

**SMK CONVENT BUKIT NANAS, KUALA LUMPUR**  
**SCHEME OF WORK 2010**  
**BIOLOGY**  
**UPPER SIX SCIENCE**

**FIRST TERM : 4 JANUARY – 4 JUNE 2010 (21 weeks)**

***LEARNING AREA : REPRODUCTION, DEVELOPMENT AND GROWTH***

<b>WEEK</b>	<b>TOPIC</b>	<b>LEARNING OUTCOMES</b>	<b>LEARNING ACTIVITIES</b>	<b>SUGGESTED PEDAGOGY</b>	<b>MORAL VALUES</b>	<b>NOTES</b>
<b>13.0 REPRODUCTION</b>						
<b>1</b>	<b>13.1 Sexual reproduction</b>  <b>13.1.1 Plants</b> Algae : <i>Spirogyra</i> Bryophyta : <i>Marchantia</i> Filicinophyta: <i>Dryopteris</i> Coniferophyta : <i>Pinus</i> Angiospermophyta : <i>Caesalpinia</i> <b>13.1.2 Fungi</b> <i>Mucor</i> <b>13.1.3 Animals</b> Ciliophora : <i>Paramecium</i> Cnidaria : <i>Hydra</i> Annelida : <i>Pheretima</i> Arthropoda : <i>Periplaneta</i> Amphibia : <i>Rana</i> Reptilia : <i>Naja</i> Osteichthyes : <i>Tilapia</i>	Able to : <ul style="list-style-type: none"> <li>• Explain the structure of sexual reproductive organ</li> <li>• Explain the life cycle with emphasis on sexual reproduction</li> </ul> Able to : <ul style="list-style-type: none"> <li>• Explain the structure of sexual reproductive organ</li> <li>• Explain the life cycle with emphasis on sexual reproduction</li> </ul> Able to : <ul style="list-style-type: none"> <li>• Explain the diversity of sexual reproduction systems and overall comparison</li> <li>• Explain the mechanism of fertilization (internal and external)</li> <li>• Describe on the oviparity, ovoviviparity and viviparity</li> </ul>	Discussion and explaining on the structure of sexual reproductive organ and life cycle with emphasis on sexual reproduction  Carry out experiment to : <ul style="list-style-type: none"> <li>• examine the slides of <i>Spirogyra, Marchantia, Dryopteris, Pinus, Caesalpinia</i></li> <li>• investigate the structure of f lowers</li> </ul> Discussion and explaining on sexual reproduction systems, mechanism of fertilization (internal and external), the oviparity, ovoviviparity and viviparity	Creative Thinking ICT	Appreciate Patient	

	Aves : <i>Columba</i> Mammalia : <i>Rattus</i>					
WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
	<b>13.2 Asexual Reproduction</b> <b>13.2.1 Parthenogenesis</b> <b>13.2.2 Pedogenesis</b> <b>13.2.3 Polyembryony</b> <b>13.2.4 Sporulation</b> <b>13.2.5 Budding</b> <b>13.2.6 Binary fission</b> <b>13.2.7 Regeneration</b> <b>13.2.8 Vegetative</b>	Able to : <ul style="list-style-type: none"> <li>Define and give examples on asexual reproduction</li> </ul>	Discuss on examples  Definition, description, importance, growth, application and examples	Creative Thinking ICT Mastering Learning	Appreciate Patient	Refer syllabus for examples
<b>14.0 DEVELOPMENT</b>						
<b>2</b>	<b>14.1 Animals</b> <b>14.1.1 Embryology</b>  <b>14.1.2 Human fetal development</b>  <b>14.1.3 Parturition process in humans</b>  <b>14.2 Plants</b> <b>14.2.1 Seed development</b>	Able to : <ul style="list-style-type: none"> <li>Define briefly on the description of major stages</li> <li>Explain on organ formation from ectoderm, mesoderm and endoderm</li> </ul> Able to : <ul style="list-style-type: none"> <li>Explains the roles of placenta, chorion, amniotic fluid and allantois</li> <li>Explains the roles of progesterone and oestrogen</li> </ul> Able to : <ul style="list-style-type: none"> <li>Explains the roles of progesterone and oestrogen, oxytocin and prolactin</li> </ul> Able to : <ul style="list-style-type: none"> <li>Explain the development of seeds and fruits after fertilization</li> <li>Explain through examples the structures of</li> </ul>	Discuss on the major stages beginning after fertilization from cleavage to organogenesis and organ formation from ectoderm, mesoderm and endoderm  Discuss and explanation on development of seeds and fruits after fertilization, structures of monocotyledonous and dicotyledonous seeds	Study skills Future research  Mastering Learning	Appreciate Patient  Appreciate Patient	

