

**Wah Yan College Kowloon**  
**F.5 Biology Scheme of Work (2016-2017)**

<b>Textbook</b>	1. New Senior Secondary - Mastering Biology Book 2 (Second Edition) 2. New Senior Secondary - Mastering Biology Book 3 (Second Edition) 3. New Senior Secondary - Mastering Biology Book E1 (Second Edition) 4. New Senior Secondary - Mastering Biology Book E2 (Second Edition)
<b>Other Resources</b>	HKCEE, HKALE, HKDSE Past Papers

**SL: Scheduled number of lessons**

**AL: Actual number of lessons**

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	SL/ AL	Teaching and Learning Activities	Consolidation and Assessment	Values <sup>#</sup>
First Term (1/9/2016 – 2/1/2017, Weeks 1 to 18)	<b>Chapter 17 Movement in Humans</b>						
	2	The human skeleton	To know what the human skeleton is made up of To know the general plan of the human skeleton To know the functions of the human skeleton	1/1	Video PowerPoint; Model; Lab experiment; and STSE & NOS discussion	Classwork; Quiz; Test; Past paper practice; Fire drill	15
	2	Joints	To identify functions of various parts of a movable joint To differentiate between hinge joints and ball-and-socket joints	1/1			12
	3	Muscles	To know what skeletal muscles are made up of and how they are attached to bones	1/1			12
	3	Movement of the body	To be able to identify opposing muscles To know how muscles and bones work together to bring about movement	1/1			10
4	Initiation of muscle	To know how muscle contraction is initiated	1/1	20			

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		contraction					
<b>E1Ch01 Regulation of Water Content (Tutorial lessons after school)</b>							
	4	Importance of osmoregulation	To realize the importance of osmoregulation To identify the major organs involved in osmoregulation	1/1	Video PowerPoint; Lab experiment; and STSE & NOS discussion	Classwork; Quiz; Test; Past paper practice	11
	4	The general plan of the urinary system	To identify the major parts of the urinary system and their functions	1/1			15
	4	Structure of the kidney	To know the structure of a nephron	1/1			20
	4	Formation of urine	To know how ultrafiltration takes place in a nephron To know the adaptive features of the proximal convoluted tubule for reabsorption To know how substances in the glomerular filtrate are reabsorbed into the blood	1/1			10
	4	The role of kidneys	To know the actions of ADH in keeping the water potential of the blood stable To understand the role of kidneys in excretion	1/1			5
	4	The dialysis machine	To know what happens if a person's kidneys do not function properly To understand how the dialysis machine helps clean the blood	1/1			11
<b>Chapter 19 Biodiversity</b>							
	5	Diversity of life forms	To understand what biodiversity is	1/1	Flipped classroom; Video, PowerPoint; Animations; Mind	Classwork; Quiz; Test; Past paper	20
	5	Classification	To know how organisms are classified and named	1/1			15

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	5	Development of the classification system	To know the modern classification of organisms	1/1	map & flow-chart; STSE readings; Expertise group	practice	13	
	6	The six kingdoms	To know the characteristics of the six kingdoms To contrast archaebacteria and bacteria To know how plants and animals are classified	2/2			13	
	6	Dichotomous keys	To know the use of a dichotomous key	2/2			11	
	6	<b>Test (Ch16-17)</b>						
		<b>Chapter 20 Ecosystems</b>						
	7	Basic concepts of ecology	To be aware of the levels of organization in ecological studies To be aware of the self-supporting, stable and dynamic nature of an ecosystem To know the major types of ecosystems in Hong Kong	1/1	Video, PowerPoint; Animations; Mind map & flow-chart; STSE readings; Expertise group, Field camp	Classwork; Quiz; Test; Past paper practice	18	
	7	Abiotic factors of an ecosystem	To identify the abiotic factors in an ecosystem	1/1			10	
	8	Biotic community of an ecosystem	To differentiate between the habitat and niche of an organism To understand what species diversity and dominant species are To know the modes of interactions among organisms in a community To differentiate between primary succession and secondary succession	2/2			12	

