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Students in a practical microbiology class.
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Vocational GCSEs

■ Helen Nankervis

From September this year, 14-year-olds are going to have a choice in the type of education they receive at GCSE level. A suite of pilot vocational GCSE (VGCSE) specifications will be available for any school to teach as an alternative to the ordinary GCSEs, although all students will still have to sit ordinary GCSE English and maths.

These new qualifications replace Part 1 GNVOs and focus on applied aspects of their subject. They are equivalent to two GCSEs and are aimed at students who would like to pursue a more practically based career; they will enable progression to higher or further education, training or employment. Although much of the factual content of the applied science course is the same as for GCSE science, the way the principles will be taught is entirely different.

The pilot specifications for the AQA (www.aqa.org.uk) and OCR (<http://194.73.21.73/schemes/vgcse/science/science.htm>) examining bodies for applied science, health and social care, engineering and manufacturing are available on-line.

VGCSE science – emphasis on microbiology

The specification is still broadly split into biology, chemistry and physics in each of the three units that make up the VGCSE. Every unit also deals with relevant social, ethical, moral and health and safety issues as well as the correct use of equipment and appropriate recording of results. When reading through the specification, it becomes obvious that a large amount of the biology section in each unit is based on microbiology techniques.

Developing scientific skills

The first unit teaches students the skills needed to carry out experiments and work in the laboratory. It includes the hazards and risks associated with the handling and disposal of micro-organisms and the associated health and safety issues. Students learn aseptic technique and use it to culture micro-organisms, for example to produce yoghurt, as well as studying the effect of antimicrobials on micro-organisms. They also cover the use of a light microscope and prepare a temporary slide.

Science for the needs of society

The second unit teaches students about the materials and living organisms that scientists work with. It focuses on the range of different products that living organisms can make. Students learn the differences between plant and animal cells, and go on to recognize that living organisms make pharmaceutical products such as antibiotics and insulin. The basics of genetic engineering are also covered so that students



understand that it involves the transfer of genetic material from one living organism to another to change the characteristics of that organism. The role of micro-organisms in the production of food and drink, such as yoghurt, bread, beer and wine is explained. The students also learn about the micro-organisms responsible for diseases such as tuberculosis, polio, rubella, mumps, measles, foot-and-mouth, athlete's foot and skin infections. The methods of protecting the body from infection, including immunization, sterilization, disinfection and antibiotics, are also covered in some detail.

Science at work

The third unit explores how science may be used to the benefit of industry and society. The unit teaches both information skills and science in the workplace, as well providing direct information on how to monitor the growth, responses and development of living organisms. The students have to complete an investigation where they choose a living organism to monitor and then measure either its growth, development or responses. One of the suggested projects is to attempt to improve the yield of a plant or micro-organism. There is great emphasis on methodology and evaluation of results. The students must produce a plan and record all their results as if they were doing a lab project in any working laboratory and the overall project is then marked as their coursework.

Resources, SGM and beyond . . .

Support literature is also being produced by educational publishers to go with these new qualifications, although no information on the books is yet available.

As the new VGCSE in applied science places so much emphasis on microbiology, it is fortuitous that the SGM is soon to publish a set of practical exercises in microbiology for secondary schools that will tie in very closely with these new specifications. The booklet will be available from the SGM in September for £5.

However well the VGCSEs in their current pilot form are taken up, it is fairly clear that education of this type is here to stay. This can only be good news both for those wanting a career in science at a technical level and any employers of technicians, especially in microbiology.

● **Helen Nankervis is a research assistant at Nottingham University developing school practicals for the SGM.**