

**Dawood Public School**  
**Course Outline 2017-18**  
**Biology**  
**Class X**

**BOOKS:**

Ron Pickering.2012 Fundamental Biology (oxford university Press)  
Kwan. 2000, *Comprehensive Biology (3 ed)*, Singapore; Federal Publication  
McKean. D, *GCE O Level Biology*, Oxford University Press

**Cambridge O Level Biology**  
**Syllabus code 5090**

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**1. ASSESSMENT AT A GLANCE**

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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	
Paper 2: Theory	1 hour 45 minutes
The paper has three sections. Section A has 50 marks and consists of a small number of compulsory, structured questions. Section B has 20 marks and consists of two compulsory questions. Each question is worth 10 marks. Section c carries 10 marks and candidate must choose one from a choice of two questions. 80 marks	
Paper:6 Alternate to Practical	1 hour
A written paper of questions designed to test past experience of practical work. 40 marks	

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**2. SYLLABUS AIMS:**

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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:

- 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
- become confident citizens in a technological world, able to take or develop an informed interest in matters of scientific import;
- recognize the usefulness, and limitations, of scientific method and to appreciate its applicability in other disciplines and in everyday life;
- Be suitably prepared and stimulated for studies beyond Cambridge O Level in pure sciences, in applied sciences or in science-dependent vocational courses.
- develop abilities and skills that
- are relevant to the study and practice of science;
- are useful in everyday life;

- encourage efficient and safe practice;
- encourage effective communication.
- develop attitudes relevant to science such as
- concern for accuracy and precision;
- objectivity;
- integrity;
- enquiry;
- initiative;
- Inventiveness.
- Stimulate interest in and care for the local and global environment.
- promote an awareness that
- 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;
- the applications of science may be both beneficial and detrimental to the individual, the community and the environment;
- Science transcends national boundaries and that the language of science, correctly and rigorously applied, is universal.

## MONTHLY SYLLABUS

<b>August</b>	<ul style="list-style-type: none"> <li>• Homeostasis</li> <li>• excretion</li> </ul>
<b>September</b>	<ul style="list-style-type: none"> <li>• support; movement and locomotion</li> </ul>
<b>October</b>	<ul style="list-style-type: none"> <li>• Co-ordination and response</li> </ul>
<b>November</b>	<ul style="list-style-type: none"> <li>• Revision for midterm exams</li> </ul>
<b>December</b>	<ul style="list-style-type: none"> <li>• Midterm exams</li> </ul>
<b>January</b>	<ul style="list-style-type: none"> <li>• Relationships of organisms with one another and with the environment</li> </ul>
<b>February</b>	<ul style="list-style-type: none"> <li>• Microorganism and biotechnology</li> </ul>
<b>March</b>	<ul style="list-style-type: none"> <li>• Revision for mock exams</li> <li>• mock exams</li> </ul>

## AUGUST

### Homeostasis

#### Content

10.1 Structure and function of the skin

#### Learning outcomes

Candidates should be able to:

- define homeostasis as the maintenance of a constant internal environment
- explain the concept of control by negative feedback
- identify, on a diagram of the skin, hairs, sweat glands, temperature receptors, blood vessels and fatty tissue
- 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.

## **Excretion**

### **Content**

9.1 Structure and function of kidneys

9.2 Kidney dialysis

### **Learning outcomes**

Candidates 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 (the function of the kidney should be described simply as removing urea and excess salts and water from the blood; details of kidney structure and nephron are **not** required)
- d) describe dialysis in kidney machines as the diffusion of waste products and salts (small molecules) through a membrane; large molecules (e.g. protein) remain in the blood.

## **SEPTEMBER**

### **Support, movement and locomotion**

#### **Content**

12.1 Bones

12.2 Joints

12.3 Antagonistic muscles

### **Learning outcomes**

Candidates should be able to:

- a) identify and describe, from diagrams, photographs and real specimens, the main bones of the forelimb (humerus, radius, ulna and scapula) of a mammal
- b) describe the type of movement permitted by the ball and socket joint and the hinge joint of the forelimb
- c) describe the action of the antagonistic muscles at the hinge joint.

