2016 HKDSE

Biology and Combined Science (Biology)

Exam Analysis

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1 Coverage

a Most topics in the curriculum are covered. More marks are allocated to the chapters below:

Ch 7 Gas exchange in humans
Ch 9 Nutrition and gas exchange in plants
Ch 19 Biodiversity
Ch 20 Ecosystems
✂ **Ch 21** Photosynthesis
Ch 26 Basic genetics

b Relationship between Biology and Combined Science:

i In Combined Science Section A, all the multiple-choice questions are common with Biology Paper 1A.

ii In Combined Science Section B, Q1 and 9 are common with Biology Paper 1B. Other questions are slightly different from those questions in Biology Paper 1B.

2 Level of difficulty

a The multiple-choice questions in 2016 and 2015 HKDSE papers are of similar level of difficulty. In Biology Paper 1A, Q10, 14, 19, 24, 27 and 36 (CS A Q4, 10, 13, 18 and 24) are more challenging and may be set to differentiate students of different abilities.

b The conventional questions in 2016 HKDSE papers are more difficult than those in 2015 HKDSE papers. In Biology Paper 1B, Q4c, 5a, 5b, 8b, 8c, 9c and 11 (CS B Q3a, 6b, 6c, 7b and 9) are more challenging and may be set to differentiate students of different abilities.

c In Biology Paper 2, Q2b, 3b and 4b are comparatively more difficult.

3 Skills assessed

a The papers follow the trend of inclusion of questions related to school-based assessment (SBA) and a number of questions require the skills for making scientific inquiries.

Making observations: Biology Paper 1A Q12 (CS A Q8); Paper 1B Q4a and 8a (CS B Q4a and 6a)

Designing experiments: Biology Paper 1A Q25 and 36 (CS A Q19 and 24)

Interpreting data or graphs: Biology Paper 1A Q9, 10, 11, 18, 19 and 20 (CS A Q7, 12, 13 and 14); Paper 1B Q5a, 5b, 8b ii, 9b ii and 9c ii (CS B Q3a, 6b ii, 7a ii and 7b ii)

b Biology Paper 1B Q3 requires students to identify structures shown in the electron micrograph of a chloroplast.

c Biology Paper 1B Q8c (CS B Q6c) assesses students' understanding of the nature of science (NOS). This question carries 2 marks.

d Biology Paper 1B Q5 and 8 (CS B Q3 and 6) involve unfamiliar situations. They assess students' ability to apply their knowledge in unfamiliar situations.

e Biology Paper 1B Q5a, 5b, 7c, 9b ii, 9c ii, 10d and 11 (CS B Q3a, 7a ii, 7b ii and 9) require good communication skills.

4 Challenging questions

Some questions in the papers are challenging. The table below lists the difficulties students may encounter when answering these questions. Suggestions for developing the necessary abilities and skills to address similar questions are also listed below.

Question	Difficulty	Suggestion
Biology Paper 1A Q36 (CS A Q24) - An experiment on phototropism in coleoptiles	Students' understanding of how to set up a control is usually poor. It may not be easy for them to choose the correct control set-up.	Students should note the difference between control and experimental set-ups. Students should also be exposed to more different experiments involving control set-ups.
Biology Paper 1B Q5a, 5b (CS B Q3a) - Factors affecting the distribution of two crab species on a rocky shore	Students are usually weak in making use of their knowledge and selecting relevant information provided to make deductions, especially in an unfamiliar situation. They may also find it difficult to present their answer clearly to show how they arrive at the deductions.	Students should read questions carefully to understand the situation. They must not recite knowledge without adaptation. Training on the use of language, e.g. in making deductions, should be strengthened.
Biology Paper 1B Q8c (CS B Q6c) - J. Hammerling's experiment on unicellular algae to find out where genetic information is stored in eukaryotic cells	Students often find the nature of science (NOS) difficult to understand. They may not be able to link different aspects of NOS with historical events in the history of science.	Revise various aspects of NOS through reviewing the history of biology and discussing biological concepts.

Question	Difficulty	Suggestion
Biology Paper 1B Q11 (CS B Q9) - Comparison of gas exchange organs in plants and humans	Students often produce poorly organized essays containing discrete ideas, such as separate descriptions of structures rather than the common principles in structural adaptations. They may find it difficult to link up related facts from different topics and present them in a logical and systematic manner.	Students should note the importance of essay planning. Identify the main areas for discussion and then organize the thoughts using tables, flow charts or mind maps. Revise the skills in answering essay questions.
Biology Paper 2 Q2b - Effect of phosphate addition on the growth of wheat in uncontaminated soil and arsenic-contaminated soil	Students often find questions involving interpretation of experimental results difficult. They may not be able to draw conclusions that address the aims of the investigations.	Students should note that no conclusion can be drawn if there is more than one difference in the conditions of the set-ups. Students should be exposed to more different experiments so that they are more familiar with comparing results and drawing valid conclusions.