	<b>14.2.2 Seed germination</b>	<p>monocotyledonous and dicotyledonous seeds</p> <p>Able to :</p> <ul style="list-style-type: none"> <li>• Explain the mobilization of nutrients after inhibition (role of giberrelin)</li> </ul>	Discuss and explanation on the mobilization of nutrients after inhibition			
<b>3&amp;4</b>	<b>FIRST TEST</b> 18-28JAN 2010					
<b>WEEK</b>	<b>TOPIC</b>	<b>LEARNING OUTCOMES</b>	<b>LEARNING ACTIVITIES</b>	<b>SUGGESTED PEDAGOGY</b>	<b>MORAL VALUES</b>	<b>NOTES</b>
<b>15.0 GROWTH</b>						
<b>5</b>	<b>15.1 Measurement</b>	<p>Able to :</p> <ul style="list-style-type: none"> <li>• Explain through examples the parameters and methods of measurement</li> <li>• Solve problems</li> </ul>	Discuss and explanation on parameters and methods of measurement			
	<b>15.2 Types of growth curve</b>	<p>Able to explain :</p> <ul style="list-style-type: none"> <li>• absolute growth curve</li> <li>• absolute growth rate curve</li> <li>• relative growth rate curve</li> </ul>	Discuss and explanation on the types of growth curve			
	<b>15.3 Growth pattern</b>	<p>Able to explain :</p> <ul style="list-style-type: none"> <li>• limited growth in human</li> <li>• unlimited growth in perennial plants or woody saka</li> <li>• allometric growth in human</li> <li>• isometric growth in fish</li> <li>• intermittent growth in insect</li> </ul>	Discuss and explanation on the growth pattern			
	<b>15.4 Ecdysis and metamorphosis</b>	<p>Able to :</p> <ul style="list-style-type: none"> <li>• Define ecdysis and metamorphosis</li> <li>• Explain the role of hormones such as neurosecretion, juvenile hormone and ecdysone</li> <li>• Describe the process of ecdysis and metamorphosis</li> </ul>	Group discussion on ecdysis and metamorphosis and the role of hormones such as neurosecretion, juvenile hormone and ecdysone	Study skills Future research	Cooperation	

		in insects				
	<b>15.5 Dormancy</b>	Able to explain the concept, importance and examples of dormancy	Explanation on the concept, importance and examples of dormancy in animals and plants			
	15.5.1 Animals	Able to explain hibernation, aestivation and diapause				
	15.5.2 Palnts	Able to : <ul style="list-style-type: none"> <li>• explain about seed dormancy</li> <li>• explain through examples the factors affecting seed dormancy and methods of overcoming them</li> </ul>				

**LEARNING AREA : GENETICS**

WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
<b>16.0 TRANSMISSION GENETICS</b>						
<b>6</b>	<b>16.1 Mendelian genetics</b>	Able to : <ul style="list-style-type: none"> <li>• Define terms</li> <li>• Explain Mendel's experiment on monohybrid and dihybrid crosses/inheritance</li> <li>• Listing and explain the characteristics of pea plants used by Mendel</li> </ul>	Group discussion on terms, Mendel's experiment on monohybrid and dihybrid crosses/inheritance and characteristics of pea plants used by Mendel	Study skills Future research Individualized instruction	Loves Obey	
	16.1.1 Monohybrid	Able to : <ul style="list-style-type: none"> <li>• Explain about monohybrid cross and its results</li> <li>• Describe the Mendel's first law and its' relation with meiosis</li> <li>• Calculate the ratios of genotypic and phenotypic until F<sub>2</sub> generation</li> </ul>	Carry out experiment on monohybrid and dihybrid crosses  Group discussion on monohybrid cross and its results and Mendel's first law and its' relation with meiosis			
	16.1.2 Dihybrid	Able to :	Carry out activity on calculating the ratios of genotypic and phenotypic until F <sub>2</sub> generation  Group discussion on			

		<ul style="list-style-type: none"> <li>• Explain about monohybrid cross and its results</li> <li>• Describe the Mendel's second law and its relation with meiosis</li> <li>• Calculate the ratios of genotypic and phenotypic until F<sub>2</sub> generation</li> </ul>	<p>monohybrid cross and its results and Mendel's second law and its relation with meiosis</p> <p>Carry out activity on calculating the ratios of genotypic and phenotypic until F<sub>2</sub> generation</p>			
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**CHINESE NEW YEAR HOLIDAY  
15-21 FEB 2010**

WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
<b>8</b>	<b>16.2 Modification of Mendelian genetics</b> 16.2.1 Codominance  16.2.2 Incomplete dominance  16.2.3 Multiple alleles	<p>Able to :</p> <ul style="list-style-type: none"> <li>• Give definition</li> <li>• Explain through examples of inheritance : MN blood group in humans</li> <li>• Calculate the ratios of genotypic and phenotypic</li> </ul> <p>Able to :</p> <ul style="list-style-type: none"> <li>• Give definition</li> <li>• Explain through examples of inheritance : <i>Antirrhinum</i> (Snapdragon) flower colour</li> <li>• Calculate the ratios of genotypic and phenotypic</li> </ul> <p>Able to :</p> <ul style="list-style-type: none"> <li>• Give definition</li> <li>• Explain through examples of inheritance : human ABO blood group</li> <li>• Calculate the ratios of genotypic and phenotypic</li> </ul>		Creative Thinking ICT	Appreciate Patient	

