AS and A2 Biology Syllabus 9700
Overview

Recommended Prior Knowledge
Candidates should have at least a Grade C in IGCSE or 'O' level (or the equivalent) Biology or Coordinated Science (Dual Award Science).

Teaching Order
The AS and A2 courses could be taught following the sequence of Units listed below.

At AS, as an alternative, Unit 2 could precede Unit 1. It is recommended that these two Units are dealt with early and before AS Units 3 and 4. It would be possible to cover Unit 5 earlier if desired, for example to enable study of an ecosystem at a suitable time of year.

AS Units

Unit	Outline	Syllabus reference	
		Section	Section title
1. Cells and Cell Division	The structure of eukaryotic and prokaryotic cells, and an outline of the functions of organelles. Mitosis and its significance	A E	Cell Structure Cell and Nuclear Division
2. Molecules and Membranes	The structures and roles of biological molecules and water, and the structure and roles of cell membranes.	B D	Biological Molecules Cell Membranes and Transport
3. Enzymes, DNA and Protein Synthesis	The activity of enzymes, and the control of protein synthesis by DNA.	C F	Enzymes Genetic Control
4. Transport and Gas Exchange	Transport systems in plants and mammals, and gas exchange in humans.	G H	Transport Gas Exchange
5. Interrelationships	The relationship between pathogens and humans, including immunity, and an outline of energy transfer and the nitrogen cycle in natural communities.	I J K	Infectious Disease Immunity Ecology

Unit 1 in the A2 course is a logical starting point but can be taught later in the course to coincide with the best time to carry out photosynthesis practicals if desired.

It is possible to deal with Unit 4 as a stand-alone Unit towards the end of the course, or to teach particular learning outcomes together with relevant knowledge covered in Units 1 to 3. If Unit 4 is left as the final unit, it may be preferable to teach Unit 3 immediately prior to Unit 4 as there are more topic overlaps. Further guidance is given in the ‘Outline’ section of Unit 4.

A2 Units

Unit	Outline	Syllabus reference	
		Section	Section title
1. Energy, Respiration and Photosynthesis	The need for energy in living organisms and biochemical detail of energy transfers in living organisms.	L M	Energy and Respiration Photosynthesis
2. Regulation and Control	The need for communication systems in multicellular organisms, the roles of the nervous and endocrine systems, examples of homeostatic mechanisms. The role of the kidney in osmoregulation and nitrogenous excretion.	N	Regulation and Control
3. Inherited Change, Selection and Evolution	The mechanism and significance of meiosis, and the study of genetics. The role of natural selection in evolution and speciation.	O P	Inherited Change Selection and Evolution
4. Applications of Biology	Biodiversity and endangered species, aspects of gene technology and biotechnology, crop plants and aspects of human reproduction.	Q R S T U	Biodiversity and Conservation Gene Technology Biotechnology Crop Plants Aspects of Human Reproduction

General Resources

Within the scheme of work, books which are listed in this overview are quoted using the titles only – other books suggested have the author and publisher added, with full details in the resource list (pp.65-69) of the 2012 ***Cambridge International A & AS Level Biology Syllabus***, code 9700.

It is recommended that the websites listed below are viewed initially to check the areas that are covered and use when appropriate. For this reason, these websites are not always given in the scheme of work and the 'Learning resources' column usually contains suggestions of additional websites to view.

Especially useful websites include:

PowerPoint presentations donated by teachers	http://www.worldofteaching.com/A-ZBiologypowerpoints.html
The Society of Biology (IOB and Biosciences Federation)	http://www.societyofbiology.org/education/educational-resources/
The National Centre for Biotechnology Education	http://www.ncbe.reading.ac.uk/
Science and Plants for Schools	http://www-saps.plantsci.cam.ac.uk/
Biology 4all (many links to other useful sites)	http://www.biology4all.com/
S-cool revision	http://www.s-cool.co.uk/alevel/biology.html
The Association for Science Education teacher resources	http://www.schoolscience.co.uk/ages_14-19/for_teachers_16-19.cfm
Biochem4schools	http://www.biochem4schools.org/default.htm
On-line biology book	http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookTOC.html
The Molecular Biology Notebook	http://www.rothamsted.ac.uk/notebook/index.php?area=&page=
Kimball's Biology Pages (especially useful for teacher reference)	http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/
Practical Biology	http://www.practicalbiology.org/

General websites such as http://en.wikipedia.org/wiki/Biology are useful for extension or extra reading. Check articles first for accuracy, for example against information on websites that end in .edu (USA) or .ac.uk, or against tertiary level, or research, institutions elsewhere, before recommending a particular topic. Teachers should remind students that websites are not specifically designed for the syllabus and that they do not always provide additional information, or may be contradictory.

http://www.textbookrevolution.org/index.php/Main_Page lists free textbooks that are available online: this may be worth checking at intervals and, for students to revisit GCSE topics, http://www.biology-resources.com/ is an excellent site.

