

DAWOOD PUBLIC SCHOOL
Course out line 2011-2012
Subject Biology
Class – XI

Books:

Kwan .L. 2000, Comprehensive Biology(3 ed),Singapore; Federal Publication
 Mackean.D, GCE O Level Biology, Oxford University Press

Cambridge O Level Biology
Syllabus code 5090

All candidates enter for **three** papers – Papers 1 and 2 and either Paper 3 or 6.

Paper 1 Multiple Choice**1 hour**

40 compulsory multiple choice questions. The questions involve four response options.
 40 marks weighted at 25%.

Paper 2 Theory**1 hour 45 minutes**

This paper has three sections.

Section A carries 50 marks and consists of a small number of compulsory, structured questions.

Section B carries 20 marks and consists of two compulsory questions. Each question is worth 10 marks.

Section C carries 10 marks and candidates must choose **one** from a choice of two questions.

80 marks weighted at 50%.

Paper 6 Alternative to Practical**1 hour**

A written paper of questions designed to test past experience of practical work. 40 marks weighted at 25%.

Syllabus Aims and Assessment**AIMS**

The aims provide the educational purposes of following a course in this subject. Some of these aims are reflected in the assessment objectives; others are not because they cannot readily be translated into objectives that can be assessed. The aims are not listed in an order of priority.

The aims are to:

1. Provide, through well designed studies of experimental and practical biological science, a worthwhile educational experience for all students, whether or not they go on to study science beyond this level and, in particular, to enable them to acquire sufficient understanding and knowledge to
 - 1.1 Become confident citizens in a technological world, able to take or develop an informed interest in matters of scientific import;
 - 1.2 Recognize the usefulness, and limitations, of scientific method and to appreciate its applicability in other disciplines and in everyday life;
 - 1.3 Be suitably prepared and stimulated for studies beyond Ordinary Level in pure sciences, in applied sciences or in science-dependent vocational courses
2. Develop abilities and skills that
 - 2.1 Are relevant to the study and practice of science;
 - 2.2 Are useful in everyday life;
 - 2.3 Encourage efficient and safe practice;
 - 2.4 Encourage effective communication.
3. Develop attitudes relevant to science such as
 - 3.1 Concern for accuracy and precision;
 - 3.2 Objectivity;
 - 3.3 Integrity;
 - 3.4 Enquiry;
 - 3.5 Initiative;
 - 3.6 Initiativenes
4. Stimulate interest in and care for the local and global environment.
5. Promote awareness that

- 5.1 The study and practice of science are co-operative and cumulative activities that are subject to social, economic, technological, ethical and cultural influences and limitations;
- 5.2 The applications of science may be both beneficial and detrimental to the individual, the community and the environment;
- 5.3 Science transcends national boundaries and that the language of science, correctly and rigorously applied, is universal.

Assessment Objective

The assessment objectives describe the knowledge, skills and abilities that candidates are expected to demonstrate at the end of the course. They reflect those aspects of the aims that are assessed.

A Knowledge with understanding

Candidates should be able to demonstrate knowledge and understanding in relation to:

1. Scientific phenomena, facts, laws, definitions, concepts, theories;
2. Scientific vocabulary, terminology and conventions (including symbols, quantities and units);
3. Scientific instruments and apparatus, including techniques of operation and aspects of safety;
4. Scientific quantities and their determination;
5. Scientific and technological applications with their social, economic and environmental implications.

B Handling information and solving problems

Candidates should be able – using oral, written, symbolic, graphical and numerical forms of presentation – to:

1. Locate, select, organize and present information from a variety of sources;
2. Translate information from one form to another;
3. Manipulate numerical and other data;
4. Use information to identify patterns, report trends and draw inferences;
5. Present reasoned explanations for phenomena, patterns and relationships;
6. Make predictions and propose hypotheses;
7. Solve problems.