	16.2.4 Lethal genes	Able to : <ul style="list-style-type: none"> <li>• Give definition</li> <li>• Explain through examples of inheritance :coat colour in mice</li> <li>• Calculate the ratios of genotypic and phenotypic</li> </ul>				
	16.2.5 Polygenes	Able to : <ul style="list-style-type: none"> <li>• Give definition</li> </ul> Explain through examples of inheritance : height in humans				

WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
5	16.2.6 Linked genes	Able to : <ul style="list-style-type: none"> <li>• Give definition on linked genes and sex-linked genes</li> <li>• Explain the effect of crossing-over on ratio of dyhybrid crosses</li> <li>• Explain through examples of <i>Drosophila</i> eye colour and haemophilia in humans on the parental and recombinant phenotypes</li> <li>• Calculate the ratios of genotypic and phenotypic</li> <li>• Describe about pedigree analysis</li> <li>• Explain on the sex determination in humans</li> </ul>	Group discussion on linked genes and sex-linked genes, effect of crossing-over on ratio of dyhybrid crosses, parental and recombinant, pedigree analysis and sex determination in humans	Creative Thinking ICT	Loves Obey	
	16.2.7 Epistasis	Able to give definition and examples	Explanation on epistasis			

**17.0 MUTATION**

<b>6</b>	<b>17.1 Classification</b>	Able to : <ul style="list-style-type: none"> <li>• Explain spontaneous and induced</li> <li>• Describe examples of mutagens</li> </ul>	Group discussion on spontaneous and induced and mutagens			
	<b>17.2 Gene mutation</b>	Able to explain gene mutation at DNA level	Explanation on the gene mutation at DNA level			
	17.2.1 Substitution	Able to : <ul style="list-style-type: none"> <li>• Give definition</li> <li>• Explain through examples the sickle-cell anaemia</li> </ul>	Group discussion substitution, insertion/addition, deletion, inversion			
	17.2.2 Insertion/ Addition	Able to : <ul style="list-style-type: none"> <li>• Give definition</li> <li>• Explain through examples Frameshift mutation</li> </ul>				

WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
<b>6</b>	17.2.3 Deletion	Able to : <ul style="list-style-type: none"> <li>• Give definition</li> <li>• Explain through examples Frameshift mutation</li> <li>• Explain thalassaemia major</li> </ul>	Group discussion on substitution, insertion/addition, deletion, inversion	Study skills Future research		
	17.2.4 Inversion	Able to give definition of inversion				
	<b>17.3 Chromosomal mutation</b>	Able to explain about chromosomal aberration	Group discussion on chromosomal aberration			
	17.3.1 Change in chromosome number	Able to : <ul style="list-style-type: none"> <li>• Explain through examples of aneuploidy and euploidy/polyploidy</li> </ul>	Group discussion and explanation on aneuploidy and euploidy/polyploidy, autosome and sex chromosome			

	Aneuploidy	<ul style="list-style-type: none"> <li>Describe the definition of autosome and sex chromosome</li> </ul>				
	Euploidy/poliploidy	<p>Able to :</p> <ul style="list-style-type: none"> <li>Give definition</li> <li>Explain non-disjunction during meiosis</li> <li>Explain abnormalities of autosome number</li> <li>Explain through examples of abnormalities of sex chromosomes number</li> </ul> <p>Able to :</p> <ul style="list-style-type: none"> <li>Give definition of Euploidy/polyploidy, autopolyploidy and allopolyploidy</li> <li>Explain through examples in plants</li> </ul>				

WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
	17.3.2 Change in chromosome structure :  Inversion Translocation Deletion Duplication/ multiplication	Able to give definition	Group discussion and explanation on inversion, translocation, deletion, duplication/, multiplication	Study skills Future research Individualized instruction	Loves Obey	
<b>18.0 POPULATION GENETICS</b>						
<b>6</b>	<b>18.1 Concepts of gene pool</b>	<p>Able to :</p> <ul style="list-style-type: none"> <li>Describe the concept of gene,allele and genotype</li> </ul>	Group discussion and explanation on the concept of gene,allele and genotype			