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	8 / 9	Energy flow in an ecosystem	To know how energy flows within an ecosystem To be able to define a food chain and a food web To know the roles of producers and consumers in the energy flow of an ecosystem To know how energy is lost from one trophic level to another To distinguish between pyramid of numbers and pyramid of biomass	3/3			11
	9	Material cycling in an ecosystem	To know how carbon and nitrogen are cycled in an ecosystem To know the roles of producers, consumers and decomposers in energy flow and material cycling	3/3			11
	10	Conservation of ecosystems	To be aware of the impact of human activities on ecosystems To know how to conserve ecosystems	1/1			18
	10	Ecological study	To know the use of quadrats, line transects and belt transects in an ecological study To know how to measure abiotic factors in an ecological study	3/3			8
<b>E1Ch02 Regulation of body temperature (Tutorial lessons after school)</b>							
	10	Importance of body temperature regulation	To state the importance of keeping body temperature stable To know the major ways of heat exchange	1/1	Video, PowerPoint; Animations; Mind map & flow-chart;	Classwork; Quiz; Test; Past paper	12

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			between the body and the environment		STSE readings; Expertise group	practice	
	10	The control centre of body temperature	To know the role of the hypothalamus in detecting changes in internal and external temperatures To know the actions of the thermoregulatory centre when there are changes in skin or blood temperature	2/2			15
	10	Mechanisms of body temperature regulation	To know the roles of various structures of the skin in body temperature regulation To state the changes of the body under cold and hot conditions	2/2			10
	10	Heatstroke and hypothermia	To know what heatstroke and hypothermia are	1/1			11
<b>E2Ch01 Human impact on the environment</b>							
	11	Impact of rapid human population growth on the environment	To know the impact of rapid human population growth on the environment and possible ways to reduce the impact	1/1	Video, PowerPoint; Animations; Mind map & flow-chart; STSE readings; Expertise group	Classwork; Quiz; Test; Past paper practice	21
	11	Natural resources	To differentiate between renewable and non-renewable resources	1/1			20
	11	The environmental impact of malpractices in fisheries	To know the environmental impact of malpractices in fisheries	2/2			18
	12	The environmental impact of malpractices in agriculture	To know the environmental impact of malpractices in agriculture To understand bioaccumulation and biomagnification of pesticides in organisms	2/2			18

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			To understand the causes of eutrophication				
	12	The environmental impact of industrialization and urbanization	To know the environmental impact of land clearance and reclamation To be able to state the sources of air pollution and water pollution, and their effects on human health	3/3			18
	13	Global environmental issues	To understand the causes and consequences of global warming, acid rain and algal bloom	2/2			19
<b>E2Ch02 Human responsibilities for the environment</b>							
	13	Sustainable development	To know what sustainable development is	1/1			2
	13	Management of resources	To be able to state the measures taken to promote sustainable fisheries and agriculture in Hong Kong	1/1			3
	14	Pollution control	To identify the 4 Rs in environmental protection To be able to state the measures taken to control air pollution and water pollution in Hong Kong To identify the roles of microorganisms in sewage treatment To be able to state the measures taken to manage solid waste in Hong Kong	1/1	Video, PowerPoint; Animations; Mind map & flow-chart; STSE readings; Expertise group	Classwork; Quiz; Test; Past paper practice	18
	14	The need for conservation	To realize the need for conservation To realize the importance of preserving biodiversity	1/1			18