C Experimental skills and investigations

1. Follow a sequence of instructions;
2. Use techniques, apparatus, measuring devices and materials effectively and safely;
3. Make and record observations, measurements, calculations and estimates with due regard to precision, accuracy and units;
4. Interpret, evaluate and report upon observations and experimental data;
5. Identify problems, design/plan and carry out investigations, including the selection of techniques, apparatus, measuring devices and materials;
6. Evaluate methods and suggest possible improvements..

Monthly Syllabus

August	<ul style="list-style-type: none"> ● The reproductive process ● reproduction in plants ● ATP
September	<ul style="list-style-type: none"> ● Reproduction in plants ● human reproduction ● ATP
October	<ul style="list-style-type: none"> ● Variation, heredity and genetics ● Inheritance ● ATP
November	<ul style="list-style-type: none"> ● Inheritance ● ATP ● Revision for mid term exams
December	<ul style="list-style-type: none"> ● Mid term exams
January	<ul style="list-style-type: none"> ● Artificial selection and variation ● ATP
February	<ul style="list-style-type: none"> ● Drugs ● past papers ● ATP
March	<ul style="list-style-type: none"> ● Revision for mock exams ● Mock Exams

Syllabus Content

1. Development of organisms and continuity of life

Comprehensive Biology by Lam Peng Kwan Chap 16-17 Pg No.(251-254)

Content

- 1.1 Asexual reproduction
- 1.2 Sexual reproduction in plants
- 1.3 Sexual reproduction in humans
- 1.4 Sexually transmitted diseases

Learning outcomes

Students should be able to:

- (a) Define mitosis as cell division giving rise to genetically identical cells in which the chromosome number is maintained and state the role of mitosis in growth, repair of damaged tissues, replacement of worn out cells and asexual reproduction;
- (b) Define asexual reproduction as the process resulting in the production of genetically identical offspring from one parent and describe **one named**, commercially important application of asexual reproduction in plants;
- (c) Define meiosis as a reduction division in which the chromosome number is halved from diploid to haploid;
- (d) State that gametes are the result of meiosis
- (e) Define sexual reproduction as the process involving the fusion of haploid nuclei to form a diploid zygote and the production of genetically dissimilar offspring;
- (f) Identify and draw, using a hand lens if necessary, the sepals, petals, stamens and carpels of **one**, locally available, **named**, insect-pollinated, dicotyledonous flower, and examine the pollen grains under a light microscope;
- (g) State the functions of the sepals, petals, anthers and carpels;
- (h) Use a hands lens to identify and describe the anthers and stigmas of **one**, locally available, **named**, wind pollinated flower, and examine the pollen grains under a light microscope;
- (i) Outline the process of pollination and distinguish between self-pollination and cross-pollination;
- (j) Compare, using fresh specimens, an insect-pollinated and a wind-pollinated flower;
- (k) Describe the growth of the pollen tube and its entry into the ovule followed by fertilisation (production of endosperm and details of development are **not** required);
- (l) Investigate and describe the structure of a non-endospermic seed in terms of the embryo and testa, protected by the pericarp;
- (m) State that seed and fruit dispersal by wind and by animals provides a means of colonising new areas;
- (n) Describe the external features of **one**, locally available, **named** example of a wind-dispersed fruit or seed and of one **named** example of an animal-dispersed fruit or seed;
- (o) Investigate and state the environmental conditions that affect germination of seeds: suitable temperature, water and oxygen;
- (p) Describe the uses of enzymes in the germination of seeds;
- (q) Identify on diagrams of the male reproductive system and give the functions of the testes, scrotum, sperm ducts, prostate gland, urethra and penis;
- (r) Identify on diagrams of the female reproductive system and give the functions of the ovaries, oviducts, uterus, cervix and vagina;
- (s) Compare male and female gametes in terms of size, numbers and mobility;
- (t) Describe the menstrual cycle, with reference to the alternation of menstruation and ovulation, the natural variation in its length and the fertile and infertile phases of the cycle;
- (u) Explain the role of hormones in controlling the menstrual cycle
- (v) Describe fertilisation and early development of the zygote simply in terms of the formation of a ball of cells that becomes implanted in the wall of the uterus;
- (w) State the function of the amniotic sac and the amniotic fluid;
- (x) Describe the function of the placenta and umbilical cord in relation to exchange of dissolved nutrients, gases and excretory products ;
- (y) Describe the special dietary needs of pregnant women;
- (z) Describe the advantages of breast milk compared with bottle milk;
 - (i) Describe the following methods of birth control:natural, chemical (spermicides), mechanical, hormonal and surgical;
 - (ii) Explain that syphilis is caused by a bacterium that is transmitted during sexual intercourse;
 - (iii)Describe the symptoms, signs, effects and treatment of syphilis;
 - (iv)Discuss the spread of human immunodeficiency virus (HIV) and methods by which it may be controlled.