	<b>18.2 Hardy-Weinberg law</b>	<p>frequencies in a population</p> <ul style="list-style-type: none"> <li>• Explain the relationship between population genetics and evolution</li> </ul> <p>Able to :</p> <ul style="list-style-type: none"> <li>• Explain genetic equilibrium and allele frequency</li> <li>• Describe the requirements f Describe the Hardy-Weinberg equilibrium</li> <li>• Calculate the frequency of allele and genotype in a population</li> </ul>	<p>frequencies in a population and the relationship between population genetics and evolution</p> <p>Group discussion and explanation genetic equilibrium and allele frequency, Hardy-Weinberg equilibrium</p>			
<b>WEEK</b>	<b>TOPIC</b>	<b>LEARNING OUTCOMES</b>	<b>LEARNING ACTIVITIES</b>	<b>SUGGESTED PEDAGOGY</b>	<b>MORAL VALUES</b>	<b>NOTES</b>
<b>19.0 GENE REGULATION AND EXPRESSION</b>						
<b>8</b>	<b>19.1 Lactose operon</b>	<p>Able to :</p> <ul style="list-style-type: none"> <li>• Describe induced and constitutive enzyme production</li> <li>• List the components of lactose operon and function</li> <li>• Effect of presence or absence of lactose on lactose operon</li> </ul>	<p>Group discussion and explanation on components of lactose operon and function</p>			
<b>20.0 MODERN GENETICS TECHNOLOGY</b>						
<b>9</b>	<p><b>20.1 Genetics engineering/ recombinant DNA technology</b></p> <p>20.1.1 Restriction endonuclease/ Restriction enzymes</p> <p>20.1.2 Vectors</p>	<p>Able to give definition</p> <p>Able to :</p> <ul style="list-style-type: none"> <li>• Give definition</li> <li>• Explain the importance</li> <li>• Explain the nomenclature</li> <li>• Explain the restriction site :polindrome</li> </ul> <p>Able to :</p> <ul style="list-style-type: none"> <li>• Give definition</li> <li>• Explain the properties of cloning vectors</li> </ul>	<p>Group discussion and explanation on restriction, endonuclease, vectors, cloning</p>	<p>Creative Thinking ICT</p>	<p>Appreciate Patient</p>	

10	20.1.3 Cloning	<ul style="list-style-type: none"> <li>Describe about plasmid</li> <li>Explain about phage</li> </ul> <p>Able to :</p> <ul style="list-style-type: none"> <li>Give definition</li> <li>Describe the steps of cloning processes</li> <li>Explain through examples of insulin production by <i>E.coli</i></li> </ul>				
	20.2 Gene libraries and gene banks	<p>Able to :</p> <ul style="list-style-type: none"> <li>Give definition and use</li> <li>Describe the gene libraries</li> <li>Explain about construction of genomic and cDNA libraries</li> </ul>	Group discussion and explanation on gene libraries			
WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
	20.3 Use of recombinant DNA technology	<p>Able to :</p> <ul style="list-style-type: none"> <li>give definition of transgenic organisms such as bacteria</li> <li>Explain about transgenic plants</li> <li>Explain about transgenic animals</li> </ul>	Group discussion and explanation on transgenic organisms	Creative Thinking ICT	Appreciate Patient	
	20.4 Other uses	<p>Able to :</p> <ul style="list-style-type: none"> <li>give definition and brief description</li> </ul>	Group discussion and explanation on amniocentesis and chorionic villus sampling (CVS), restoration of adenosine deaminase enzyme in infants			
	20.4.1 Genetic screening	<p>Able to:</p> <ul style="list-style-type: none"> <li>Explain about amniocentesis and chorionic villus sampling (CVS)</li> </ul>				
	20.4.2 Gene therapy	<ul style="list-style-type: none"> <li>Explain about restoration of adenosine deaminase enzyme in infants</li> </ul>				
	20.4.3 DNA fingerprinting	<ul style="list-style-type: none"> <li>Explain the use in forensic science</li> </ul>				
20.5 Ethics of modern	Able to describe the advantages and disadvantages of	Group discussion and explanation on advantages and				

	<b>genetics</b>	recombinant DNA technology	disadvantages of recombinant DNA technology			
<b>FIRST TERM SCHOOL HOLIDAY 13 - 20 MAC 2010</b>						
<b>11-13 MID YEAR EXAM STPM 23 MAC-8APRIL 2010</b>						

**LEARNING AREA : ENERGETICS**

WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
<b>4.0 PHOTOSYNTHESIS</b>						
<b>14</b>	<b>4.1 Light Reaction</b>	Able to : <ul style="list-style-type: none"> <li>• Explain the reaction and detailed description</li> <li>• Explain through example of photoactivation of photosystem I and photosystem II</li> <li>• Explain the process of photolysis of water</li> <li>• Explain the production and roles of NADPH and ATP</li> <li>• Explain the process of cyclic and non-cyclic photophosphorylation</li> </ul>	Group discussion and presentation on : <ul style="list-style-type: none"> <li>• light reaction</li> <li>• photosystem I and photosystem II</li> <li>• photolysis of water</li> <li>• cyclic and non-cyclic photophosphorylation</li> </ul>	Constructivism Study Skills	Appreciate Patient	
<b>15</b>	<b>4.2 Dark Reaction Calvin cycle in C<sub>3</sub> and C<sub>4</sub> plants</b>	Able to : <ul style="list-style-type: none"> <li>• Explain the reaction and detailed description</li> <li>• Explain CO<sub>2</sub> fixation to RuDP</li> <li>• Explain the production of</li> </ul>	Group discussion and presentation on : <ul style="list-style-type: none"> <li>• dark reaction</li> <li>• CO<sub>2</sub> fixation to RuDP</li> </ul>			