5 Exam trend

Compulsory part

= equivalent

~ similar to

Chapter	2012	2013	2014	2015	2016
Ch 1 Introducing biology					
Ch 2 The cell as the basic unit of life		MC BIO IA Q3 = CS A Q3	MC BIO IA Q3 ~ CS A Q1 MC BIO IA Q5 ~ CS A Q2	MC BIO IA Q1 = CS A Q1	MC BIO IA Q12 = CS A Q8
Ch 3 Movement of substances across cell membrane		MC BIO IA Q5 = CS A Q5 MC BIO IA Q23 = CS A Q9 MC BIO IA Q24 = CS A Q10 MC BIO IA Q25 = CS A Q11	BIO IB Q7 = CS B Q6	MC BIO IA Q2 = CS A Q2 BIO IB Q6 = CS B Q5	MC BIO IA Q1 = CS A Q1 MC BIO IA Q24 = CS A Q18 MC BIO IA Q25 = CS A Q19
Ch 4 Enzymes and metabolism		MC BIO IA Q6 = CS A Q6 MC BIO IA Q7 = CS A Q7	MC BIO IA Q9 = CS A Q3	MC BIO IA Q3 = CS A Q3 BIO IB Q7 = CS B Q6	MC BIO IA Q8 MC BIO IA Q27 = CS A Q4
Ch 5 Food and humans					MC BIO IA Q3 = CS A Q3 MC BIO IA Q5 = CS A Q5 MC BIO IA Q6 = CS A Q6
Ch 6 Nutrition in humans	MC BIO IA Q1 = CS A Q1 MC BIO IA Q20 = CS A Q6 MC BIO IA Q34 = CS A Q7 BIO IB Q10	MC BIO IA Q26 = CS A Q18 BIO IB Q3 = CS B Q2	MC BIO IA Q1 MC BIO IA Q24 = CS A Q15 MC BIO IA Q25 = CS A Q16 MC BIO IA Q26 = CS A Q17 BIO IB Q11 = CS B Q8	MC BIO IA Q7 = CS A Q5 MC BIO IA Q8 = CS A Q6 MC BIO IA Q9 = CS A Q7 MC BIO IA Q10 = CS A Q8	MC BIO IA Q2 = CS A Q2 MC BIO IA Q7
Ch 7 Gas exchange in humans	MC BIO IA Q22 = CS A Q17	MC BIO IA Q1 = CS A Q1 MC BIO IA Q30 = CS A Q20	MC BIO IA Q27 = CS A Q18 BIO IB Q2 = CS B Q1	MC BIO IA Q13 = CS A Q10 MC BIO IA Q15 = CS A Q12	BIO IB Q11 = CS B Q9

