

Science Online

The Newsletter for Science Online Teachers

news

New Support Options Available to Schools

Flexible support tailored specifically for your school's needs

The price restructure of the course, which took place earlier this year, has meant that we are now able to offer teachers a range of support opportunities, tailored to meet your individual needs.

In purchasing the course for the first time, schools are able to access two days of training free of charge, to ensure that staff are able to manage the new materials and approaches as effectively as possible. Additionally, you will be able to buy in extra support, as and when

required, which you have identified as being most relevant for you. The support offered ranges from telephone & e-mail advice from our helpline on **0121 329 8366**, the FAQs on our website: **www.sciencelessons.co.uk** and the Resource Centre pages through to individual and group

training sessions, either at The City Technology College, Kingshurst, or in your own school.

If you would like to discuss any of these options in more detail, please contact Jan Richards on: info@3es.com or 0121 329 8366.

Content Searcher

NEW!

The 'Content Searcher' provides an easy way to find information. With around 450 linked items, this is ideal for connecting materials across units. You can search for information in three different ways.

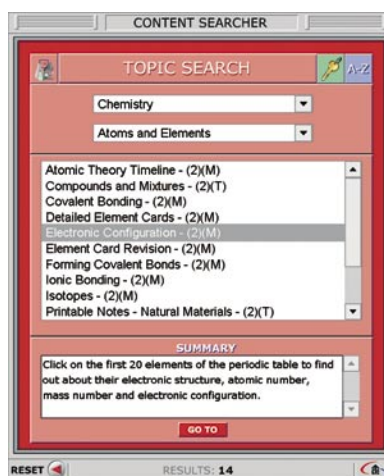
1. Alphabetical Search

Choose a letter from the alphabet to search for required content.

2. Topic Search

Firstly select a 'Subject' from 'Biology', 'Chemistry', 'Physics', or 'Forensic Science'. Then select a relevant 'Topic' from the list generated. For example, choosing the subject 'Forensic Science' will bring a list of topics including areas such

as 'Types of Evidence', 'Analysis of Evidence', 'Drugs' and 'Teeth'.



3. Keyword Search

There are around 600 keywords from which to choose. Examples include 'Activity', 'Light', 'Genetics', 'Yield', and 'Periodic Table'.

All searches will examine the whole course, bringing up a range of results across the units. Each results has a title, unit number and type of content indicator. Type of content is indicated by (M) for a movie, (P) for interactive photographs and (T) for text and images. Select from the list of generated results to view a summary for that page. Click on 'GO TO' to link to that page.



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NEWSLETTER CONTRIBUTIONS
e-mail Jan on info@3es.com any
articles and photos for consideration



3Es Multimedia

Data Logging in GNVQ Science

Enhancing data logging for use in GNVQ

Whatever you want to measure, there's an ICT means of doing it. However, data logging in school science is often limited to the use of temperature probes as electronic thermometers.



By Steve Ferguson
Broadlands School

The GNVQ course demands a more imaginative approach to all aspects of ICT use, including the collection and display of data. From the outset, we were determined that GNVQ students should use the best tools for the job and that these should closely replicate the tools used in vocational contexts. Of course, this can be expensive and can take a while to get organised; however, we have managed to make data logging the main means of data collection in two portfolio activities.

Activity 1

The Unit 3 "Sprinter" activity requires repeated measurement of resting heart rate, post exercise heart rate and cardiac recovery rate, over several weeks. We tried measuring pulse by the traditional method and by using hand-held electronic devices, but both seemed to give unreliable results. Our Loggit data loggers had previously been used with Polar chest strap sensors. Although these have the advantage of being wireless, they tend to be temperamental (the Loggit receiver seems to cause problems), so some ear/finger clip sensors were purchased for this activity.

Students sit near a computer for a minute or two, until a steady resting heart rate trace is displayed – this is labelled and saved. The students then carry out a 100m sprint, which ends very near the lab, and immediately return to be connected to the computer. They must remain fairly still for several minutes, until the trace has returned to near

normal – this is also labelled and saved. Some students were keen to include the printed graphs in their work, others recorded directly from the screen. The results varied from one student to another, probably due to different levels of commitment to the 6 week training programme; however, this method of recording allows the teacher to confirm, at a glance, that useful measurements are being taken and recorded.

