

Dawood Public School
Course Outline 2020-21
Cambridge O Level Biology 5090
Grade XI

Months	Syllabus Break down	Reference Book
August	Reproduction in Plants	Biology by Lam Peng Kwan Chapter 20 D.G Mackean Chapter 8 & 9
		ATP paper
September	Human Reproduction	Biology by Lam Peng Kwan Chapter 21 D.G Mackean Chapter 16
		ATP paper
October	Variation, Heredity and Genetics Inheritance	Biology by Lam Peng Kwan Chapter 22 D.G Mackean Chapter 23
		ATP paper
November	Revision	Past papers
December	MID-YEAR EXAMINATION	
January	Artificial selection and Variation	Biology by Lam Peng Kwan Chapter 22 D.G Mackean Chapter 23
		ATP paper
February	The Use and abuse of Drugs	Biology by Lam Peng Kwan Chapter 16 D.G Mackean Chapter 20
		Past papers & ATP paper
March	MOCK EXAMINATION	

1. ASSESSMENT AT A GLANCE

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	

2. SYLLABUS 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:

- 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.

SYLLABUS BREAKDOWN

1. Development of organisms and continuity of life

Biology by Lam Peng Kwan Chapter 20 (page no: 309-336) and 21 (page no: 337-356)

D.G Mackean Chapter 8 (page no: 67-78), 9 (page no: 79-82) and 16 (page no: 140-151)

Content

16.1 Asexual reproduction

16.2 Sexual reproduction in plants

16.3 Sexual reproduction in humans

16.4 Sexually transmitted diseases

Learning outcomes

Candidates should be able to:

- 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.
- 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.
- Define meiosis as a reduction division in which the chromosome number is halved from diploid to haploid.
- State that gametes are the result of meiosis (reduction division).
- Define sexual reproduction as the process involving the fusion of haploid nuclei to form a diploid zygote and the production of genetically dissimilar offspring.
- 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.
- State the functions of the sepals, petals, anthers and carpels.
- Use a hand 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.
- Outline the process of pollination and distinguish between self-pollination and cross-pollination.
- Compare, using fresh specimens, an insect-pollinated and a wind-pollinated flower.
- Describe the growth of the pollen tube and its entry into the ovule followed by fertilization (production of endosperm and details of development are **not** required).
- Investigate and describe the structure of a non-endospermic seed in terms of the embryo (radicle, plumule and cotyledons) and testa, protected by the pericarp (fruit wall).
- State that seed and fruit dispersal by wind and by animals provides a means of colonizing new areas.
- 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.
- Investigate and state the environmental conditions that affect germination of seeds: suitable temperature, water and oxygen.
- Describe the uses of enzymes in the germination of seeds.
- Identify on diagrams of the male reproductive system and state the functions of the testes, scrotum, sperm ducts, prostate gland, urethra and penis.
- Identify on diagrams of the female reproductive system and state the functions of the ovaries, oviducts, uterus, cervix and vagina.
- Compare male and female gametes in terms of size, numbers and mobility.
- 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.
- Explain the role of hormones in controlling the menstrual cycle (including FSH, LH, progesterone and estrogen).
- Describe fertilization 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.
- State the function of the amniotic sac and the amniotic fluid.

- Describe the function of the placenta and umbilical cord in relation to exchange of dissolved nutrients, gases and excretory products (**no** structural details are required).
- Describe the special dietary needs of pregnant women.
- Describe the advantages of breast milk compared with bottle milk.
- Describe the following methods of birth control:
 - natural
 - chemical (spermicides)
 - mechanical
 - hormonal
 - surgical
- Explain that syphilis is caused by a bacterium that is transmitted during sexual intercourse.
- Describe the symptoms, signs, effects and treatment of syphilis.
- Discuss the spread of human immunodeficiency virus (HIV) and methods by which it may be controlled.

2. Inheritance

Biology by Lam Peng Kwan Chapter 22 (page no: 357- 387)

D.G Mackean Chapter 23 (page no: 200-223)

Content

17.1 Variation

17.2 Chromosomes and DNA

17.3 Monohybrid inheritance

17.4 Selection

17.5 Genetic engineering

Learning outcomes

Candidates should be able to:

- Describe the difference between continuous and discontinuous variation and give examples of each.
- State that a chromosome includes a long molecule of DNA.
- State that DNA is divided up into sections called genes.
- Explain that genes may be copied and passed on to the next generation.
- Define a gene as a unit of inheritance and distinguish clearly between the terms gene and allele.
- Describe complete dominance using the terms dominant, recessive, phenotype and genotype.
- Describe mutation as a change in the structure of a gene (e.g. sickle cell anaemia) or in the chromosome number (e.g. 47 in Down's syndrome instead of 46).
- Name radiation and chemicals as factors that may increase the rate of mutation.
- 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.
- Explain why observed ratios often differ from expected ratios, especially when there are small numbers of progeny.
- Explain codominance by reference to the inheritance of the ABO blood group (phenotypes A, B, AB, O, gene alleles IA, IB and IO).
- Describe the determination of sex in humans (XX and XY chromosomes).
- Describe variation and state that competition leads to differential survival of organisms, and reproduction by those organisms best fitted to the environment.
- Assess the importance of natural selection as a possible mechanism for evolution.
- Describe the role of artificial selection in the production of economically important plants and animals.
- Explain that DNA controls the production of proteins.
- State that each gene controls the production of one protein.
- Explain that genes may be transferred between cells (reference should be made to transfer between organisms of the same or different species).
- Explain that the gene that controls the production of human insulin can be inserted into bacterial DNA.
- Understand that such genetically engineered bacteria can be used to produce human insulin on a commercial scale.

- Discuss potential advantages and dangers of genetic engineering.

3. The use and abuse of drugs

Biology by Lam Peng Kwan Chapter 16 (page no: 240-252)
D.G Mackean Chapter 20 (page no: 174- 189)

Content

- 13.1 Antibiotics
- 13.2 Effects of heroin
- 13.3 Effects of alcohol
- 13.4 Effects of tobacco smoke

Learning outcomes

Candidates should be able to:

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

MARCH

Mock examination

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 (2nd 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