

**TIN KA PING SECONDARY SCHOOL
BIOLOGY
FORM FOUR SYLLABUS**

Chapter	Content	Language objectives	Experiments	Aids / resources	Activities – STSE or SBA	Generic skills *													
						1	2	3	4	5	6	7	8	9					
		Students should be able to:																	
Ch.1 – Introducing Biology	What is biology? The characteristics of organisms. How do scientists study biology?			Powerpoint: <i>Exploring Life</i> Historical charts on key-discoveries in biology				✓	✓	✓			✓					✓	
	Why should we study biology? Major biological discoveries & inventions.							✓	✓	✓			✓						
Ch.2 – The cell as the basic unit of life	Chemicals of Life Discovery of cells		Practical 2.1-2.3	Story: Microscope then & now Diagram: A drawing of a cell as seen under the light microscope	Observation with light microscope Preparation of temporary mounts of animal cells Preparation of temporary mounts of plant cells	✓	✓	✓	✓	✓			✓						
	The basic structure of a cell	use the following sentence patterns: ● It is responsible for ... ● It is used for ... to describe the functions of different organelles		Models	STSE: Contribution of microscope development to cell discovery Attitudes: ● appreciate the wonders of the natural world ● obey safety rules in lab.			✓	✓	✓			✓					✓	
	Levels of body organization Using a light microscope							✓	✓	✓			✓						
	Prokaryotic & eukaryotic cells	use the following sentence patterns: ● Both ... ● ... while ... ● ... whereas ... ● ... however ... to compare prokaryotes and eukaryotes.						✓	✓	✓			✓						

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Ch.3 – Movement of subs. across cell membrane	Cell membrane							✓	✓	✓			✓						
	Movement of substances across membranes		Practical 3.1-3.2		Demonstration of osmosis using dialysis tubing Demonstration of osmosis using living animal tissue STSE: Applications of diffusion and osmosis	✓	✓	✓	✓	✓			✓						✓
Ch.4 – Enzymes & metabolism	Metabolism								✓	✓	✓			✓					
	Properties & actions of enzymes				STSE: Application of enzymes in commercial products and industrial processes				✓	✓	✓			✓					✓
	Factors affecting the rate of enzymatic reactions Applications of enzymes	explain the cause and effects of different factors affecting the enzyme activity using causal connectives, verbs of causes, adverbs of certainty and reference. use the following sentence patterns: ● It causes ... to ... ● First Then ... Next ... Finally ... ● As a result, ...	Practical 4.2-3, 4.4, 4.5		Investigation of the effect of temperature on enzyme activity Investigation of the effect of pH on enzyme activity Investigation of protease activities in different fruit juices Design an investigation of the effectiveness of different biological washing powders	✓	✓	✓	✓	✓			✓						
Ch.5 – Food & humans	Humans as heterotrophs The food requirements of humans								✓	✓	✓			✓					
	Food tests			Story: The discovery of Vit. C Newspaper articles					✓	✓	✓			✓					

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	Balanced diet	Students should be able to:			Attitudes: <ul style="list-style-type: none"> ● achieve better eating habits & health ● learn through daily experience ● do not waste food ● appreciate the functions of diff. parts of a human body 			✓	✓	✓		✓			
Ch.6 – Nutrition in humans	The process of human nutrition The human digestive system				Attitude: appreciate the functions of diff. parts of a human body			✓	✓	✓		✓			
	Ingestion of food Movement of food along the alimentary canal	use the following sentence patterns: <ul style="list-style-type: none"> ● It is responsible for ... ● It is used for ... to describe the functions of different digestive structures 	Practical 6.1	Trunk model showing digestive system	Examination of the mammalian alimentary canal and its associated glands	✓	✓	✓	✓	✓		✓			
	Digestion of food Absorption of digested food							✓	✓	✓		✓			
	Assimilation of absorbed food egestion							✓	✓	✓		✓			
Ch.7 – Gas exchange in humans	The human breathing system Gas exchange in the air sacs	present the arguments clearly using language forms of sequence like: To begin with... First, ... Next, ... Then, ... After that, ... Finally, ...	Practical 7.1-7.3	Trunk model showing breathing system Newspaper articles	Examination of the mammalian breathing system Examination of the pig lungs Examination of the mammalian air sacs	✓	✓	✓	✓	✓		✓			✓