Chapter	2012	2013	2014	2015	2016
Ch 8 Transport in humans	MC BIO IA Q21 = CS A Q16 MC BIO IA Q31 = CS A Q23 MC BIO IA Q32 = CS A Q24 MC BIO IA Q33 = CS A Q5 BIO IB Q1 ~ CS B Q1	MC BIO IA Q31		MC BIO IA Q14 = CS A Q11 BIO IB Q11 = CS B Q9	MC BIO IA Q13 = CS A Q9 MC BIO IA Q16 MC BIO IA Q17 MC BIO IA Q28 = CS A Q21 MC BIO IA Q29 = CS A Q22
Ch 9 Nutrition and gas exchange in plants	BIO IB Q5 = CS B Q5		MC BIO IA Q6 MC BIO IA Q7 MC BIO IA Q8		BIO IB Q9 ~ CS B Q7
Ch 10 Transpiration, transport and support in plants	MC BIO IA Q3 = CS A Q2 MC BIO IA Q10 = CS A Q11 MC BIO IA Q11 = CS A Q12 MC BIO IA Q12 = CS A Q10 BIO IB Q3 = CS B Q3	BIO IB Q6 ~ CS B Q4	MC BIO IA Q20 = CS A Q11 MC BIO IA Q21 = CS A Q12 MC BIO IA Q22 = CS A Q13 MC BIO IA Q23 = CS A Q14 BIO IB Q4 = CS B Q3	MC BIO IA Q17 = CS A Q13 MC BIO IA Q18 = CS A Q14 BIO IB Q9 ~ CS B Q8	MC BIO IA Q11 = CS A Q7 MC BIO IA Q21 MC BIO IA Q22 = CS A Q15 MC BIO IA Q23 = CS A Q16
Ch 11 Cell cycle and division	BIO IB Q11 = CS B Q8	MC BIO IA Q14 = CS A Q13 MC BIO IA Q18 = CS A Q17	BIO IB Q3 ~ CS B Q2	BIO IB Q2 ~ CS B Q2	MC BIO IA Q18 = CS A Q12 MC BIO IA Q19 = CS A Q13 MC BIO IA Q20 = CS A Q14
✂ **Ch 12** Reproduction in flowering plants	MC BIO IA Q24		MC BIO IA Q4 BIO IB Q8	MC BIO IA Q19 MC BIO IA Q24 MC BIO IA Q25	MC BIO IA Q31 MC BIO IA Q32
Ch 13 Reproduction in humans	MC BIO IA Q25 = CS A Q18 MC BIO IA Q26 = CS A Q19 MC BIO IA Q27 = CS A Q20 MC BIO IA Q28 MC BIO IA Q29 = CS A Q21	MC BIO IA Q35 = CS A Q23 MC BIO IA Q36 = CS A Q24	MC BIO IA Q28 = CS A Q19 MC BIO IA Q29 = CS A Q20	MC CS A Q22	BIO IB Q2 ~ CS B Q2

Chapter	2012	2013	2014	2015	2016
✂ **Ch 14** Growth and development				MC BIO IA Q28	
Ch 15 Detecting the environment	MC BIO IA Q8 = CS A Q8 MC BIO IA Q9 = CS A Q9 MC BIO IA Q30 = CS A Q22	MC BIO IA Q27 MC BIO IA Q28 MC BIO IA Q29 = CS A Q19 BIO IB Q7 = CS B Q5	MC BIO IA Q36 = CS A Q24	MC BIO IA Q27 = CS A Q17 MC BIO IA Q29 = CS A Q18 BIO IB Q1 = CS B Q1	MC BIO IA Q35 = CS A Q23 MC BIO IA Q36 = CS A Q24
Ch 16 Coordination in humans	MC BIO IA Q4 = CS A Q3 MC BIO IA Q6 = CS A Q4	BIO IB Q1 = CS B Q1	MC BIO IA Q2 BIO IB Q10 ~ CS B Q5	MC BIO IA Q22 = CS A Q15 MC BIO IA Q23 = CS A Q16	BIO IB Q1 = CS B Q1
✂ **Ch 17** Movement in humans	MC BIO IA Q5 MC BIO IA Q7	BIO IB Q2	MC BIO IA Q34 MC BIO IA Q35	MC BIO IA Q20 MC BIO IA Q21 BIO IB Q5	MC BIO IA Q33 = CS A Q20
Ch 18 Homeostasis		MC BIO IA Q2 = CS A Q2 MC BIO IA Q33 = CS A Q21 MC BIO IA Q34 = CS A Q22			
Ch 19 Biodiversity	BIO IB Q4 = CS B Q4	MC BIO IA Q21	MC BIO IA Q15	MC BIO IA Q5 ~ CS A Q4	MC BIO IA Q15 = CS A Q11 BIO IB Q4 ~ CS B Q4
Ch 20 Ecosystems	MC BIO IA Q13 MC BIO IA Q14 MC BIO IA Q16 = CS A Q14 MC BIO IA Q17 = CS A Q15 BIO IB Q6 = CS B Q7	BIO IB Q5 BIO IB Q8 = CS B Q6	MC BIO IA Q30 = CS A Q21 MC BIO IA Q31 = CS A Q22 MC BIO IA Q33 = CS A Q23 BIO IB Q5	MC BIO IA Q30 = CS A Q23 MC BIO IA Q31 = CS A Q24 BIO IB Q3 = CS B Q3	MC BIO IA Q30 = CS A Q17 MC BIO IA Q34 BIO IB Q5 ~ CS B Q3
✂ **Ch 21** Photosynthesis	MC BIO IA Q2 MC BIO IA Q23	MC BIO IA Q8 MC BIO IA Q9 (deleted)		MC BIO IA Q4 MC BIO IA Q11 MC BIO IA Q12	MC BIO IA Q9 MC BIO IA Q10 BIO IB Q3

