

Experiment with success

There's a 35 per cent chunk of marks waiting to be picked up before you even set foot in an exam hall, so don't miss out

THE EXPERT



Brendan Casserly graduated with a bachelor of science degree from UCG, now NUI Galway. He taught science in Nigeria from 1963 to 1966. Back in Ireland, he taught in St Mary's Castleblayney, CBS Dundalk and Douglas Community School Cork from 1969 onwards. He is co-author of *Physics, A Basic Course* (1981), *A Complete Course in Intermediate Science* 1983, *Fundamental Physics* (1984) plus a new edition in 1990, *Breakthrough Science* (1994), *Less Stress, More Success: Physics Revision* (2002), *Breakthrough Science, New Edition* (2003) and *Less Stress, More Success: Physics Revised Edition* (2007). He is also a science expert for the study support and exam preparation website www.examsupport.ie. Casserly is also a director of the Everyman Palace Theatre, chairman of Everyman Theatre and a director of Three in One Theatre. Why theatre? Because anyone who wants to teach and remain sane has to know how to bring a subject to life, often with humour, and to hold the attention of an audience who would not pay to get in, but might pay to leave.

MAKING A GOOD START

The Junior Certificate examination, in most subjects, consists of a terminal written examination in June of the third year. The revised Junior Certificate Science syllabus is significantly different. It consists of Coursework A (10 per cent), Coursework B (25 per cent) and a Terminal Written Examination (65 per cent). This means that a student could get 35 per cent before ever sitting the written exam in June.

Yes, but realistically, how likely is it that the average student would, as opposed to could, get the full 35 per cent or anything near it? The answer is very likely indeed. In 2006 the average was 10 per cent for Coursework A and 21 per cent for coursework B, giving a total of 31 per cent. Here's how it can be done.

COURSEWORK A – 10 PER CENT (60 MARKS)

This consists of 30 mandatory experiments, or investigations, that have to be done by the students themselves, in school, over the three years. A report on each experiment must be written into a practical notebook.

The student must then sign a form to the effect that each practical has been done and written up. The teacher counter signs this form which is then used to claim the relevant 10 per cent. The notebook must be kept in the school for inspection should an inspector call. In most cases there is no inspection, so by doing all 30 experiments and writing a reasonable report the 10 per cent is in the bag. It would be crazy, therefore, for any student to miss out on these marks.

COURSEWORK B – 25 PER CENT (150 MARKS)

Each year the State Examinations Commission nominates three investigations. Each student must do two of these or opt for a single longer investigation of their own choosing. Reports have to be written into a special booklet supplied by the commission. These reports are sent to the commission and will be examined,

so make sure this is your own individual report. Remember, the person who examines it will probably also be examining the reports of the other members of the group you worked with. The simpler the language the better.

So what are the examiners looking for? How are the marks allocated? The marks are usually spread out under the following headings for a total of 75 in each of the two investigations.

Introduction – five marks

A clear statement of the problem or topic to be investigated and details of any research carried out.

Preparation and planning – 20 marks

Identifying variables and controls, list the equipment needed and list the tasks to be carried out. A control means you set up two experiments which are identical in every way except one. If something happens in one experiment which does not happen in the other, then the one difference must be the reason for it.

Procedure – 20 marks

Safety precautions, procedures, recorded data/observations.

Analysis and conclusions – 20 marks

Calculations/data analysis, conclusions and evaluation of results.

Comment – 10 marks

Sources of error, how the process might be improved, etc.

To put flesh on all of this, consider what the examiners were looking for in 2006 in the case of an assignment on the germination of seeds.

Introduction – five marks

Statement of problem or topic (three marks).

Research: name any reference book, website, etc, consulted (two marks).

Preparation and planning – 20 marks

Variables: Name any three. Number of peas/time left soaking/amount of water used/temperature (five marks).

Control, eg set of peas left unsoaked (five marks).

Equipment. Any four. Eg, containers/water/graduated cylinder/peas, etc (five marks).

Tasks. Any three eg set up equipment/soak peas/monitor changes/record results (five marks)

Procedure – 20 marks

Safety. Any two safety precautions, eg careful handling of glass, etc (five marks)

Procedure. Any five steps. Soaking set of peas/leaving other set unsoaked/timing how long peas left soaked/counting equal number of peas into both sets/taking temperature/observe results. (five marks x two)

Recorded data. Time taken for soaked peas to germinate/number of peas that germinated, etc. (five marks)

