

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

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 Paper 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 Becomes confident citizens in a technological world, able to take or develop an informed interest in matters of scientific import;
 - 1.2 Recognizes 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 Enquiries;
 - 3.5 Initiatives;
 - 3.6 Inventiveness.

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 Sciences transcend 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

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|-----------|--|
| August | <ul style="list-style-type: none"> ● Homeostasis ● excretion |
| September | <ul style="list-style-type: none"> ● Sensitivity and movement in plants ● support ; movement and locomotion in animals |
| October | <ul style="list-style-type: none"> ● Co-ordination and response ● animal senses and behavior |
| November | <ul style="list-style-type: none"> ● Animal senses and behavior ● Revision for midterm exams |
| December | <ul style="list-style-type: none"> ● Midterm exams |
| January | <ul style="list-style-type: none"> ● Ecology ● parasites, diseases and immunity |
| February | <ul style="list-style-type: none"> ● The use and abuse of drug ● evolution and natural selection |
| March | <ul style="list-style-type: none"> ● Micro organism and biotechnology <p>Revision for mock exams</p> <ul style="list-style-type: none"> ● mock exams |

Syllabus Content

1. Excretion

Comprehensive Biology by Lam Peng Kwan Chap 7 Pg No.(149-157)

Content

- 1.1 Structure and function of kidneys
- 1.2 Kidney dialysis

Learning outcomes

Students should be able to:

- (a) Define excretion as the removal of toxic materials and the waste products of metabolism from organisms;
- (b) Describe the removal of carbon dioxide from the lungs;
- (c) Identify on diagrams and name the kidneys, ureters, bladder, urethra and state the function of each
- (d) Describe dialysis in kidney machines as the diffusion of waste products and salts through a membrane; large molecules remain in the blood.

2. Homeostasis

Comprehensive Biology by Lam Peng Kwan Chap 8 Pg No.(157-166)

Content

- 2.1 Structure and function of the skin

Learning outcomes

- a. Students should be able to:
- b. Define *homeostasis* as the maintenance of a constant internal environment;
- c. Explain the concept of control by negative feedback;
- d. Identify, on a diagram of the skin, hairs, sweat glands, temperature receptors, blood vessels and fatty tissue;
- e. Describe the maintenance of a constant body temperature in humans in terms of insulation and the role of temperature receptors in the skin, sweating, shivering, blood vessels near the skin surface and the coordinating role of the brain.

3. Coordination and response

Comprehensive Biology by Lam Peng Kwan Chap10,11Pg No.(190- 199)

Content

- 3.1 Nervous system
- 3.2 Receptors
- 3.3 Reflex action
- 3.4 Hormones

Learning outcomes

- a. Candidates should be able to:
- b. State that the nervous system – brain, spinal cord and nerves, serves to coordinate and regulate bodily functions;
- c. Identify, on diagrams of the central nervous system, the cerebrum, cerebellum, pituitary gland and hypothalamus, medulla, spinal cord and nerves;
- d. Describe the principal functions of the above structures in terms of coordinating and regulating bodily functions;
- e. Describe the gross structure of the eye as seen in front view and in horizontal section;
- f. State the principal functions of component parts of the eye in producing a focused image of near and distant objects on the retina;
- g. Describe the pupil reflex in response to bright and dim light;
- h. Outline the functions of sensory neurons, relay neurons and motor neurons;

- i. Discuss the function of the brain and spinal cord in producing a coordinated response as a result of a specific stimulus;
- j. Define a hormone as a chemical substance, produced by a gland, carried by the blood, which alters the activity of one or more specific target organs and is then destroyed by the liver;
- k. State the role of the hormone adrenaline in boosting the blood glucose concentration and give examples of situations in which this may occur;
- l. Describe the signs and treatment of diabetes mellitus.

4. Support, movement and locomotion

Comprehensive Biology by Lam Peng Kwan Chap 13 Pg No.(216-230)

Content

- 4.1 Bones
- 4.2 Joints
- 4.3 Antagonistic muscles

Learning outcomes

- a. Students should be able to:
- b. Identify and describe, from diagrams, photographs and real specimens, the main bones of the forelimb of a mammal;
- c. Describe the type of movement permitted by the ball and socket joint and the hinge joint of the forelimb;
- d. Describe the action of the antagonistic muscles at the hinge joint.