		PGAL until the formation of carbohydrates <ul style="list-style-type: none"> <li>• Explain the involvement in the formation of proteins and fatty acids</li> <li>• Distinguishes between leaves of C<sub>3</sub> and C<sub>4</sub> plants (anatomical and physiological)</li> </ul>	<ul style="list-style-type: none"> <li>• the production of PGAL until the formation of carbohydrates</li> <li>• the formation of proteins and fatty acids</li> <li>• leaves of C<sub>3</sub> and C<sub>4</sub> plants</li> </ul> Carry out experiment to examine transverse sections of C <sub>3</sub> and C <sub>4</sub> leaves			
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WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
	<b>4.2 Dark Reaction growth Calvin cycle in C<sub>3</sub> and C<sub>4</sub> plants</b>	<ul style="list-style-type: none"> <li>• Explain through example Krantz's anatomy, Hatch-Slack pathway and Crassulacean acid metabolism (CAM)</li> </ul>	Group discussion and presentation on : <ul style="list-style-type: none"> <li>• Krantz's anatomy</li> <li>• Hatch-Slack pathway</li> <li>• Crassulacean acid metabolism (CAM)</li> </ul>	Constructivism Study Skills	Cooperation	
	<b>4.3 Factors limiting the rate of photosynthesis</b>	Able to explain limiting factors of photosynthesis : <ul style="list-style-type: none"> <li>• Wavelength and intensity of light</li> <li>• Temperature</li> <li>• Carbon dioxide concentration</li> </ul> Explain through examples the compensation point	Group discussion and presentation on : <ul style="list-style-type: none"> <li>• Wavelength and intensity of light</li> <li>• Temperature</li> <li>• Carbon dioxide concentration</li> <li>• compensation point</li> </ul>			
<b>5.0 RESPIRATION</b>						
<b>16</b>	<b>5.1 Aerobiosis</b>					

	5.1.1 Glycolysis	<p>Able to :</p> <ul style="list-style-type: none"> <li>• Explain the process of glucose phosphorylation and the production of fructose diphosphate</li> <li>• Demonstrate the splitting into phosphoglyceraldehyde and dihydroxyacetone phosphate</li> <li>• Demonstrate the phosphoglyceraldehyde to pyruvate and production of ATP and NADPH</li> </ul> <p>Explain the substrate level of phosphorylation</p>	<ul style="list-style-type: none"> <li>• Group discussion on glucose phosphorylation and the production of fructose diphosphate, splitting into phosphoglyceraldehyde and dihydroxyacetone phosphate, phosphoglyceraldehyde to pyruvate and production of ATP and NADPH, substrate level of phosphorylation</li> </ul>	Constructivism	Appreciate Patient	
WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
17	<p>5.1.2 Krebs Cycle growth tricarboxylic acid cycle growth citric acid cycle</p> <p>5.1.3 Electron transport system</p>	<p>Able to explain :</p> <ul style="list-style-type: none"> <li>• the formation of acetyl coenzyme A</li> <li>• formation of citrate</li> <li>• reformation of oxaloacetate from citrate via <math>\alpha</math>-ketoglutarate and succinate (with emphasis on the formation of NADPH, FADH<sub>2</sub> and GTP and release of carbon dioxide)</li> <li>• Calculating ATP production</li> </ul> <p>Able to :</p> <ul style="list-style-type: none"> <li>• Explain the electron flow from NADPHgrowth FADH<sub>2</sub> via flavoprotein, coenzyme Q and cytochrome to oxygen with the production of ATP and water</li> </ul> <p>Explain through examples the effects of inhibitors (cyanide and carbon monoxide)</p>	<p>Group presentation and discussion on formation of acetyl coenzyme A, formation of citrate, reformation of oxaloacetate from citrate via <math>\alpha</math>-ketoglutarate and succinate</p> <p>Carry out activity to calculate the production of ATP</p> <p>Group discussion on electron flow from NADPHgrowth FADH<sub>2</sub> via flavoprotein, coenzyme Q and cytochrome to oxygen with the production of ATP and water and effects of inhibitors (cyanide and carbon monoxide)</p>	Constructivism Study Skills	Cooperation Cleanliness	
18	5.2 Anaerobiosis	Able to :	Discuss to define and listing the		Appreciate	