## **OCTOBER**

### **Coordination and response**

#### **Content**

11.1 Nervous system

11.2 Receptors

11.3 Reflex action

11.4 Hormones

### **Learning outcomes**

Candidates should be able to:

- a) state that the nervous system (brain, spinal cord and nerves) serves to coordinate and regulate bodily functions
- b) identify, on diagrams of the central nervous system, the cerebrum, cerebellum, pituitary gland and hypothalamus, medulla, spinal cord and nerves
- c) describe the principal functions of the above structures in terms of coordinating and regulating bodily functions
- d) describe the gross structure of the eye as seen in front view and in horizontal section
- e) state the principal functions of component parts of the eye in producing a focused image of near and distant objects on the retina
- f) describe the pupil reflex in response to bright and dim light
- g) outline the functions of sensory neurons, relay neurons and motor neurons

- h) discuss the function of the brain and spinal cord in producing a coordinated response as a result of a specific stimulus (reflex action)
- i) 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
- j) state the role of the hormone adrenaline in boosting the blood glucose concentration and give examples of situations in which this may occur
- k) state the role of the hormone insulin in controlling blood glucose concentration
- l) describe the signs (increased blood glucose concentration and glucose in urine) and treatment (administration of insulin) of diabetes mellitus.

## NOVEMBER

Revision for midterm examination

## DECEMBER

Midterm Examination

## FINAL TERM

## JANUARY

### Relationships of organisms with one another and with the environment

#### Content

- 15.1 Energy flow
- 15.2 Food chains and food webs
- 15.3 Carbon cycle
- 15.4 Nitrogen cycle
- 15.5 Parasitism
- 15.6 Effects of humans on the ecosystem
- 15.7 Pollution
- 15.8 Conservation

#### Learning outcomes

Candidates 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 – an organism that makes its own organic nutrients, usually using energy from sunlight through photosynthesis
  - consumer – an organism that gets its energy by feeding on other organisms
  - herbivore – an animal that obtains its energy by eating plants
  - carnivore – an animal that obtains its energy by eating other animals
  - decomposer – an organism that obtains its energy from dead or waste organic matter
  - food chain – a chart showing the flow of energy (food) from one organism to the next, beginning with the producer (e.g. mahogany tree → caterpillar → songbird → hawk)
- 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
- f) describe and state the importance of the carbon cycle
- g) 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 denitrification and the names of individual bacteria are **not** required)
- h) understand the role of the mosquito as a vector of disease
- i) describe the malarial 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)
- j) describe the effects of humans on the ecosystem with emphasis on examples of international importance (tropical rainforests, 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: water pollution by sewage, by inorganic waste and by nitrogen-containing fertilizers air pollution by greenhouse gases (carbon dioxide and methane), contributing to global warming air pollution by acidic gases (sulfur dioxide and oxides of nitrogen), contributing to acid rain pollution due to insecticides
- m) discuss reasons for conservation of species with reference to maintenance of biodiversity, management of fisheries and management of timber production
- n) discuss reasons for recycling materials, with reference to **named** examples.

## FEBRUARY

### Microorganisms and biotechnology

#### Content

- 14.1 Microorganisms
- 14.2 Food biotechnology
- 14.3 Industrial biotechnology

#### Learning outcomes

Candidates should be able to:

- a) list the main characteristics of the following groups: viruses, bacteria and fungi
- b) outline the role of microorganisms in decomposition
- c) explain the role of yeast in the production of bread and alcohol
- d) outline the role of bacteria in yoghurt and cheese production
- e) describe the use of fermenters for large-scale production of antibiotics and single cell protein
- f) describe the role of the fungus *Penicillium* in the production of penicillin.

## APRIL

Revision for Final term

## MAY

Final Examination

### Resource list:

**Title and date Publisher ISBN**

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

### Useful websites available at the time of writing

<http://www.cellsalive.com> CELLS alive

<http://www.bbc.co.uk/schools/gcsebitesize/biology/> GCSE BITESIZE revision in biology

<http://www.schoolscience.co.uk> School science Applications of science