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	14	Conservation of species	To know what endangered species are To be able to state the measures for protecting endangered species	1/1			8	
	14	Conservation of habitats	To identify some conservation areas in Hong Kong To be aware of some ecological restoration projects and habitat creation projects in Hong Kong	1/1			8	
	14	Roles of individuals in conservation	To know what individuals can do in conservation	1/1			19	
	<b>Revision</b>							
<b>Mid-year Examination</b>								
<b>Second Term (3/1/2017 - 15/7/2017 , Weeks 19 to 46)</b>	19	Exam discussion		2/2			II	
	<b>Chapter 11 Cell Cycle and Division</b>							
	19	Chromosomes	To be able to describe the structure of a chromosome To be able to contrast diploid and haploid cells	1/1	Flipped classroom; PowerPoint; Animations; Model; Mind map & flow-chart; STSE readings; Expertise group	Classwork; Quiz; Test; Past paper practice	20	
	20	The cell cycle and mitotic cell division	To know that cell cycle consists of interphase and mitotic cell division To identify different stages of mitotic cell division To state the importance of mitotic cell division	2/2			15	
21	Meiotic cell division	To identify different stages of meiotic cell division	2/2	15				

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			To state the importance of meiotic cell division				
	21	Comparison between mitotic and meiotic cell divisions	To be able to compare mitotic and meiotic cell divisions	3/3			7
<b>Chapter 12 Reproduction in flowering plants</b>							
	24	Types of reproduction	To contrast asexual and sexual reproduction	1/1	Flipped classroom; PowerPoint; Animations; Model; Mind map & flow-chart; STSE readings; Expertise group	Classwork; Quiz; Test; Past paper practice	14
	24	Asexual reproduction	To know what binary fission is To know what vegetative propagation is To identify storage organs involved in vegetative propagation To know what cutting is	2/2			2
	25	Sexual reproduction in flowering plants	To identify structures and functions of various parts of a flower To state the characteristics of insect-pollinated and wind-pollinated flowers To be able to describe the process of fertilization in flowers To know the significance of seed and fruit dispersal	3/3			12
	25	Significance of asexual and sexual reproduction	To know the advantages and disadvantages of asexual and sexual reproduction in flowering plants	1			12
<b>Chapter 13 Reproduction in humans</b>							
	26	Human reproductive systems	To identify the structures and functions of male and female reproductive systems	3/3	Flipped classroom; PowerPoint;	Classwork; Quiz; Test;	20



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	26	Human gametes	To identify the differences between sperms and ova To be able to describe the secondary sexual characteristics in boys and girls	1/1	Animations; Model; Mind map & flow-chart; STSE readings; Expertise group	Past paper practice	12
	27	Ovulation and menstrual cycle	To know what ovulation is To realize events that happen during the human menstrual cycle	3/3			2
	27	Fertilization	To know how sperms are transferred from a male into a female body To be able to describe the process of fertilization	1/1			21
	28	Development of the embryo and foetus	To know the events leading to implantation To know the functions of amnion and placenta To understand how identical twins and fraternal twins are formed	1/1			15
	28	The birth process	To be able to outline the main stages of labour	1/1			21
	28	Parental care	To understand the importance of parental care to humans To know the advantages of breast-feeding	1/1			16
	28	Birth control	To understand the biological basis and reliability of various contraceptive methods	1/1			19
	29	<b>Investigative training (5 hours) Lab training (including 1 investigative lab-training)</b>					
	30	<b>School based assessment(s) Lab 01</b>					
	31	<b>Uniform Test</b>					
<b>E1Ch4 Hormonal control of reproductive cycle</b>							

