GCSE
SCIENCE A, SCIENCE B, BIOLOGY
UNIT B1 – Example 2
4461, 4462, 4411

Scheme of Work

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Introduction

This Outline Scheme of Work is one of a number of schemes prepared by practising teachers for the new AQA GCSE Sciences suite. It is hoped that other teachers will find them helpful as the basis for the fully detailed schemes prepared for teaching from September 2006. Each outline scheme covers one unit (B1, B2, B3, C1, C2, C3, P1, P2, P3) and for some units more than one outline scheme is available. This is because there are different, equally valid ways of approaching the teaching of the specifications and a single scheme would not show the range of possible approaches.

The AQA specifications are designed to be used with a wide range of resources, so this scheme does not assume the availability of any particular printed or electronic publications, or any special equipment. Teachers are enabled to use existing resources, including their own, together with resources specially purchased for the new specifications.

The outline scheme is arranged under the section headings of the relevant specification, for example, *11.1 How do human bodies respond to changes inside them and to their environment?* The content in the section is further subdivided with a brief statement given of the coverage of each subdivision, together with activities that relate to that content and an indication of the number of hours it is suggested are needed to deliver that part of the content.

Opportunities to deliver 'How Science Works' and to use ICT are highlighted using the same icons as used in the specifications.

This identifies parts of the content which lend themselves to extended investigative work of the type needed to explore Sections 10.3–10.7 of the specifications. These sections are about obtaining valid and reliable scientific evidence.

This identifies parts of the content which lend themselves to activities which allow Sections 10.2 and 10.8–10.9 to be considered. These sections are about using scientific evidence, for example, how scientific evidence can contribute to decision making and how scientific evidence is limited.

This identifies where there are opportunities to use ICT sources and tools in teaching the specifications.

UNIT BIOLOGY 1			
Total hours: 7	**11.1 How do human bodies respond to changes inside them and to their environment?**		
Topic outline		**Teaching approach including possible experiments/investigation opportunities**	**Additional notes**
The nervous system including: • receptors • reflex actions		• Investigate sensitivity of different areas of skin. Pupils decide whether one or two points are touching their skin when blindfold. Results determine which area of skin has the most touch receptors.	Could use an opened out paperclip for this. Can also be done with rough and smooth surfaces against skin.
Internal conditions (homeostasis)		• Measure sweat production and skin temperature during exercise.	Cotton wool pads can be used to absorb sweat. Find mass before and after.
Evaluate the claims of manufacturers about sports drinks.		• Pupils look at labels on sports drinks and compare to recommended intakes.	http://www.brianmac.demon.co.uk/drinks.htm has useful info.
Hormones		• Look at insulin / contraceptive pill and discuss their use	Fact sheet available at: http://hcd2.bupa.co.uk/fact_sheets/html/hormonal_contraception.html

Topic outline		Teaching approach including possible experiments/investigation opportunities	Additional notes
Evaluate the benefits of, and the problems that may arise from, the use of hormones to control fertility, including IVF.		• Debate the arguments for and against the use of IVF.	http://news.bbc.co.uk/1/hi/talking_point/1836379.stm is useful.

Total hours: 7	11.2 What can we do to keep our bodies healthy?

Topic outline		Teaching approach including possible experiments/investigation opportunities	Additional notes
A healthy diet		• Look at food labels • Construct graphs or pie charts of contents	Use a range of different foods: cereals, crisps, chocolates etc Energy in food calculator available at: http://www.machinehead-software.co.uk/bike/power/kcal_food_energy.html
The metabolic rate varies with exercise and the proportion of muscle to fat in your body.		• Pupils measure their own body mass index	Calculator available at: http://nhlbisupport.com/bmi/

Topic outline		Teaching approach including possible experiments/investigation opportunities	Additional notes
Doing exercise		• Investigate the effect of exercise on breathing rate and heart rate.	Worksheet available at: http://www.the-aps.org/education/lot/pdfs/physioex/module2.pdf
Cholesterol		• Pupils look at a range of butter and margarine packets to find the proportion of mono-unsaturated, polyunsaturated and saturated fats. This information is then used to determine which type may be helpful in reducing cholesterol.	Information available from the food standards agency at: http://www.eatwell.gov.uk/asksam/healthydiet/fssq/#A218453
Processed food and salt		• Pupils could write letters campaigning for real school food.	See: http://www.channel4.com/life/microsites/J/jamies_school_dinners/fowl/index.html

Total hours: 5	11.3 How do we use/abuse medical and recreational drugs?		
Topic outline		**Teaching approach including possible experiments/investigation opportunities**	**Additional notes**
Drugs		• Could arrange a visiting speaker such as a local health promotion officer, community police officer or a former drug user to speak to pupils. • Use audio-visual materials, role-playing and group discussions.	Some excellent resources available at: http://www.lifebytes.gov.uk/teachers/lb_teachers-drugs.htm Although originally intended for KS3 much of the content is applicable to KS4.
Thalidomide		• Pupils could research thalidomide on the internet and produce a report to decide whether the drug should still be in use today.	http://www.thalidomideuk.com/ is a good place to start.
Smoking		• Could demonstrate the tar content of cigarettes with a "smoking machine". • Challenge pupils to give reasons why people find it difficult to give up smoking. • Explain how the link between smoking tobacco and lung cancer gradually became accepted. • Pupils evaluate the different ways of trying to stop smoking.	Try: http://www.teachernet.gov.uk/wholeschool/healthyliving/behaviours/smoking/

