

## SCHEME OF WORK

## BIOLOGY FORM FOUR

## TERM ONE

W NO	L/ NO	TOPIC/ SUBTOPIC	LESSON / SPECIFIC OBJECTIVES	TEACHING / LEARNING ACTIVITIES	MATERIALS / RESOURCES	REF.	REMARKS
1	1	GENETICS  The concept of variation.	<u>By the end of the lesson, the learner should be able to:</u> Define Genetics. Define variation.	Exposition of new concepts. Probing questions on some variations in human beings. Observe some variations in human beings such as tongue rolling, finger prints, students' heights, etc. Discussion on the concept of variation.	<i>Ink pad, hand lenses, white paper.</i>	KLB BK IV. PP 1-2.	
	2-3	Discontinuous variation.	Define discontinuous variation.	Observe some discontinuous variations in human beings such as tongue rolling, sex, blood groups, etc. Discussion on the concept of discontinuous variation.		KLB BK IV. P 3.	
	4,5	Continuous variation.	Define continuous variation. Give examples of characteristics that show continuous variation.	Class activity ; students measure and record their heights; Plotting of frequency-height graph; Analyzing the graph; Discussion with probing questions.	<i>Metre rules/ tape measure, Graph papers</i>	KLB BK IV. PP 3-4	
2	1-2	Causes of variation.	Discuss causes of variation.	Exposition of new concepts. Discussion with probing questions.		KLB BK IV. P 4	

2	3-4	The chromosome.	Describe the structure of chromosomes.	Exposition of new concepts. Probing questions. Discussion.		KLB BK IV. PP 4-5.	
	5	Chromosomal behaviour during mitosis.	Describe chromosomal behaviour during mitosis.	Exposition; Teacher demonstrations; Drawing diagrams; Detailed discussion.	<i>Scissors, Manilla papers, thread, cellotape.</i>	KLB BK IV. PP 5-6	
3	1-2	Chromosomal behaviour during meiosis.	Describe chromosomal behaviour during meiosis.	Exposition; Teacher demonstrations; Drawing diagrams; Detailed discussion.	<i>Scissors, Manilla papers, threads, cellotape.</i>	KLB BK IV. PP 6-7	
	3-4	Genes and DNA.	Describe the structure of genes and DNA. Identify the role of DNA.	Expository approach.	<i>Chart- the double helix DNA.</i>	KLB BK IV. PP 7-8	
	5	DNA replication.	Describe DNA replication. Explain the role of DNA in protein synthesis.	Exposition; Drawing mRNA strands.		KLB BK IV. PP 9-10	
4	1	First law of heredity.	Describe Mendel's experiments. State Mendel's first law.	Exposition with explanations.		KLB BK IV. PP 11-12	
	2-3	Monohybrid inheritance.	Define monohybrid inheritance. Differentiate between genotype and phenotype. Draw diagrams to show genetic crosses.	Q/A to review Mendel's first law. Drawing diagrams to show genetic crosses. Discussion with probing questions.		KLB BK IV. PP 12-14	
	4-5	Genetic crosses using a punnet square.	Show fusion of gametes using a punnet square.	Completing a punnet square; Brief discussion.		KLB BK IV. PP 14-15	

5	1-2	Ratios of phenotypes and genotypes.	Explain the concept of probability in inheritance of characteristics.	Q/A to review phenotypes and genotypes. Simple experiments on probability. Discussion.	<i>Beans of two different colours, beakers.</i>	KLB BK IV. PP 15-17	
	3-4	Incomplete dominance.	Cite examples of incomplete dominance. Illustrate incomplete dominance with diagrams.	Exposition; Discussion; Drawing diagrams.		KLB BK IV. PP 19-20.	
	5	Inheritance of ABO blood groups.	Identify the four blood groups and their genotypes. Illustrate inheritance of blood groups with diagrams.	Exposition; Discussion; Drawing diagrams; Supervised practice on inheritance of blood groups.		KLB BK IV. PP 20-21	
6	1	Inheritance of ABO blood groups.	Illustrate inheritance of blood groups with diagrams.	Exposition; Discussion; Drawing diagrams; Supervised practice on inheritance of blood groups.		KLB BK IV. PP 20-21	
	2	Inheritance of Rhesus factor.	Describe inheritance of Rhesus factor.	Exposition; Discussion.		KLB BK IV. PP 21-22	
	3-4	Determining unknown genotypes.	Determine unknown genotypes using test crosses and selfing crosses.	Exposition; Probing questions; Drawing illustrative diagrams; Discussion.		KLB BK IV. PP 22-23	
	5	Sex determination in man.	Describe sex determination in man.	Exposition; Drawing illustrative diagrams; Discussion.		KLB BK IV. PP 23-24	