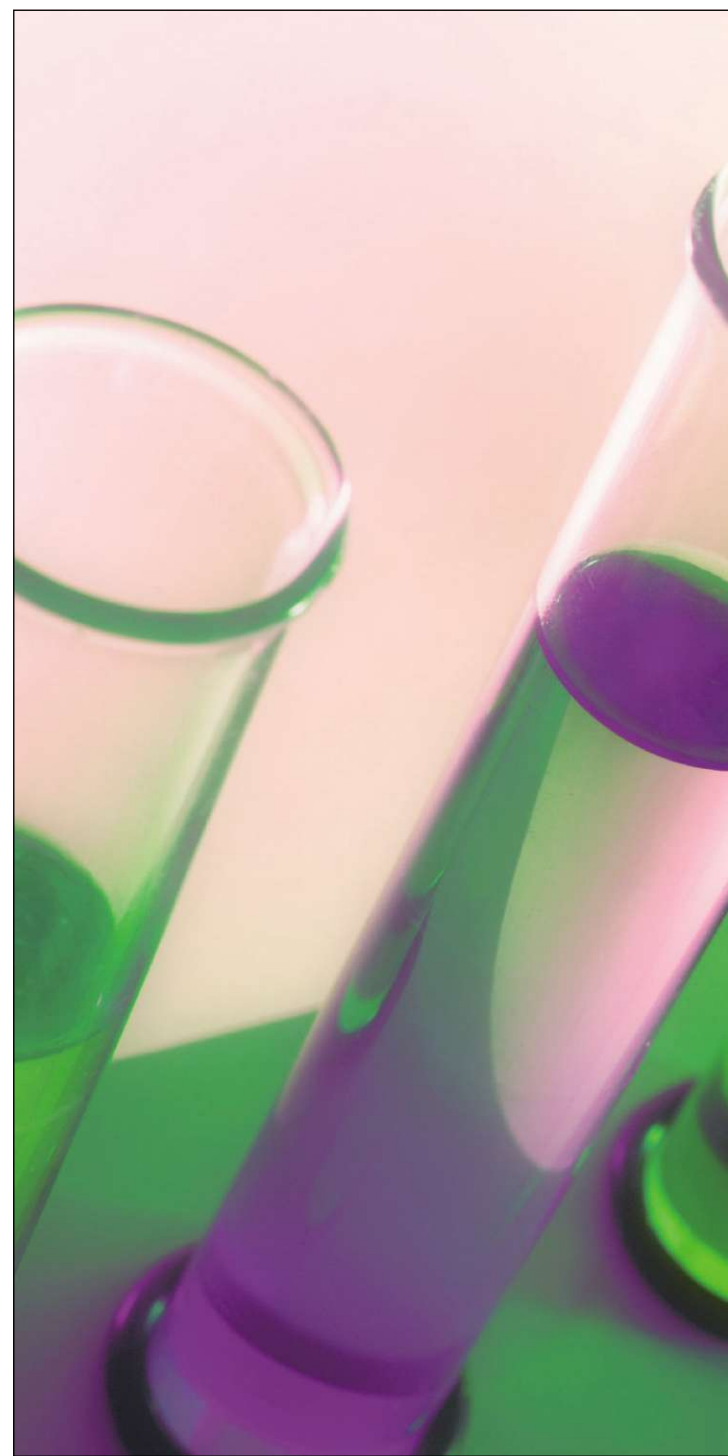
Analysis and conclusions – 20 marks

Relevant comments on data/calculations/conclusions/graph, etc. (10 marks)

Conclusions: relevant conclusions or evaluation of results. (10 marks)

Comment – 10 marks

Sources of error/how experiment might be improved/what was



learned from experiment/reason for any unexpected result, etc. (10 marks)

Obviously, the students report would not be laid out as above but the examiner would read through the report awarding marks for the above points. I think it is well worth going through all of the above because any student who would not make every effort to get maximum marks from coursework A and coursework B would be very foolish indeed.

May I remind you once again that the average student scored 31 per cent out of a possible 35 per cent in coursework A and Coursework B in 2006? All they needed to pass was 9 per cent from the written paper and, with any effort at all, they could get a grade B.

THE WRITTEN PAPER

The written paper still accounts for 65 per cent of the marks. In the written paper, students do best in biology, next best in physics and worst in chemistry.

One reason for this is that they seem to have difficulty with chemical formulae, such as CaCO_3 . Words and numbers they can handle, chemical formulae pose a problem. Also, examiners believe that many students fail to grasp the very core of chemistry eg why do elements combine? How do they combine?

In the textbook, *Breakthrough Science* (Gill and Macmillan), these questions are clearly and simply answered in just two chapters: chapter 31, Elements and compounds – Atoms and molecules; and chapter 33, How do elements form compounds?

There are, of course, other problems. In a recent exam question, Question 5 (a) Higher Level Junior Certificate Science 2006, "to prepare a sample of sodium chloride", some students had no idea how to use a burette, raising questions as to whether they had ever carried out this experiment, even though it is one of the mandatory experiments in Coursework A.

There is no basic reason why students should not do well in chemistry but it is an area which might need a little extra attention.