2. Inheritance

Comprehensive Biology by Lam Peng Kwan Chap 18 Pg No.(266-280)

Content

- 2.1 Variation
- 2.2 Chromosomes and DNA
- 2.3 Monohybrid inheritance
- 2.4 Selection
- 2.5 Genetic engineering

Learning outcomes

Students should be able to:

- (a) Describe the difference between continuous and discontinuous variation and give examples of each;
- (b) State that a chromosome includes a long molecule of DNA;
- (c) State that DNA is divided up into sections called genes;
- (d) Explain that genes may be copied and passed on to the next generation;
- (e) Define a gene as a unit of inheritance and distinguish clearly between the terms gene and allele;
- (f) Describe complete dominance using the terms dominant, recessive, phenotype and genotype;
- (g) Describe mutation as a change in the structure of a gene or in the chromosome number
- (h) Name radiation and chemicals as factors that may increase the rate of mutation;
- (i) Predict the results of simple crosses with expected ratios of 3:1 and 1:1, using the terms homozygous, heterozygous, F1 generation and F2 generation;
- (j) Explain why observed ratios often differ from expected ratios, especially when there are small numbers of progeny;
- (k) Explain codominance by reference to the inheritance of the ABO blood group phenotypes (A, B, AB, O, gene alleles I^A , I^B and I^O);
- (l) Describe the determination of sex in humans (XX and XY chromosomes);
- (m) Describe variation and state that competition leads to differential survival of organisms, and reproduction by those organisms' best fitted to the environment;
- (n) Assess the importance of natural selection as a possible mechanism for evolution;
- (o) Describe the role of artificial selection in the production of economically important plants and animals;
- (p) explain that DNA controls the production of proteins;
- (q) State that each gene controls the production of one protein;
- (r) Explain that genes may be transferred between cells
- (s) Explain that the gene that controls the production of human insulin can be inserted into bacterial DNA;
- (t) Understand that such genetically engineered bacteria can be used to produce human insulin on a commercial scale;
- (u) Discuss potential advantages and dangers of genetic engineering.

3. The use and abuse of drugs

Comprehensive Biology by Lam Peng Kwan Chap 21 Pg No.(281-287)

Content

- 3.1 Antibiotics
- 3.2 Effects of heroin
- 3.3 Effects of alcohol
- 3.4 Effects of tobacco smoke

Learning outcomes

Students should be able to:

- (a) Define a drug as any externally administered substance that modifies or affects chemical reactions in the body;
- (b) Describe the medicinal use of antibiotics for the treatment of bacterial infection;
- (c) Describe the effects of the abuse of heroin: a powerful depressant, problems of addiction, severe withdrawal symptoms and associated problems such as crime and infection e.g. AIDS;
- (d) Describe the effects of excessive consumption of alcohol: reduced self-control, depressant, effect on reaction times, damage to liver and social implications;
- (e) Describe the effects of tobacco smoke and its major toxic components on health: strong association with bronchitis, emphysema, lung cancer and heart disease, and the association between smoking during pregnancy and reduced birth weight of the baby;
- (f) Recognize the fact that many people regard smoking as no longer socially acceptable.