Activity 2

Unit 8 involves students in undertaking an ecological survey, in which they attempt to explain patterns in the abundance and distribution of plant/animal species by looking for differences in a range of physical factors. This is an excellent opportunity to use data logging to measure several factors simultaneously and to use the storage and retrieval capability. Students first practised measuring light intensity and temperature around

the school building, making sure that they were aware of problems with using the logger and with the retrieval of data.

Our fieldwork activity compared the physical and biological characteristics of a pond with those of a nearby stream. Data loggers were used to measure temperature, light intensity and pH. Flow rate had to be measured by timing a floating object over a measured distance; dissolved oxygen was measured using a modified version of the Winkler titration (demonstrated), although we have ordered a dissolved oxygen probe, which we will use next time.

In both of these examples, the use of data logging ensures that useful measurements are taken and recorded, often when the time available is limited. It has also taken the chore out of repetitious recording and allowed students and teachers to focus on the important relationships between the variables being investigated.



■ (Right) Students using data logging equipment as part of the GNVQ Science course

The 'V' Bit Part 2

Maximising Links and Expertise in Science

In Issue 1, Adrian Tucker offered advice, guidance and some 'golden rules' when seeking outside support from business and industry. In this article he explains how to maximise the links and make the best use of this expertise within the science curriculum.

So you've done your cold calling and got a few industries that are willing to participate. The next stage is where to fit them into the curriculum and the sort of evidence that students need to produce. At King Richard School in Portsmouth we teach Units 1-3 by discipline, i.e. all of the chemistry, then biology and finally physics. Like many schools who have adopted this model we have found that students find it easier to understand why they are doing what they are, if they are presented with the skills, knowledge, and application together. Finding one good link for each discipline is far more valuable than lots of cursory ones. The Online material, as good as it is, can never fully provide this vocational aspect of the curriculum as it will depend on what is available in your local area. Here are some suggestions, however, as to what aspects of the curriculum to cover.

Chemistry Units 1-3

Many services use the scientific skills presented in Unit 1. Titration and Chemical Testing will be a

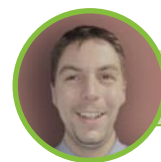
feature of many local industries. They can come to you to demonstrate, or some may be able to take small numbers of students to their sites. Many manufacturing plants will have Quality Assurance Departments; chemical testing of some products will be a feature here.

Biology Units 1-3

The Industry you used for the chemistry section may be able to help out with biology. Setting up and using microscopes to observe fine detail are features of many Quality Assurance procedures. Aseptic technique may be more problematic but the local hospital may be able to help out – the pathology and blood labs will use these techniques.

Physics Units 1-3

Depending on the options you pick will depend on the links you make. King Richard School does the pulley section and any garage containing a block and tackle for lifting out engine blocks



By ADRIAN TUCKER
KING RICHARD SCHOOL

would be an obvious place to start. This is also an opportunity to include a lot of the material science that is a feature of the examinable component in unit 2.

Writing up of these experiences falls into Unit 1 P6, M4, D4 of the marking criteria. This area is usually the weakest of a student's portfolio, primarily because of the opportunities with which they have been presented. The wording of the criteria for awarding these marks is quite clear: to obtain a pass, students should describe similarities and differences between a standard procedure in school and a science based service. This does not simply mean explain what they do at the place you visited. Marks should be awarded for taking one procedure that is common to both and stating how it is the same and how it is different. Merit marks can be awarded if the candidate has given reasons why these differences might occur, and the Distinction marks for providing an evaluation of some of the procedures.

I hope that by using this in conjunction with the first article in Issue 1 you will be able to initiate and maintain a worthwhile and sustainable vocational aspect of the curriculum that adds considerably to the GNVQ course.

Resource Centre

The Resource Centre is an online shared area where teachers can share work they have developed with other teachers. If you have any worksheets, handouts or other useful materials including web sites that you have found helpful, why not share them with others? If you need information for a lesson, you may find it on the Resource Centre.

It's now even easier to get your work on the Resource Centre. Just attach the relevant document(s) to an e-mail and send it to info@3es.com including the following

information: who you are; what establishment you are from; a short title as a link to your resource and a brief description of what the resource covers.