7	1-2	Sex-linked genes and traits.	Identify sex-linked traits in man. Illustrate inheritance of sex-linked traits with diagrams.	Probing questions; Drawing illustrative diagrams; Discussion.		KLB BK IV. PP 24-27	
	3-4	Non-disjunction.	Explain effects of non-disjunction as a chromosomal abnormality.	Exposition of new concepts; Discussion.		KLB BK IV. PP 30-33	
	5-1	TEST & MID – TERM BREAK					
8	2-3	Gene mutation.	Differentiate between chromosomal and gene mutation. Identify types of gene mutation.	Q/A to review types of chromosomal mutation; Using sequence models to show chromosomal mutations. Discussion.	<i>Models to show Chromosomal mutations.</i>	KLB BK IV. PP 33-35	
	4-5	Disorders due to gene mutations.	Explain some disorders due to gene mutations. Illustrate genetic disorders with diagrams.	Discussion on albinism, sickle-cell anaemia, haemophilia, colour blindness. Drawing illustrative diagrams.		KLB BK IV. PP 35-38	
	1-2	Disorders due to gene mutations.	Illustrate genetic disorders with diagrams.	Discussion on albinism, sickle-cell anaemia, haemophilia, colour blindness. Drawing illustrative diagrams.		KLB BK IV. PP 35-38	
9	3-4	Applications of genetics.	Identify areas of practical application of genetics.	Probing questions; Open discussion; Topic review.		KLB BK IV. PP 39-45	
	5	EVOLUTION				KLB BK IV. PP 49-51	
		Meaning of evolution. Theories of origin of life.	Define evolution. Explain the theories of life.	Brain storming; Probing questions; Q/A on creation theory; Exposition of chemical theory.			

10	1-2	Evidence for organic evolution.	Cite evidence for organic evolution.	Brain storming; Probing questions; Exposition; Discussion.		KLB BK IV. PP 51-59	
	3-4	Comparative anatomy and homologous structures.	Define divergent evolution. Give examples of homologous structures.	Examine forelimbs of vertebrates; Discuss adaptations and use of the limbs.	<i>Forelimbs of vertebrates.</i>	KLB BK IV. PP 59-63	
	5	Comparative anatomy and homologous structures. (contd)	Define divergent evolution. Give examples of homologous structures.	Examine forelimbs of vertebrates; Discuss adaptations and use of the limbs.	<i>Forelimbs of vertebrates.</i>	KLB BK IV. PP 59-63	
11	1	Convergent evolution and analogous structures.	Define convergent evolution. Give examples of analogous structures. Give examples of vestigial structures.	Examine wings of insects; wings of birds / bat. Discuss observations.	<i>Wings of insects, wings of birds / bat.</i>	KLB BK IV. PP 63-64	
	2-3	Convergent evolution and analogous structures.(contd)	Define convergent evolution. Give examples of analogous structures. Give examples of vestigial structures.	Examine wings of insects; wings of birds / bat. Discuss observations.	<i>Wings of insects, wings of birds / bat.</i>	KLB BK IV. PP 63-64	
	4	Larmack's theory of evolution.	Explain Larmack's theory of evolution.	Expositions and explanations.		KLB BK IV. P 67	
	5	Darwin's theory of natural selection.	Explain Darwin's theory of natural selection. Cite examples of natural selection in action.	Expositions and explanations; Probing questions; Topic review.		KLB BK IV. PP 67-72	
12 13	END OF TERM ONE EXAMS						

*SCHEME OF WORK*

*BIOLOGY FORM FOUR*

*TERM TWO*

<i>W NO</i>	<i>L/ NO</i>	<i>TOPIC/ SUBTOPIC</i>	<i>LESSON / SPECIFIC OBJECTIVES</i>	<i>TEACHING / LEARNING ACTIVITIES</i>	<i>MATERIALS / RESOURCES</i>	<i>REF.</i>	<i>REMARKS</i>
-------------	--------------	------------------------	-------------------------------------	---------------------------------------	------------------------------	-------------	----------------