Paper 6: Alternative to practical

- 1. The Alternative to Practical is designed to test students' abilities:
 - (a) To follow carefully a sequence of instructions within a set time allowance;
 - (b) To use and describe familiar, and use and suggest unfamiliar, techniques to record their observations and make deductions from them;

- (c) To recognise and observe features of photographs and drawings of familiar and unfamiliar biological specimens, record their observations and make deductions about functions of whole specimens or their parts;
 - (d) To make clear line drawings of the images of specimens provided, indicate magnification and to label familiar structures;
 - (e) To interpret unfamiliar data and draw conclusions from their interpretations;
 - (f) To design/plan an investigation to solve a problem;
 - (g) To comment on a procedure used in an experiment and suggest an improvement;
 - (h) To observe simulations and images of reactions, read, from photographs and diagrams, simple measuring instruments and perform simple arithmetical calculations;
 - (i) To measure to an accuracy of 1 mm, using a ruler.
2. Students may be asked to describe simple physiological experiments, involving tests for food substances, enzyme reactions, hydrogen carbonate indicator solution, cobalt chloride paper, and other materials listed in this syllabus. It is expected that student will have experience of the use of glassware and instruments normally found in a laboratory e.g. beakers, test-tube racks, funnels, thermometers, droppers and other apparatus listed in this syllabus, so that they can describe their use in such experiments.
 3. Students may be asked to describe simple physiological experiments, involving the use of the items mentioned above involving plant or animal materials. Accurate observations of life-sized and magnified images of such specimens will be expected.
 4. The material set will be closely related to the subject matter of the syllabus, but will not necessarily be limited to the particular types mentioned in it. In order to assist their own practical work, schools are recommended to build up a reference collection of material with which candidates can practice.
 5. When planning practical work, teachers should make sure that they do not contravene any school, education authority or government regulations that restrict the sampling, in educational establishments, of urine, saliva, blood or other bodily secretions and tissues.

Glossary of terms used in biology papers

During the moderation of a question paper, care is taken to ensure that the paper and its individual questions are, in relation to the syllabus, fair as regards balance, overall difficulty and suitability. Attention is also paid to the wording of questions to ensure that it is as concise and as unambiguous as possible. In many instances, Examiners are able to make appropriate allowance for an interpretation that differs, but acceptably so, from the one intended.

It is hoped that the glossary (which is relevant only to biology, human and social biology and agriculture) will prove helpful to candidates as a guide (i.e. it is neither exhaustive nor definitive). The glossary has been deliberately kept brief not only with respect to the number of terms included but also to the descriptions of their meanings. Candidates should appreciate that the meaning of a term must depend, in part, on its context.

1. Define (the term(s) ...) is intended literally, only a formal statement or equivalent paraphrase being required.
2. What is meant by (the term(s) ...) normally implies that a definition should be given, together with some relevant comment on the significance or context of the term(s) concerned, especially where two or more terms are included in the question. The amount of supplementary comment intended should be interpreted in the light of the indicated mark value.
3. State implies a concise answer with little or no supporting argument (e.g. a numerical answer that can readily be obtained 'by inspection').
4. List requires a number of points, generally each of one word, with no elaboration. Where a given number of points is specified, this should not be exceeded.
5. (a) Explain may imply reasoning or some reference to theory, depending on the context. It is another way of asking candidates to give reasons for. The candidate needs to leave the examiner in no doubt **why** something happens.
(b) Give a reason/Give reasons is another way of asking candidates to explain **why** something happens.
6. (a) Describe, the data or information given in a graph, table or diagram, requires the candidate to state the key points that can be seen in the stimulus material. Where possible, reference should be made to numbers drawn from the stimulus material.
(b) Describe, a process, requires the candidate to give a step by step written statement of what happens during the process. Describe and explain may be coupled, as may state and explain.
7. Discuss requires the candidate to give a critical account of the points involved in the topic.
8. Outline implies brevity (i.e. restricting the answer to giving essentials).
9. Predict implies that the candidate is not expected to produce the required answer by recall but by making a logical connection between other pieces of information. Such information may be wholly given in the question or may depend on answers extracted in an earlier part of the question. Predict also implies a concise answer, with no supporting statement required.
10. Deduce is used in a similar way to predict except that some supporting statement is required (e.g. reference to a law/principle, or the necessary reasoning is to be included in the answer).
11. Suggest is used in two main contexts i.e. either to imply that there is no unique answer (e.g. in Biology, there are a variety of factors that might limit the rate of photosynthesis in a plant kept in a glasshouse) or to imply that candidates are expected to apply their general knowledge and understanding of biology to a 'novel' situation, one that may be formally 'not in the syllabus' – many data response and problem solving questions are of this type.
12. Find is a general term that may variously be interpreted as calculate, measure, determine, etc.
13. Calculate is used when a numerical answer is required. In general, working should be shown, especially where two or more steps are involved.

