to reach their potential and ability. Third-year and sixth-year classes sit 'mock' examinations in February. Formal examinations take place at Christmas and summer for other class groups. TY students are continually assessed through their ongoing project and practical work.

Parents are kept informed about students' progress in many ways such as school reports, the annual parent-teacher meeting and the student journal. Academic reports are sent to parents on two occasions during the year following formal examination. Additional progress reports are also sent to the homes of students and good ongoing communication links are maintained with parents. Certificate examination results are analysed by senior management and subject teachers and are well utilised in planning for the support of students.

The uptake of higher-level Physics by students is very good, with a very large proportion of students achieving a good higher level grade in recent years.

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

The following are the main strengths identified in the evaluation:

- Science is a core subject at junior cycle and there is good provision of science subjects at senior cycle with Physics, Chemistry, Biology and Agricultural Science offered to students.
- The uptake of Physics at senior cycle is very good.
- A very good and comprehensive subject plan is in place for Physics.
- There was a very good atmosphere of learning in all lessons to which the positive student-teacher and peer rapport contributed.
- Students' affirmation is frequently articulated and the students in turn are motivated to learn.
- Lessons observed were very well planned and structured.
- Methodologies observed in the course of the evaluation were commendably varied. The use of ICT, the board and demonstrations were very effectively employed to reinforce abstract concepts.
- Assessment practices are very good.
- The uptake of higher-level Physics by students is very good. A very large proportion of students achieve a good higher-level grade.

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

- The schemes of work for Physics should be developed to link each topic to its appropriate assessment strategies, methodologies and resources utilised.
- The TY plan for the science subjects should be agreed and documented and should be informed by the expertise of the entire science department while recognising and maintaining the individual skills and interests of teachers in the delivery of the programme.
- Student practical notebooks should be further monitored and annotated to help improve the quality and consistency of this work.

A post-evaluation meeting was held with the teachers of Physics, together 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 1: Observations on the content of the inspection report**

The King's Hospital is delighted to adopt this extremely positive subject Inspection of Physics.

The subject inspection report is representative of the highly motivated physics teachers and of the high level of collaboration and professional support provided by the Science Department.

It is pleasing that the pioneering use of ICT as a communication tool for teachers within the school and colleagues from other schools is positively influencing classroom practice.

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

- Schemes of work are being reviewed to provide a more detailed link to assessment strategies, methodologies and resources utilised.
- The TY plan has been refined and recommendations implemented.
- Practical notebooks are further monitored.