

Curriculum 2000 – What Will Our Chemistry Students Know?

LTSN Physical Sciences
Briefing paper

How the new curriculum will affect HE

The long-awaited arrival of the first intake of Curriculum 2000 students is almost upon us. In September 2002, HE Institutions can expect to see the outcome of the changes made, not only to A and AS Levels but also to Scottish Higher and Advanced Higher examinations. This briefing paper describes the kind of knowledge you can expect these students to have.

New A Level

In truth, the students who come to HE having completed A Levels will be very similar to the intake of the last five years. The main changes in the A Level syllabus occurred quietly in the early nineties. The actual core specifications have changed very little for Curriculum 2000, but there is now an emphasis on teaching in context. Students are made more aware of the applications of fundamental chemistry. Social and economic effects of the chemical industry are also stressed. Key skills (communication skills, IT skills, numeracy, problem-solving skills, teamworking skills and student-centred learning skills) are assessed throughout the A Level course and two modules allow for synoptic assessment.

Options

One major area to be aware of is the provision of options within some A Level syllabuses, which allow students to “tune” their courses to cover areas of interest to them. Students who have completed the OCR A-Level qualification will have studied one of the following options in greater detail; biochemistry, environmental chemistry, methods of analysis and detection, gases, liquids and solids or transition elements. These areas also make up a considerable part of the core syllabuses for the Salters and Nuffield courses, but are not covered in depth within the syllabuses that are considered more “academic” such as OCR and EdExcel.

New AS Level

The first year of the A Level course now constitutes the AS Level qualification. Although secondary schools and sixth form colleges have been advised that students wishing to continue a subject at tertiary level should continue on to the A2 year, we should be prepared for applications from students with AS Level. The AS course gives a good foundation in chemistry and addresses aspects from physical, organic and inorganic chemistry. However, there is no denying that this is the “easier half” of the A Level. There is also no room for synoptic assessment. Thus, students will have a rudimentary knowledge of the main branches of chemistry, but will never have had to understand how they fit together.

The Vocational A Level

The vocational A Level is designed to allow students to show their knowledge by “doing” rather than through examination. In the traditional A Level course, the exam:coursework ratio is between 2:1 and 4:1. For the vocational qualification, this ratio is 1:2 and 1:4. If your institution is planning to take students with a vocational A Level in science, you can expect them to know about the following areas of chemistry; chemical formulae and equations, chemical equilibrium, rates of reaction, organic groups and functional groups, types of organic reaction and fundamentals of biochemistry. There are also optional modules in genetic engineering, analytical techniques, thermochemistry and electrochemistry, redox equilibria, basic organic chemistry,

basic inorganic chemistry and periodicity, colour chemistry and basic pharmacology. The vocational A Level has the capacity to be a highly useful qualification since students will have greater experience in the laboratory and in key skills. However, it is possible that students will only have covered the minimum core areas of chemistry and these may not provide sufficient background knowledge when studying for a degree.

The Scottish Higher System

In Scotland, the Higher system has also undergone a re-birth. The rationale for the changes in the Scottish system is very similar to that for the English system and therefore, Scotland too has placed higher emphasis on key skills areas and application of knowledge. The Higher Certificate has a lower academic content than the AS Level qualification, but the A2 and Advanced Higher Certificate are comparable in both depth and content.

Maths and Chemistry

It is no secret that there has been a decline in the mathematical ability of HE students in recent years. The QCA and SQA have moved to try to redress this by introducing numeracy as a key skill. A Level students are expected to be able to carry out the following mathematical operations.

- Using standard and decimal form
- Using calculators
- Using significant figures
- Constructing and interpreting charts
- Using scatter plots
- Changing the subject of an equation
- Understanding and appreciating 2D and 3D symmetry
- Determining the slope and intercept of a linear graph
- Ratios, fractions and percentages
- Estimating values without the use of a calculator
- Finding arithmetic means and medians
- Data-smoothing techniques
- Using logarithmic scales
- Substituting numerical values into an equation
- Plotting and understanding graphs
- Drawing tangents

From this you will see that, unless candidates have mathematics A Level, there is no provision for calculus.

Practical Work

For AS and A2 qualifications, the assessed practical work makes up 20% of the final qualification. The practical may take the form of an examination or, more often, coursework. Only two assessments (of five to ten hours each for coursework and of one hour to ninety minutes for the examination method) over the two years count towards the final mark and the amount of non-assessed practical work is completely at the discretion of the individual teacher. Thus, it is entirely feasible that students may enter HE having only completed twenty hours of practical work. This is a particular problem for those who have taken A Levels on a part-time basis.

For More Information

The core specification for A and AS Level chemistry can be downloaded from <http://www.qca.org.uk>. Syllabuses and specimen questions for the awarding bodies can be found on their websites. Most also have answers to frequently asked questions about the new curriculum.

AQA: <http://www.aqa.org.uk>

CCEA: <http://www.ccea.org.uk>

OCR: <http://www.ocr.org.uk>

SQA: <http://www.sqa.org.uk>

EdExcel: <http://www.edexcel.org.uk>

WJEC: <http://www.wjec.co.uk/>