		<ul style="list-style-type: none"> <li>Defining and listing the differences between ethanol production in plants and lactic acid production in animals</li> <li>Explain through examples the use of fermentation in industry</li> </ul>	<p>differences between ethanol production in plants and lactic acid production in animals.</p> <p>Carry out experiment to investigate the use of yeast in respiratory</p>		Patient	
WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
<b><u>NUTRITION</u></b>						
<b>19</b>	<b>5.1 Autotroph</b>  6.1.1 Chemosynthesis  6.1.2 Photosynthesis  <b>5.2 Heterotroph</b>  6.2.1 Holozoic 6.2.2 Saprophytic 6.2.3 Parasitic	<p>Able to :</p> <ul style="list-style-type: none"> <li>Define and explain the process of Chemosynthesis</li> <li>Explain through examples of Chemosynthesis</li> </ul> <p>Able to :</p> <ul style="list-style-type: none"> <li>Explain briefly on description of photosynthesis in bacteria</li> </ul> <p>Able to :</p> <ul style="list-style-type: none"> <li>Define and explain on the holozoic, saprophytic, parasitic</li> <li>Give examples for holozoic, saprophytic, parasitic</li> </ul>	<p>Student group discussion on Chemosynthesis and photosynthesis in bacteria</p> <p>Discussion on basic concept of holozoic, saprophytic, parasitic</p>	Constructivism Study Skills	Appreciate Patient	

**LEARNING AREA : GASEOUS EXCHANGE, TRANSPORT AND HOMEOSTASIS**

WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
<b>6.0 GASEOUS EXCHANGE</b>						
<b>20</b>	<b>7.1 Animals</b> 7.1.1 Gaseous exchange in mammals	Able to : <ul style="list-style-type: none"> <li>• Explain the processes and structures involved</li> <li>• Explain the processes of oxygen and carbon dioxide transport</li> <li>• Explain partial pressure and Bohr effect</li> <li>• Explain oxygen dissociation curves</li> </ul>	Group discussion and presentation on : <ul style="list-style-type: none"> <li>• the processes of gaseous exchange in mammals and structures involved</li> <li>• partial pressure and Bohr effect</li> <li>• oxygen dissociation curves</li> </ul>	Study skills Future research Individualized instruction	Cleanliness Patient	
WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
<b>21</b>	7.1.2 Breathing cycle  <b>7.2 Plants</b> 7.2.1 Stomata	Able to : <ul style="list-style-type: none"> <li>• Explain the mechanism of breathing control</li> <li>• Explain through examples of chemoreceptor</li> <li>• Explain through examples tidal volume, vital capacity, total lung capacity, inspiratory reserve volume, expiratory reserve volume and residual volume</li> </ul> Able to : <ul style="list-style-type: none"> <li>• Illustrate structure of stomata</li> <li>• Explain the structure and function of stomata</li> <li>• Various animal cells</li> <li>• Describe the mechanism of stomatal opening and closing</li> </ul>	Group discussion on mechanism of breathing control and examples of chemoreceptor  Individual activity on tidal volume, vital capacity, total lung capacity, inspiratory reserve volume, expiratory reserve volume and residual volume  Carry out experiment on observing mammalian respiratory system  Individual activity on defining and describing the structure, functions and distribution of stomata.  Discussions on the mechanism	Study skills Future research Individualized instruction	Loyalty	

		based on the starch-sugar hypothesis and K <sup>+</sup> ions accumulation hypothesis	of stomatal opening and closing based on the starch-sugar hypothesis and K <sup>+</sup> ions accumulation hypothesis			
<b>MID YEAR SCHOOL HOLIDAY 5 - 20 JUNE 2010</b>						

**SECOND TERM : 21 JUNE – 19 NOVEMBER 2010 (21 WEEKS)**

**LEARNING AREA : GASEOUS EXCHANGE, TRANSPORT AND HOMEOSTASIS**

WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
<b>7.0 <u>TRANSPORT</u></b>						
<b>1</b>	<b>7.1 Animals</b>					
	8.1.1 Cardiac cycle	Able to <ul style="list-style-type: none"> <li>Define systole and diastole</li> <li>Describe changes in pressure and volume in aorta, left atrium and left ventricle</li> </ul>	Discussions on systole and diastole, changes in pressure and volume in aorta, left atrium and left ventricle	Study skills Future research Individualized instruction	Appreciate Patient	
	8.1.2 Control of heart beat	Able to : <ul style="list-style-type: none"> <li>Explain about sinoatrial and atrioventricular nodes</li> <li>Explain about sympathetic and parasympathetic nerves</li> <li>Describe detailed description of heart beat</li> </ul>	Discussions on sinoatrial and atrioventricular nodes, sympathetic and parasympathetic nerves, heart beat  Carry out experiment to investigate mammalian circulatory system  Carry out experiment to examine slides of transverse sections of vein, artery and capillary			
	8.1.3 Cardiovascular diseases	Able to : <ul style="list-style-type: none"> <li>Explain about hypertension,</li> </ul>				