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	Transport of respiratory gases Ventilation				STSE: Relationship between smoking and the incidence of emphysema and lung cancer Attitude: appreciate the functions of diff. parts of a human body			✓	✓	✓									
Ch.8 – Transport in humans	The transport system The blood The blood vessels	use the following sentence patterns: ● It is responsible for ... ● It is used for ... to describe the functions of different parts of the transport system		Trunk model showing circulatory system Newspaper articles				✓	✓	✓		✓							
	The heart							✓	✓	✓		✓							
	Blood circulation							✓	✓	✓		✓							
	Exchange of materials between blood and body cells		Practical 8.3-8.4		Examination of the capillary flow in a fish tail fin Dissection & examination of a pig heart STSE: Relationship between diet, lifestyle and the incidence of coronary heart disease, stroke and high blood pressure	✓	✓	✓	✓	✓		✓							✓
	Lymphatic system				Attitude: appreciate the functions of diff. parts of a human body			✓	✓	✓		✓							
Ch.9 – Nutrition & gas exchange in plants	Nutrition in plants Gas exchange in plants							✓	✓	✓		✓							

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Ch.10 – Transpiration, transport & support in plants	Transpiration							✓	✓	✓			✓						
	Transport in flowering plants		Practical 9.5	Data logger with different sensors	Investigation of the effect of light intensity on gas exchange in plants using a data logger	✓	✓	✓	✓	✓			✓						
	Support in plants		Practical 10.1		Demonstration of the occurrence of transpiration	✓	✓	✓	✓	✓			✓						
<i>Christmas & New Year</i>																			
<i>First term Exam</i>																			
Ch.11 – Cell cycle & division	Chromosomes Mitotic cell division			Models				✓	✓	✓			✓						
	Meiotic cell division			Models															
	Comparison between mitotic & meiotic cell divisions	use the following sentence patterns: ● Both ... ● ... while ... ● ... whereas ... ● ... however ... to compare mitotic & meiotic cell divisions	Practical 11.1		Examination of different stages of the cell cycle	✓	✓	✓	✓	✓			✓						
Ch.12 – Reproduction in flowering plants	Types of reproduction Asexual reproduction in flowering plants		Practical 11.3	Living specimens (e.g. potato tuber, water chestnuts, onions...)	Examination of meiotic cell division	✓	✓	✓	✓	✓			✓						
	Sexual reproduction in flowering plants	use the following sentence patterns: ● Both ... ● ... while ... ● ... whereas ... ● ... however ... to compare asexual & sexual reproduction	Practical 12.1-12.2		Examination of binary fission in bacteria Examination & cultivation of a vegetative propagating organ	✓	✓	✓	✓	✓			✓						

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Ch.13 – Reproduction in humans	13.3 Fertilization in humans 13.4 Development of the embryo and foetus		13.3 Examination of different stages of foetal development	<ul style="list-style-type: none"> Videos – contraception, parturition 															
	13.5 The birth process 13.6 Parental care				SBA – rat dissection – reproductive system <ul style="list-style-type: none"> Harmful effects of drinking and smoking on foetal development Prenatal and postnatal care Pros and cons of breast-feeding 														
	13.7 Birth control			<ul style="list-style-type: none"> Contraception kit – by HKFA 	<ul style="list-style-type: none"> Various birth control methods Causes of infertility and its treatment Discussion bioethic problems like casual sex & abortion, surrogate mother, test-tube baby, etc 														
<i>Easter Holidays</i>																			
Ch.14 – Growth & development	14.1 Concepts of growth and development 14.2 Growth and development in plants 14.3 Measurement of growth 14.4 Growth curves		14.1 Design an investigation of the conditions for seed germination 14.2 Design an investigation of the growth of the main roots of young seedlings	<ul style="list-style-type: none"> Video – growth & changes 		✓	✓	✓	✓	✓							✓	✓	
				<ul style="list-style-type: none"> 															
Ch.15 – Detecting the environment	15.1 Irritability 15.2 Detecting light by the eye		15.1 Examination of a human eye model 15.2 Dissection and examination of an ox eye	<ul style="list-style-type: none"> Model – eye 	SBA – Presence of protease in pineapple and / or kiwifruit	✓	✓	✓	✓	✓							✓	✓	

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	15.3 Detecting light by plants 15.4 Detecting sound by the ear		15.3 Investigation of the phototropic responses of shoots and roots 15.4 Examination of a human ear model	<ul style="list-style-type: none"> Model – ear 															
Ch.16 – Coordination in humans	16.1 The human nervous system 16.2 Transmission of nerve impulses between neurons		16.1 Examination of a human brain model	<ul style="list-style-type: none"> Models – spinal cord, neurone and brain Videos – nervous system, messengers 	Attitude: appreciate the functions of diff. parts of a human body			✓	✓	✓						✓	✓		
	16.3 The brain 16.4 The spinal cord 16.5 Reflex action and voluntary action																		
REVISION																			
<i>Yearly Exam</i>																			
To be taught in summer vocation	16.6 Differences between reflex actions and voluntary actions 16.7 The human endocrine system 16.8 Comparison between hormonal and nervous coordination																		

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1. collaboration	2. communication	3. creativity
4. critical thinking	5. information technology	6. numeracy
7. problem solving	8. self-management	9. study