Topic outline		Teaching approach including possible experiments/investigation opportunities	Additional notes
Alcohol		• Use audio-visual materials, role-playing and group discussions. • Explore pupils' ideas about alcohol and its effects through discussion.	Try: http://www.teachernet.gov.uk/wholeschool/healthyliving/behaviours/alcohol/
Total hours: 7	**11.4 What causes infectious diseases and how can our bodies defend themselves against them?**		
Topic outline		**Teaching approach including possible experiments/investigation opportunities**	**Additional notes**
Microorganisms		• Use agar plates to look at microbes on unwashed and washed hands, relate to the contribution of Semmelweiss in controlling infection to solving modern problems with the spread of infection in hospitals.	Resources at: http://www.labs.net/schools/marion/mms/html/body_experiment.htm http://www.henrythehand.com
White blood cells		• Look at prepared blood slides to identify white blood cells.	Web based activity available at: http://www.mclno.org/labpartners/index.htm

Topic outline		Teaching approach including possible experiments/investigation opportunities	Additional notes
Medicines and antibiotics		• Use audio-visual aids and role play to explain how the treatment of disease has changed as a result of increased understanding of the action of antibiotics and immunity.	
Resistance to antibiotics		• Pupils evaluate the consequences of mutations of bacteria and viruses in relation to epidemics and pandemics eg bird influenza.	Information about bird influenza at: http://www.scidev.net/ms/bird_flu/
Immunisation		• Pupils evaluate the advantages and disadvantages of being vaccinated against a particular disease.	http://www.immunisation.org.uk/ has some useful information.
Total hours: 4	**11.5 What determines where particular species live and how many of them there are?**		
Topic outline		**Teaching approach including possible experiments/investigation opportunities**	**Additional notes**
Survival		• Use audio-visual resources to demonstrate reasons for the distribution of animals or plants in a particular habitat.	http://news.bbc.co.uk/2/hi/science/nature /2299547.stm
Adaptation		• Provide pupils with information about individual organisms and ask them to suggest how the organism is adapted to the conditions in which they live.	http://www.bbc.co.uk/nature/blueplanet/ factfiles.shtml

Topic outline		Teaching approach including possible experiments/investigation opportunities	Additional notes
Competition		• Discuss the factors for which organisms are competing in a given habitat.	http://www.bbc.co.uk/schools/gcsebitesize/biology/livingthingsenvironment/0habitatsandpopsrev7.shtml.
Total hours: 9	**11.6 Why are individuals of the same species different from each other? What new methods do we have for producing plants and animals with the characteristics we prefer?**		
Topic outline		**Teaching approach including possible experiments/investigation opportunities**	**Additional notes**
Genes and Characteristics		• Read out the True/False statements which you have selected asking students to stand up if they think they are true.	http://www.gig.org.uk/genesandyoutruefalse.htm has list of true or false statements.
Chromosomes		• Model chromosomes could be made from pipe cleaners of different length. If different colours are used for two parents, the production of gametes can be demonstrated, along with subsequent events at fertilisation.	
Forms of reproduction		• Pupils take cuttings of plants such as geraniums to illustrate sexual reproduction. • Use audio-visual resources to explain sexual reproduction.	

Topic outline		Teaching approach including possible experiments/investigation opportunities	Additional notes
Cloning	 	• Use worksheet to interpret information about cloning techniques and genetic engineering techniques.	Worksheet available at: http://www.collinseducation.com/resources/worksheets/Da2%20Hello%20Dolly%20goodbye%20piglets.pdf
Genetic engineering	 	• Debate the use of genetic engineering to make informed judgements about the economic, social and ethical issues concerning cloning and genetic engineering, including GM crops.	
Total hours: 6	**11.7 Why have some species of plants and animals died out? How do new species of plants and animals develop?**		
Topic outline		**Teaching approach including possible experiments/investigation opportunities**	**Additional notes**
Fossils		• Pupils look at a selection of different fossils and discuss how each one was formed. Suggest reasons why scientists cannot be certain about how life began on Earth.	

Topic outline		Teaching approach including possible experiments/investigation opportunities	Additional notes
Extinction	 	• Pupils look at the mass extinction that took place during the Mesozoic era and relate to modern day animals and plants that face imminent extinction.	http://news.bbc.co.uk/2/hi/science/ nature/4522044.stm
Evolution	 	• Pupils view suitable audio-visual material to debate evolutionary theory.	
Studying the similarities and differences between species		• Discussion in terms of comparative anatomy.	
Total hours: 7	**11.8 How do humans affect the environment?**		
Topic outline		**Teaching approach including possible experiments/investigation opportunities**	**Additional notes**
Consequences of human population growth	 	• Pupils could evaluate data from a variety of sources to produce a fact sheet.	Try: http://www.populationmedia.org/issues/issues.html

Topic outline		Teaching approach including possible experiments/investigation opportunities	Additional notes
Pollution		• Pupils evaluate methods used to collect environmental data and consider their validity and reliability as evidence for environmental change.	
Deforestation		• Pupils could debate the reasons for an against deforestation, the economic and environmental issues.	Information on http://news.bbc.co.uk/2/hi/science/nature/ 4436116.stm Could be used as a starting point.
Global warming		• Pupils analyse and interpret scientific data concerning environmental issues.	Interactive quiz available at: http://www.defra.gov.uk/Environment/ climatechange/schools/12-16/quiz/index.htm.
Sustainable development		• Pupils weigh evidence and form balanced judgements about some of the major environmental issues facing society, including the importance of sustainable development.	