Chapter	2012	2013	2014	2015	2016
✂ **Ch 22** Respiration	BIO IB Q9	MC BIO IA Q10	MC BIO IA Q14 BIO IB Q1	MC BIO IA Q6	MC BIO IA Q26
Ch 23 Infectious diseases	BIO IB Q2 = CS B Q2			MC BIO IA Q33 = CS A Q21	
✂ **Ch 24** Non-infectious diseases and disease prevention	BIO IB Q7		BIO IB Q9 = CS B Q7	MC BIO IA Q34 = CS A Q19 MC BIO IA Q35 = CS A Q20 BIO IB Q8	BIO IB Q6
✂ **Ch 25** Body defence mechanisms	MC BIO IA Q35 MC BIO IA Q36	MC BIO IA Q32 BIO IB Q9	MC BIO IA Q32	MC BIO IA Q32 MC BIO IA Q36	BIO IB Q7 ~ CS B Q5
Ch 26 Basic genetics	MC BIO IA Q15 = CS A Q13 BIO IB Q8 = CS B Q6	MC BIO IA Q4 = CS A Q4 MC BIO IA Q12 = CS A Q8 MC BIO IA Q13 = CS A Q12 MC BIO IA Q15 = CS A Q14 MC BIO IA Q16 = CS A Q15 MC BIO IA Q17 = CS A Q16 BIO IB Q4 ~ CS B Q3 BIO IB Q10 = CS B Q7	MC BIO IA Q10 = CS A Q4 MC BIO IA Q11 = CS A Q5 MC BIO IA Q12 = CS A Q6 MC BIO IA Q13 = CS A Q7 CS B Q4	MC BIO IA Q16 = CS A Q9 MC BIO IA Q26 BIO IB Q4 ~ CS B Q4	MC BIO IA Q4 BIO IB Q8 ~ CS B Q6 BIO IB Q10 ~ CS B Q8
✂ **Ch 27** Molecular genetics	MC BIO IA Q18 MC BIO IA Q19	MC BIO IA Q11	MC BIO IA Q16		
Ch 28 Biotechnology			MC BIO IA Q19 = CS A Q10		
Ch 29 Evolution I		MC BIO IA Q19 MC BIO IA Q20	MC BIO IA Q17 = CS A Q8 MC BIO IA Q18 = CS A Q9	BIO IB Q10 ~ CS B Q7	MC BIO IA Q14 = CS A Q10
✂ **Ch 30** Evolution II		MC BIO IA Q22	BIO IB Q6		

Elective part

Chapter	2012	2013	2014	2015	2016
✂ **E1 Human Physiology: Regulation and Control**					
Ch 1 Regulation of water content	BIO II Q1a, b(i)		BIO II Q1a		BIO II Q1b
Ch 2 Regulation of body temperature	BIO II Q1b(ii)			BIO II Q1b(iii)	
Ch 3 Regulation of gas content in blood	BIO II Q1b(iii)	BIO II Q1a	BIO II Q1b	BIO II Q1b(i), (ii)	BIO II Q1a
Ch 4 Hormonal control of reproductive cycle		BIO II Q1b		BIO II Q1a	
✂ **E2 Applied Ecology**					
Ch 1 Human impact on the environment	BIO II Q2a	BIO II Q2a, b	BIO II Q2a, b(ii)	BIO II Q2a, b	BIO II Q2a, b
Ch 2 Human responsibilities for the environment	BIO II Q2b		BIO II Q2b(i), (iii)		
✂ **E3 Microorganisms and Humans**					
Ch 1 Basic microbiology	BIO II Q3a(i)-(iv), b	BIO II Q3b(i)	BIO II Q3a	BIO II Q3a, b	BIO II Q3a(iii)
Ch 2 Use of microorganisms		BIO II Q3a, b(ii)	BIO II Q3b(i), (ii)(2)		BIO II Q3b
Ch 3 Harmful effects of microorganisms	BIO II Q3a(v)	BIO II Q3b(iii)	BIO II Q3b(ii)(1)		BIO II Q3a(i), (ii), (iv)
✂ **E4 Biotechnology**					
Ch 1 Techniques in modern biotechnology	BIO II Q4a	BIO II Q4a(i)-(iii), b	BIO II Q4a(i), (ii)(1), b	BIO II Q4b	BIO II Q4b
Ch 2 Applications in biotechnology	BIO II Q4b(i), (iii)(1), (2)			BIO II Q4a	BIO II Q4a(i)-(iii)
Ch 3 Bioethics	BIO II Q4b(ii), (iii)(3)	BIO II Q4a(iv)	BIO II Q4a, b(ii)(2)		BIO II Q4a(iv)

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