		function in mammals • Describe about Cori cycle and ornithine cycle (emphasis on the entrance of amino groups into the cycle and the production of urea)	function in mammals, Cori cycle and ornithine cycle			
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WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
4	<b>8.3 Osmoregulation</b>					
	9.3.1 Animals I. Kidney	Able to : • Describe the detailed process of urine formation • Explain the structure and functions of nephron and related blood vessels	Discussion on the formation of urine and structure and functions of nephron and related blood vessels	Study skills Future research	Appreciating the body	
	II. Antidiuretic hormone (ADH)	Able to : • Explain through examples the role and mechanism of action	Collect information on ADH role and mechanism of action			
	III. Control of blood Na <sup>+</sup> ions and pH	• Explain through examples the mechanism of action	Collect information on control of blood Na <sup>+</sup> ions and pH  Carry out experiment to examine the slides of liver and kidney			
9.3.2 Plants I. Role of stomata in the regulation of water loss	Able to : • Explain the role of stomata in the regulation of water loss • Explain the adaptation of plants to the environment	Discussion on the role of stomata in the regulation of water loss and adaptation of plants to the environment				
	II. Adaptation of plants to the					

	environment					
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**LEARNING AREA : CONTROL AND COORDINATION**

WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
	<b>9.0 Nervous system</b>  10.1 (a) Generation, characteristics and transmission of impulse	Able to : <ul style="list-style-type: none"> <li>• Explain through examples the organization of nervous system in mammals</li> <li>• Describe the formation of resting and action potentials</li> </ul>	Collect information and discussion on organization of nervous system in mammals and the formation of resting and action potentials	Study skills Future research Context Effects	Cooperation Cleanliness	

5						
<b>SECOND TEST</b>						
<b>7 JULY 2008 - 11 JULY 2008</b>						
WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
		<ul style="list-style-type: none"> <li>• Listing the characteristics of nerve impulse and explain the definition of related terms</li> <li>• Explain the mechanism of transmission and spread of</li> </ul>	Group discussion on nerve impulse and mechanism of transmission and spread of impulse along the axon  Defining and listing the importance of variation.	Study skills Future research	Appreciate Patient	

<b>6</b>	(b) Synapses	<p>impulse along the axon</p> <p>Able to :</p> <ul style="list-style-type: none"> <li>• Explain the structure of synapse</li> <li>• Explain the role of neurotransmitters such as acetylcholine and norepinephrine</li> <li>• Explain the mechanism of impulse transmission across synapse</li> <li>• Distinguish between mechanisms of impulse transmission across synapse and along axon</li> </ul>	<p>Group discussion on the structure of synapse, role of neurotransmitters, mechanism of impulse transmission across synapse, mechanisms of impulse transmission across synapse and along axon</p>			
	(c) Neuromuscular junctions	<p>Able to :</p> <ul style="list-style-type: none"> <li>• Explain the structure of neuromuscular junctions and sarcomere</li> <li>• Explain the importance role of sarcoplasmic reticulum, Ca<sup>2+</sup> ions, myofibril and T tubule in muscle contraction</li> <li>• Explain the sliding filament hypothesis</li> <li>• Explain the mechanism of muscle contraction : roles of actin, myosin and troponin</li> </ul>	<p>Discussing the importance of neuromuscular structure junctions and sarcomere, the importance role of sarcoplasmic reticulum, Ca<sup>2+</sup> ions, myofibril and T tubule in muscle contraction, sliding filament hypothesis, mechanism of muscle contraction : roles of actin, myosin and troponin</p>			

WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
<b>7</b>	10.2 Autonomous nervous system in mammals	<p>Able to :</p> <ul style="list-style-type: none"> <li>• Describe the organization of the sympathetic and parasympathetic nervous system and their relationship with central nervous system</li> <li>• Explain through examples the structure and function</li> </ul>	<p>Discussion on the organization of the sympathetic and parasympathetic nervous system and their relationship with central nervous system, examples the structure and function</p>	<p>Study skills Future research</p>	<p>Loves Obey</p>	

