**12.2 Cross-curricular activities**

The physics department tries whenever possible to engage in cross-curricular activities with other departments in the school and in the past has been involved in team-teaching with teachers from the following departments:

* **Geography**

There are many areas of overlap between Physics and Geography, particularly in relation to the Physical Geography section of the Geography syllabus (which is in essence Physics wrapped up in a different cloak). Quite often students who liked Physics at Junior Cert level are quite surprised to find that this section which they are now considering following as a career is in fact largely Physics.

* Recently, as a result of a fortuitous connection make via YouTube, we spoke with a geophysicist named George Reynolds. It turned out that not only is George world-renowned, he is also a former winner of the Young Scientist and his own students went to King’s Hospital themselves!

George has already called out to us and promised to visit us regularly and keep us updated in relation to his work, much of which is abroad and involves testing areas for the presence of uranium and plutonium for mining purposes.

* **Theatre**

We are fortunate to have on the staff a teacher who is an expert on lighting in the theatre (Jerome Devitt) and who has regularly spoken to our Science and Physics classes on the physics of industrial lighting.

This is so well-received that one occasion we recorded the class and it is now available on YouTube; it can be found using the search term “light and the stage theatre” (and at the last count had over 8,000 views).

* **Music**

Music features very strongly in the school and many of the students are themselves accomplished musicians and are only too happy to be given the opportunity to play in front of their colleagues. Their playing can be recorded and analysed using the free program *audacity* (downloaded from soundforge.com). One of the nicest (and easiest demonstrations is to use this to look at the concept of harmonics and show why two instruments which are playing the same note sound so different).

Every morning students begin the day with chapel service. The single greatest feature of the chapel is the large organ which stands behind the altar. The school organist (Mr Graham Walsh) has always been delighted to be afforded the opportunity to explain to our physics students the workings of the organ itself, with emphasis on the physics of sound produced from open and closed pipes.

* **Religion**

Each year the Leaving Cert Physics (and/or Applied Maths) and Religion classes come together to tease out issues of interest to both. Sometimes this takes the form of a debate and in the past emotions have run high with students passionately defending their own points of view. Usually the single greatest lesson to be learned is that Religion and Science are not incompatible, despite many students initially believing otherwise.

* **History**

One of last year’s leaving cert students studied both Physics and History. His grandfather also happens to be a former aeronautical engineer who worked on the Apollo Projects including putting the first man on the moon in 1969. He spoke to both the History and Physics classes and it was a talk that everyone there will remember for a long time.

We also find that quite often a Leaving Cert History student will take on a Physics topic as their special topic for their History exam. Usually this will involve a military development e.g. recently one student did her special topic on *Los Alamos and the effect of the atomic bomb on World War II*.

* **Poetry**

Few disciplines manage to convey the sense of wonder and mystery which permeates through science.

Those that do don’t generally overlap much with the traditional science disciplines. Here in the Physics Department we believe strongly that passion and wonder should be integral parts of any physics education.

Where better to look for assistance than in the world of poetry? From John Updike’s *Cosmic Gall* (a story about neutrinos which is included in the students’ notes in their Particle Physics section) or Monty Python’s *The Galaxy Song* (included in the Transition Year module *Ten Great Ideas* where students have to learn some of the missing lines) there is no shortage of material. Students respond very well to this variation in their normal studies and we hope to extend it to as many different topics as possible.

**Science and poetry books**

*Dark Matter: Poems of Space* edited by Jocelyn Bell Burnell and Maurice Reardon

*A Quark for Mister Mark: 101 Poems about* Science (Faber poetry) edited by Maurice Reardon

* **Art**

Past pupil Nick Di Mascio (who studied both Physics and Applied Maths in King’s Hospital last year) was a winner at the Bord Gáis Energy Capture the Power Schools' Photography Competition last year with his photograph captioned *Capture the Power*:

<http://www.bordgaisenergy.ie/sponsorship/arts/capture-the-power/winners-2010/>

Similar to poetry, Art is used to impress on students not only the wonder and mystery of science, but also the idea that there is more than one way to investigate the world.

**An Experiment on a Bird in the Air Pump**

1768, [Joseph Wright 'of Derby'](http://www.nationalgallery.org.uk/artists/joseph-wright-of-derby)

This has enormous explanatory powers and provides wonderful scope for discussion on for example the ethics and the applications of science.

It can also serve to highlight what may otherwise be ‘just another science lesson’.

A travelling scientist is shown demonstrating the formation of a vacuum by withdrawing air from a flask containing a white cockatoo, though common birds like sparrows would normally have been used. Air pumps were developed in the 17th century and were relatively familiar by Wright's day. The artist's subject is not scientific invention, but a human drama in a night-time setting.

The bird will die if the demonstrator continues to deprive it of oxygen, and Wright leaves us in doubt as to whether or not the cockatoo will be reprieved. The painting reveals a wide range of individual reactions, from the frightened children, through the reflective philosopher, the excited interest of the youth on the left, to the indifferent young lovers concerned only with each other.

The figures are dramatically lit by a single candle, while in the window the moon appears. On the table in front of the candle is a glass containing a skull.

Online picture

<http://www.nationalgallery.org.uk/paintings/joseph-wright-of-derby-an-experiment-on-a-bird-in-the-air-pump>

A copy of the painting was kindly donated to the Physics Department by History and English teacher Ray McIlreavy and now hangs just outside the entrance to the Physics lab in A7.

It hangs in a prominent position in A7 and is referenced every time we introduce the topic of ‘Air’ and ‘Vacuums’ to students of all ages, from first year to sixth year

There is also a work-sheet which accompanies the lesson.

There are many online resources available and we hope to add to them here as we incorporate them into out lessons.

**Chaos and Fractals - The Mandelbrot Set**

A 30 minute video entitled The Colours of Infinity (available from YouTube) is shown to the students as part of their Ten Great Ideas module and is used to emphasis the interplay between Science, Maths and Art.