Other resources:

The most useful single text book is ***AS and A Level Biology***, Jones, Fosbery, Taylor and Gregory, published by CUP (ISBN 9780521703062) and endorsed by CIE. For practical work, ***Practical Advanced Biology***, King, Reiss and Roberts, published by Nelson Thornes (ISBN 9780174483083) and ***Comprehensive Practical Biology for A Level***, Siddiqui, published by Ferozsons (ISBN 9690015729) are both excellent. ***Bio Factsheets***, published by Curriculum Press, cover a wide range of topics and are useful for revision and extension work http://www.curriculum-press.co.uk/ . For Unit 4 of the A2 course, ***Applications of Biology****** provides helpful information and gives a guide to the level of detail required. ***Teaching AS/A2 Biology Practical Skills**** are two CIE publications useful for planning practical sessions that will help students develop the necessary skills. *CIE Teacher Support website and from CIE Publications.

A revision guide has been published for this syllabus: ***Cambridge International A/AS-Level Biology Revision Guide***, Jones, published by Hodder Education (ISBN: 9781444112672). The current Biozone International Ltd publications do not match this syllabus, but centres that have ***Biozone (2004) Advanced Biology AS and A2*** – Student Resource and Activity Manuals, (ISBN 9781877329968, 1877329223 – Model Answers ISBN 9781877329975), will find that many learning outcomes in this syllabus are covered.

As symbols, signs and abbreviations used in examination papers follow the recommendations made in ***Biological Nomenclature (4th Edition)***, published by the Society of Biology (formerly the Institute of Biology), this publication should be consulted. http://www.societyofbiology.org/education/educational-resources/bnn

The CD- ROM, ***BIOSCOPE*** is a very realistic biological microscope simulation (Cambridge-Hitachi) ISBN 9781845650261) accompanied by paper-based tasks (in Word and PDF format). There are 56 high quality slide sets of plant and animal specimens and students are also able to learn how to use an eyepiece graticule and a stage micrometer scale. http://www.cambridge.org/gb/education/secondary/subject/project/item404911/?site_locale=en_GB

Reinforcement and formative assessment

It is recommended that, towards the end of the time allocated to each of the units, time be taken to permit reinforcement of the learning that has occurred. There are many ways in which this might be done, ranging from revision lessons, through overview homework, through research project and into preparation of essays (particularly useful for the extended questions in the A2 examination), presentations, posters or other material. ***AS and A level Biology***, has useful self-assessment, and past examination, questions, both with answers. Groups of two or three students should be encouraged to work together for an hour or two of lesson time, plus homework for a week or two. They should prepare a presentation of a topic to their peers. This could be in the form of a poster, a video/video clip, a PowerPoint presentation, an OHP illustrated talk or whatever seems appropriate. Biology topics, with so much attractive visual material, are very well suited to highly visual presentations. Some students will wish to draw their own diagrams, and others to download them from the net, and others to photocopy them from paper sources – all these approaches should be encouraged.

Formative assessment could take the form of mini-tests, taking just 10 or 15 minutes for students to do and then mark for themselves, perhaps using questions from online question banks such as http://www.learncie.org.uk/ – discussing the correct answers as a whole class. At the end of the unit, there should be a much larger formative assessment test, using appropriate past-examination and similar style questions, taking a lesson to do, and a lesson to provide feedback after marking by the teacher. Past papers from which to select questions can be obtained from the CIE Teacher Support website. Note that providing students with the published mark scheme for a question has limitations and is not recommended unless further guidance is given by the teacher. The mark scheme for each question paper must be used by the teacher in conjunction with the relevant question paper and the Examiner Report. Teachers should be familiar with the abbreviations and conventions used in the mark scheme.