	10.3 Drug abuse	<ul style="list-style-type: none"> <li>• Explain the comparison between the sympathetic and parasympathetic nervous system</li> </ul> <p>Able to :</p> <ul style="list-style-type: none"> <li>• Explain through examples the mechanism of action of drug on nervous system and neuromuscular junctions</li> </ul>	Discussion and explanation on mechanism of action of drug on nervous system and neuromuscular junctions through examples of cocaine and kurare			
<b>10.0 <u>HORMONE/CHEMICAL COORDINATION</u></b>						
<b>8</b>	<b>10.1 HUMANS</b>  11.1.1 Hormonal action	<p>Able to :</p> <ul style="list-style-type: none"> <li>• Describe through examples of steroid hormones on the mechanism of hormone action via gene activation</li> <li>• Explain through examples of adrenaline the mechanism of nonsteroid hormones via activation of cyclic AMP system (cascade effect)</li> <li>• Explain the comparison between the two action mechanism</li> </ul>	Discussion and explanation on the mechanism of hormone action via gene activation, the mechanism of nonsteroid hormones via activation of cyclic AMP system (cascade effect)	Creative Thinking ICT	Appreciate Patient	
<b>WEEK</b>	<b>TOPIC</b>	<b>LEARNING OUTCOMES</b>	<b>LEARNING ACTIVITIES</b>	<b>SUGGESTED PEDAGOGY</b>	<b>MORAL VALUES</b>	<b>NOTES</b>
	11.1.2 Role of hormones in reproduction	<p>Able to :</p> <ul style="list-style-type: none"> <li>• Explain the site of production and role of hormones in oestrus cycle</li> <li>• Explain the site of production and role of hormones during pregnancy</li> </ul>	Discussion the site of production and role of hormones in oestrus cycle and during pregnancy	Creative Thinking ICT Study skills	Loyalty	<b>Refer to 14.1.2 &amp; 14.1.3</b>

<b>9</b>	<b>11.2 Plants</b> 11.2.1 Auxin 11.2.2 Gibberellin 11.2.3 Cytokinin 11.2.4 Abscisic acid (ABA) 11.2.5 Ethene	Able to : • Explain the role of hormones in plant growth and development • Describe the interaction between hormones	Defining and listing the role of hormones in plant growth and development			
	<b>11.3 Phytochromes and the effect of light on flowering</b>	Able to : • Define phytochromes • Explain through examples the mechanism of phytochromes action • Define and explain photoperiodism • Explain the role of phytochromes in photoperiodism and flowering	Defining and discussing on phytochromes, photoperiodism			

**LEARNING AREA : IMMUNE SYSTEM**

WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
<b>12.0 IMMUNITY</b>						
<b>10</b>	<b>12.1 Antibody, antigen, epitope, cell-mediated response, humoral immune response</b>	Able to describe and give description on antibody, antigen, epitope, cell-mediated response, humoral immune response	Group discussion on antibody, antigen, epitope, cell-mediated response, humoral immune response	Creative Thinking ICT	Loves Obey	
WEEK	TOPIC	LEARNING OUTCOMES	LEARNING ACTIVITIES	SUGGESTED PEDAGOGY	MORAL VALUES	NOTES
	<b>12.2 Lymphatic system</b>	Able to : • Explain the organization of lymphatic system and formation of lymphatic fluid	Group discussion on the organization of lymphatic system and formation of lymphatic fluid	Study skills Future research	Loves Obey	

	<p><b>12.3 Development of immunity</b></p> <p><b>12.4 Concept of self and non-self</b></p> <p><b>12.5 Acquired immune deficiency syndrome (AIDS)</b></p>	<ul style="list-style-type: none"> <li>Describe the relationship between lymphatic system and immunity</li> </ul> <p>Able to :</p> <ul style="list-style-type: none"> <li>Explain the roles of macrophages, T-cells and B-cells</li> <li>Explain the mechanism of cell-mediated response (T-cell) and humoral immune response (plasma cells)</li> </ul> <p>Able to :</p> <ul style="list-style-type: none"> <li>Explain through examples about the foreign tissue/graft rejection by the body</li> <li>Describe the application of concept in medicine (organ transplant)</li> </ul> <p>Able to :</p> <ul style="list-style-type: none"> <li>Explain the causes, causing agent (HIV), symptoms and prevention of AIDS</li> <li>Explain the mechanisms of HIV infection</li> </ul>	<p>Group discussion on the roles of macrophages, T-cells and B-cells, mechanism of cell-mediated response (T-cell) and humoral immune response (plasma cells)</p> <p>Group discussion on the foreign tissue/graft rejection by the body and the application of concept in medicine (organ transplant)</p> <p>Collect information and discussion on the causes, causing agent (HIV), symptoms and prevention of AIDS and the mechanisms of the causes, causing agent (HIV), the mechanisms of HIV infection</p>			
<b>11</b>	<p><b>SECOND TERM SCHOOL HOLIDAY 4-14 SEPT 2010</b></p> <p><b>HARI RAYA PUASA 2010 10-11 SEPT 2010</b></p>					
<b>12 -13 14 -17</b>	<p><b>REVISION FOR TRIAL EXAMINATION</b></p> <p><b>TRIAL EXAMINATIONS 2010 29SEPT – 13 NOV2010</b></p>					

<b>18 –21</b>	<b>INTENSIVE REVISION PROGRAMME</b>	
<b>YEAR END SCHOOL HOLIDAYS 20 NOVEMBER 2010 – 3 JANUARY 2011</b>		