5. The use and abuse of drugs

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

Content

- 5.1 Antibiotics
- 5.2 Effects of heroin
- 5.3 Effects of alcohol
- 5.4 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.

6. Microorganisms and biotechnology

Comprehensive Biology by Lam Peng Kwan Chap 22 Pg No.(255-286)

Content

- 6.1 Microorganisms
- 6.2 Food biotechnology
- 6.3 Industrial biotechnology

Learning outcomes

- a. Students should be able to:
- b. List the main characteristics of the following groups: viruses, bacteria and fungi;
- c. Outline the role of microorganisms in decomposition;
- d. Explain the role of yeast in the production of bread and alcohol;
- e. Outline the role of bacteria in yoghurt and cheese production;
- f. Describe the use of fermenters for large-scale production of antibiotics and single cell protein;
- g. Describe the role of the fungus *Penicillium* in the production of penicillin.

6. Relationships of organisms with one another and with the environment

Comprehensive Biology by Lam Peng Kwan Chap 14 Pg No.(299- 320)

Content

- 7.1 Energy flow
- 7.2 Food chains and food webs
- 7.3 Carbon cycle
- 7.4 Nitrogen cycle
- 7.5 Parasitism
- 7.6 Effects of humans on the ecosystem
- 7.7 Pollution
- 7.8 Conservation

Learning outcomes

Students should be able to:

- a. State that the Sun is the principal source of energy input to biological systems;
- b. Describe the non-cyclical nature of energy flow;
- c. Define the following terms and establish the relationship of each in food webs: Producer, consumer, herbivore, carnivore, decomposer, food chain;
- d. Describe energy losses between trophic levels and infer the advantages of short food chains;
- e. Describe and interpret pyramids of numbers and of biomass; describes and state the importance of the carbon cycle;
- f. describe the nitrogen cycle in making available nitrogen for plant and animal protein, including the role of bacteria in nitrogen fixation, decomposition and nitrification (details of nitrification and the names of individual bacteria are **not** required);
- g. Understand the role of the mosquito as a vector of disease;
- h. Describe the malaria pathogen as an example of a parasite and describe the transmission and control of the malarial pathogen (details of the life cycle of the pathogen are **not** required);
- i. Describe the effects of humans on the ecosystem with emphasis on examples of international
- j. importance (tropical rain forests, oceans and important rivers);
- k. Describe the consequences of deforestation in terms of its effects on soil stability, climate and local human populations;
- l. Evaluate the effects of:
 - m. Water pollution by sewage, by inorganic waste and by nitrogen-containing fertilizers;
 - n. air pollution by greenhouse gases, contributing to global warming;
 - o. air pollution by acidic gases, contributing to acid rain;
 - p. pollution due to insecticides;
- (q) Discuss reasons for conservation of species with reference to maintenance of biodiversity, management of fisheries and management of timber production;
- (r) Discuss reasons for recycling materials, with reference to **named** examples.

7. Microorganisms and biotechnology

Comprehensive Biology by Lam Peng Kwan Chap 22 Pg No.(255-288)

Content

- 8.1 Microorganisms
- 8.2 Food biotechnology
- 8.3 Industrial biotechnology

Learning outcomes

Students should be able to:

- List the main characteristics of the following groups: viruses, bacteria and fungi;
- Outline the role of microorganisms in decomposition;
- Explain the role of yeast in the production of bread and alcohol;
- Outline the role of bacteria in yoghurt and cheese production;
- Describe the use of fermenters for large-scale production of antibiotics and single cell protein;
- Describe the role of the fungus *Penicillium* in the production of penicilli

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 |

Useful websites:

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| American Lung Association | www.lungusa.org/diseases |
| CELLS alive | www.cellsalive.com |
| GCSE BITESIZE revision in biology | www.bbc.co.uk/schools/gcsebitesize/biology |
| Middle school science | www.middleschoolscience.com |
| SAPS (Science and Plants for Schools) | www-saps.plantsci.cam.ac.uk |
| School science | www.schoolscience.co.uk |
| The Science Spot | www.sciencespot.net |