14. Measure implies that the quantity concerned can be directly obtained from a suitable measuring instrument (e.g. length, using a rule, or mass, using a balance).
15. Determine often implies that the quantity concerned cannot be measured directly but is obtained by calculation, substituting measured or known values of other quantities into a standard formula.
16. Estimate implies a reasoned order of magnitude statement or calculation of the quantity concerned, making such simplifying assumptions as may be necessary about points of principle and about the values of quantities not otherwise included in the question.
17. Sketch, when applied to graph work, implies that the shape and/or position of the curve need only be qualitatively correct, but candidates should be aware that, depending on the context, some quantitative aspects may be looked for (e.g. passing through the origin, having an intercept, asymptote or discontinuity at a particular value).

In diagrams, sketch implies that a simple, freehand drawing is acceptable; nevertheless, care should be taken over proportions and the clear exposition of important details.

In all questions, the number of marks allocated are shown on the examination paper and should be used as a guide by candidates to how much detail to give. In describing a process the mark allocation should guide the candidate about how many steps to include. In explaining why something happens, it guides the candidate how many reasons to give, or how much detail to give for each reason.

Resource list:

Author	Title and Date	Publisher	ISBN
Ian J Burton	The Cambridge Revision Guide GCE O Level Biology (2000)	Cambridge University Press http://uk.cambridge.org/education/international/cie	0521648467
Mary Jones	O Level Biology (2003)	Oxford University Press http://www4.oup.co.uk	0195799828
Mary Jones & Geoff Jones	Biology: International Edition for IGCSE and O Level (2002)	Cambridge University Press http://uk.cambridge.org/education/international/cie	0521891175

Other helpful textbooks:

Author	Title and Date	Publisher	ISBN
Carrington, M. Agard & L. Sealy	Biology, Skills for Excellence (1995)	Longman Caribbean http://www.longmancaribbean.com	0582093473
Julian Ford-Robertson	Revise GCSE Study Guide in Biology (2001)	Letts Educational http://www.letts-education.com	1858059291
D. Hayward	Teaching and Assessing Practical Skills in Science (2003)	Cambridge University Press http://uk.cambridge.org	0521753597
D. Hayward	IGCSE Study Guide for Biology (endorsed by CIE) (2005)	Hodder Murray http://www.hoddereducation.co.uk	071957904X
Geoff Jones & Mary Jones	Biology (3rd edition 1995)	Cambridge University Press http://uk.cambridge.org/education/international/cie	0521456185

Mary Jones	Biology for IGCSE (2 nd edition 2002)	Heinemann http://www.heinemann.co.uk	0435966782
D. G. Mackean	IGCSE Biology (2002)	John Murray http://www.johnmurray.co.uk	0719580536
Parsons (Ed.)	GCSE Biology Revision Guides and Workbooks	Co-ordination Group Publications http://www.cgpbooks.co.uk	
W.R. Pickering	Complete Biology (2000)	Oxford University Press http://www4.oup.co.uk	0199147396