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	32	Interaction of hormones in the menstrual cycle	To be able to state the major hormones involved in the menstrual cycle and their functions To understand how follicle stimulating hormone, luteinising hormone, oestrogen and progesterone interact to bring about changes in the menstrual cycle	4/4	Flipped classroom; PowerPoint; Animations; Model; Mind map & flow-chart; STSE readings; Expertise group	Classwork; Quiz; Test; Past paper practice	6
	35	Use of hormones as contraceptives	To understand how hormones are used as contraceptives	2/2			17
	35	Use of hormones in the treatment of infertility	To understand how synthetic hormones are used in the treatment of infertility	2/2			11
<b>Chapter 14 Growth and development</b>							
	36	Concepts of growth and development	To know what growth and development are and how they occur	1/1	Flipped classroom; PowerPoint; Animations; Model; Mind map & flow-chart; STSE readings; Expertise group	Classwork; Quiz; Test; Past paper practice	21
	36	Growth and development in plants	To know the structure of a seed To identify the conditions for seed germination To know what happens when a seed germinates To identify primary and secondary growth To know what happens to cells in different regions of the root and shoot tips during growth and development	2/2			13
	37	Measurement of growth	To state the advantages and disadvantages of the parameters for measuring growth	1/1			8
	37	Growth curves	To identify the stages of growth in annual	1/1			13

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			plants and humans				
<b>Chapter 21 Photosynthesis</b>							
	38	The basic concepts of photosynthesis	To know what photosynthesis is	1/1	Flipped classroom; PowerPoint; Animations; Model; Mind map & flow-chart; STSE readings; Expertise group	Classwork; Quiz; Test; Past paper practice	20
	38	The site of photosynthesis	To know the adaptive features of a leaf for photosynthesis To know the adaptive features of a chloroplast for photosynthesis	1/1			10
	38	The requirements for photosynthesis	To be aware of the need of destarching a plant before conducting experiments To know the requirements for photosynthesis	1/1			5
	39	The process of photosynthesis	To understand the major steps of photochemical reactions To understand the major steps of the Calvin cycle To know the relationship between photochemical reactions and the Calvin cycle	3/3			12
	39	Factors affecting the rate of photosynthesis	To know the effect of light intensity and carbon dioxide concentration on the rate of photosynthesis To know how the rate of photosynthesis is regulated in a greenhouse	1/1			8
	40	The fate of photosynthetic products	To know the fate of photosynthetic products	1/1			15
	40	The significance of photosynthesis	To know the significance of photosynthesis	1/1			13

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<b>Chapter 22 Respiration</b>							
	40	The basic concepts of respiration	To know what respiration is To know the role of ATP in cellular metabolism To identify the two types of respiration	1/1	Flipped classroom; PowerPoint; Animations; Model; Mind map & flow-chart; STSE readings; Expertise group	Classwork; Quiz; Test; Past paper practice	10 20
	40	The site of respiration	To know where respiration takes place in a cell	1/1			5
	41	Aerobic respiration	To understand the major steps of aerobic respiration	1/1			10
		Anaerobic respiration	To know how anaerobic respiration occurs in yeast and skeletal muscles To know the importance of anaerobic respiration To know what oxygen debt is To state the applications of anaerobic respiration	1/1			5
		Comparison of aerobic and anaerobic respiration	To contrast between aerobic and anaerobic respiration	1/1			7
		Relationship between respiration and photosynthesis	To contrast between respiration and photosynthesis	1/1			7
	39-40	Revision					

\* The extended parts should be marked with asterisks. These parts should be more challenging and can be covered when the students can master the knowledge and skills covered in the conventional topics.

# **Core Values of Wah Yan College, Kowloon**

I. Love and care	1. Accept & feel positive about himself 2. Appreciation & Gratitude 3. Empathy & Compassion	4. Forgiveness & Reconciliation 5. Service 6. Family as a basic unit of society; marriage is the foundation of a family
II. Strive for excellence	7. Reflective 8. Commitment 9. Perseverance	10. Curiosity & willingness to learn 11. Value imagination and creativity
III. Respect and Justice	12. Life is valuable and respectable 13. Openness to good in all things 14. Respect for himself & others	15. Integrity 16. Faithfulness
IV. Responsibility	17. Freedom & Self-discipline 18. Care for the environment	19. Social Identities: citizen identity, national identity and global citizen identity
V. Faith	20. Experience of God 21. Explore & practise one's faith	22. Appreciate religious liturgies