



Case Study -Forensic Science for Transition Year Students at Waterford IT

Context of the school

This initiative was developed by CALMAST at Waterford IT, a third level college in south east Ireland. It is offered to Transition Year Students, who are typically 15-16 years old. Transition year is a year between junior and senior cycle in secondary school.

In Ireland, there is concern about the low numbers of students taking science at senior cycle secondary students and at third level. As a result, programmes specifically for transition year students are designed to show them that science is interesting, and relevant to their lives. The aim of these programmes is to show students interesting aspects of science, before they choose their subjects for senior cycle, in an attempt to get more students to study science at senior cycle.

The TV programme CSI has made Forensic Science attractive to young people. But many of them do not associate the science they learn in school to the science they see in the TV programme. The aim is to show students that the science they learn in school has practical applications which are exciting.



Identification	
<i>Establishment:</i>	Waterford Institute of Technology
<i>Teacher's name:</i>	Margery Godinho (mgodinho@wit.ie)
<i>Subject:</i>	Forensic Science
Context	
<i>Class: level</i>	5 th year secondary school (typically 16 years old)
<i>Number of pupils</i>	30
<i>Date/Hour</i>	May 2006
<i>Duration of the observation (when applicable)</i>	2 hours
Learning/teaching objective	
<i>Summary description</i>	To encourage students to become interested in science through forensic science.
Description of the sequence	
<i>Intentions of the teacher</i>	To present activities that are related to the School Science Syllabus but presented in a way that is more interesting for the students. The students can see a reason for carrying out the science activities. It brings science to life.
<i>Description of the activity stage</i>	Crime scene is laid out prior to the students arrival. Various pieces of evidence have been found. The students must use the science they know to solve the crime. Different stations are set up from identifying powders, to chromatography, to blood analysis and finger print analysis. The students must work through these activities and use science to solve the crime.
<i>Pupils' output</i>	Identification of the guilty party and explanation of their reasoning.



Concrete case study

Introduction - Set – up

The programme runs a number of times through the school year. Teachers contact the college to bring their students in. Single sex and mixed schools have participated, both rural and urban.

Before the students arrive, a crime scene is set up. The outline of a body is drawn with chalk on the ground. Police cones surround the body and police tape cordons off the area. Red liquid to resemble blood is splattered around the body, and a “blood” covered knife is placed near the body. A white powder is sprinkled near the body. A hand written note is placed near the body also. Money and a metal bar are left near the body. A toy rabbit is also placed near the body.

A variety of reports are prepared in advance to give to the students:

- Police report
- Autopsy report
- Witness statements

A number of workstations are set up to test:

- Blood type
- Ink
- Powder analysis
- Finger print analysis

Real progression of the session(s)

Approximately 30 students participate at a time. The co-ordinator sets the scene. A robbery has taken place in a bakery – “Pat’s Pies”. Pat has been found dead. He was found by a neighbour. A number of people have given statements – Pat’s wife, the postman, an animal rights activist living locally among others. All of these have been asked to hand in all their pens. They also have had their fingerprints taken, and they all have volunteered to give their blood group.

All of the reports – autopsy, police report, witness statements are given to the students, who are then asked to solve the crime.



The students are then broken into groups of four, to work together. Initially each group examines the crime scene and makes notes. They go to one of the work stations which has been pre assigned to that group.

All of the work stations are manned by scientists – either post graduate students or science lecturers. Each workstation has a different theme. Each of the procedures is explained to the students, who are also given detailed written instructions and worksheets to fill in their results. All equipment is laid out for the students. All of the tests are part of the senior cycle science syllabus in either Chemistry or Physics, and this is reinforced throughout the event e.g ink analysis is carried out by paper chromatography, blood group analysis etc.

The students have half an hour to complete each of the tests. At a defined time the co-ordinator will announce that it is time to move to the next pre assigned work station.

Station 1:

A white powder was taken from the scene of the crime. The students are also given three other white powders and have been told that the white powder found at the scene of the crime corresponds to one of the powders.

The white powders given to the students are:

- Flour
- Baking soda
- Sugar

A worksheet is given to each of the students, into which they must write a description of each of the powders in terms of the “feel” and look of the powder. They must test solubility in water, the effect of starch solution on the powders and how the powders react with dil acid.

They do the same with the white powder at the scene of the crime, and the evidence is shown to be baking soda.



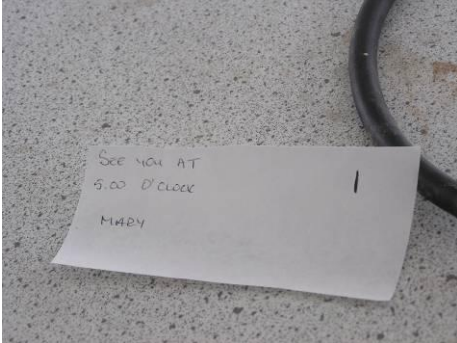
Station 2:

Chromatography or Ink Analysis

Each of the suspects has been asked to hand in their pens. These are all well labelled. The students draw a line about 1 inch from the bottom using each of the pens in turn with a different pen. They then place these in a beaker of 50/50 water/ethanol so that the solvent does not cover the line.

The solvent moves up the filter paper separating out the components of the ink to show the constituent colours.

The ransom note taken from the scene of the crime is also subjected to the same chromatography. The results from the ransom note are then compared with each of the pens in turn to identify a match.



Station 3:

Finger Print analysis:

The students are given a brief presentation on fingerprints. They are then given out handouts to show the various characteristics e.g whorls, loops, arches.

They are then shown a simple way of taking a finger print. A pencil is rubbed very heavily on a piece of card. The finger is placed firmly on the pencil rubbing. A piece of “sellotape” then is out on the fingerprint and placed down on another piece of card.

All of the student take their own finger print in turn and look at the different characteristics of them – they see how scars show up etc.

Finger prints have already been taken from the knife found at the scene of the crime. All of the suspects have given finger prints. The students compare the fingerprint from the knife to each of the suspects.





Station 4: Blood analysis

A synthetic blood analysis kit is provided for the students. The students are shown the difference between the various blood groups in how they clot with the test mixture. Again blood has been found at the scene of the crime. The students must test the blood and see what blood type it is. All of the suspects have given their blood group so the students compare and find a match.



Once all the workstations have been visited by the students, the students regroup to discuss their findings. The witnesses are brought in for questioning. The students have the chance to question each of the witnesses in turn. After half an hour, the groups are asked to identify the guilty party and to explain their reasoning. Jane an animal rights activist was shown to have committed the crime. Most of the students were correct in finding out the guilty party.



Added Value

The day went according to plan. The students worked well through the tests, and were found to be able to relate to this more readily than science from a book. The fact that it took place in a college was beneficial to the students as they could see the type of instrumentation available in a third level college. It promotes the idea of studying science at third level. The students get to spend a day or a morning in the college, so they a brief glimpse of college life.

Obstacles

This venture takes place in a science lab of a third level college. As such it can only take place when this it is not being used by third level students. This generally is April or May. As there are several workstations involved, there is a requirement for a large number of volunteers to help run the event. This is a major obstacle to rolling out this programme to a wider audience.

As the lab can only accommodate 30 pupils, this is the max number of students to be accommodated at a time. Thus only small numbers can be reached.