These materials are working documents designed by teachers for other teachers using the course. You should check the materials, but we are aware that some errors may arise – they don't need to be perfect. We advise teachers using any material from the Resource Centre to read through and check for themselves before using with students. There is also a disclaimer to cover us all under any eventuality.

Please contribute any materials that could

benefit others. We aim to build a comprehensive bank of resources but can only do so with your help. Recent additions to the Resource Centre include:

- Unit 4 web link to Riverside County Sheriff's department
- Unit 5 worksheets on material investigations; including grip, density, stiffness, strength, chemical erosion and wear
- Unit 3 worksheet on pulley systems
- Module 6 of the Broadlands Approach covering manufactured materials is now available. This consists of 7 lesson plans and 10 OHTs and worksheets.

Supporting GNVQ – Guidance for Technicians

Eleven practical tips from the technicians at King Richard School

As with any new program there have been teething problems, many of which are not considered or seen by teaching staff when asking the technical staff to implement the program.

These problems can range from illustrations not matching instructions or the instructions not being accurate (if you discover any problems like this on the online material please inform Jan Richards at info@3es.com). Nor do teaching staff always take into account the juggling with equipment that technicians perform so that all classes in all keys stages receive the required equipment. Be prepared for these problems and things will run more smoothly.

Key points to take into consideration:

- In our experience all lessons need to be planned and prepared thoroughly by the teachers involved at least two weeks in advance – this is to avoid clashes of resources.
- You will need to familiarise yourself with the online site as this will come in handy for guidance and understanding.
- When ordering and preparing for GNVQ units make sure you know which units and experiments your school will be doing, as not

all are obligatory so not all the equipment on the lists is needed.



By Mick Turner & Helen Gillam
King Richard School

- Prepare and order GNVQ equipment well in advance of when you need it, so that you can familiarise yourself with the equipment and identify problems early.
- Modification of experiments may also be needed due to constraints of lesson length, class size and class clashes.
- Some equipment is expensive or hard to obtain, so don't be afraid to modify experiments to fit the equipment you have. For example in Unit 4 Forensic Science, cheap blusher brushes are ideal for finger print dusting.
- Prepare yourself a quick reference guide of equipment for the experiments you've modified – remember this can be done on your home page of the website.
- A Digital camera is useful for Portfolio Evidence, so a colour printer dedicated to the digital camera is advised. This means you need to familiarise yourself with a digital camera and digital photography software.
- If you can, find a source of discarded plastic tubs of various sizes, such as those from a resource bank, as they are always needed in many differing contexts.
- Remember teachers are new to GNVQ too so you will be asked constantly 'how do I do this?'
- Above all remember the GNVQ relies on good technicians.

Good Luck in your GNVQ Experience!

Technicians' Lists

A new section in the Teacher Guidance area has been created called 'Technicians' Lists'. This contains 10 links corresponding to the 10 units on the course. Each list is broken down into lessons matching the lesson plans and include:

- The equipment required per group, per class or by the teacher.
- The chemicals required, along with concentrations and volumes needed per group.
- Relevant safety considerations.

These are not meant to be definitive lists, merely guidelines to help with the activities. They can be used in conjunction with the lesson plans or just used for specific activities. All of the 50 assessed activities covered on the course have been individually addressed. Make ordering equipment easier by downloading the files and giving them to your lab technician(s). Thanks to Mike and Helen from King Richard School for their input.

- LESSON 1.7: CALIBRATING AN INSTRUMENT -

Activity 1.3: Calibrating a pH Meter

EXAMPLE

Each group needs:

EQUIPMENT

- pH meter.
- 100 cm³ beaker.
- Wash bottle.
- Small screwdriver to adjust pH meter.
- Boiling tubes or beakers x 4.
- Pipettes to collect test liquids.

CHEMICALS

- Buffer solutions, pH 4, 7 and 10.
- Distilled water.
- A variety of liquids to test pH, e.g. vinegar, antacid, detergents (see Unit 7).

SAFETY

- Buffer solutions (harmful).
- You must always follow school safety procedures in the laboratory.
- Consult CLEAPSS for further details.