1	1-2	RECEPTION, RESPONSE & CO-ORDINATION  Meaning of stimulus, response and irritability.  Tactic responses.	Define of stimulus, response and irritability. Explain the need for sensitivity and response. Identify types of tactics responses.	Brain storming; Exposition; Group experiments-chemotaxis in termites; Discussion.	<i>Brad crumbs, termites, dry sand, moth balls.</i>	KLB BK IV. PP 73-74	
	3-4	Tropism and types of tropism.	Identify types of tropism. State differences between tropisms and taxes.	Examine previous plant set -ups on response to light, gravity; Probing questions and discussion.	<i>Seedlings, klinostat, corked beaker.</i>	KLB BK IV. PP 74-78	
	5	Nastic responses.	Identify types of nastic responses	Q/A and discussion.		KLB BK IV. PP 78-80	
2	1-3	Role of auxins in tropisms.	Explain the role of auxins in tropisms.	Examine previous plant set -ups on response to light, gravity; contact; Probing questions and discussion.		KLB BK IV. PP 80-83	
	4-5	Response and Co-ordination in animals.  The nervous system.	State components of the nervous system. Describe the structure of nerve cells.	Descriptive and expository approaches.	<i>Illustrative diagrams.</i>	KLB BK IV. PP 84-85	
3	1	Types of neurons.  The brain.	Identify types of neurons.  Describe structure of the human brain.	Descriptive and expository approaches.	<i>Illustrative diagrams.</i>	KLB BK IV. PP 85-88	

	2	Reflex actions.	Differentiate between simple and conditioned reflex actions.	Illustrate a simple reflex arc. Probing questions on differences between simple and conditioned reflex actions.	<i>Illustrative diagrams.</i>	KLB BK IV. PP 88-90	
	3,4	Transmission of a nerve impulse.	Describe the transmission of a nerve impulse.	Descriptive and expository approaches.	<i>Illustrative diagrams.</i>	KLB BK IV. PP 90-93	
	5	The endocrine system.	Identify components of endocrine system. Compare endocrine system. With nervous system.	Discussion; tabulate the differences.	<i>Illustrative diagrams.</i>	KLB BK IV. PP 93-6	
4	1-2	The mammalian eye.	Identify major parts of the human eye. Explain image formation and interpretation in the eye.	Brain storming; Discussion with probing questions.	<i>Chart- the human eye.</i>	KLB BK IV. PP 93-100	
	3-4	Accommodation of the eye.	Explain the role of ciliary muscles in accommodation of the eye.	Discussion with probing questions, Drawing illustrative diagrams.	<i>Chart- focusing far and near points.</i>	KLB BK IV. PP 100-1	
	5	Defects of vision and their correction.	Identify defects of vision. Explain correction of vision defects.	Detailed discussion with probing questions; Drawing illustrative diagrams.	<i>Illustrative diagrams.</i>	KLB BK IV. PP 101-4	
5	1	Defects of vision and their correction.	Identify defects of vision. Explain correction of vision defects.	Detailed discussion with probing questions; Drawing illustrative diagrams.	<i>Illustrative diagrams.</i>	KLB BK IV. PP 101-4	

	2	The human ear.	Identify major parts of the human ear.	Descriptive and expository approaches. Drawn diagrams.	<i>Illustrative diagrams.</i>	KLB BK IV. PP 104-5	
	3	Hearing.	Explain how the ear perceives sound.	Descriptive and expository approaches.		KLB BK IV. P 106	
	4	Body balance and posture.	Explain how the ear maintains body balance and posture.	Descriptive and expository approaches.		KLB BK IV. PP 107-8	
	5	Defects of the ear.	Identify some defects of the ear.	Descriptive and expository approaches.		KLB BK IV. P 108	
6	1	SUPPORT & MOVEMENT IN PLANTS AND ANIMALS  Importance of support and movement in plants.	Explain the importance of support and movement in plants.	Brain storming; Probing questions; Discussion.		KLB BK IV. PP 111-2	
	2	Arrangement of tissues in a monocotyledonous stem.	Draw and label a transverse section of a monocotyledonous stem.	Examine transverse section of a monocotyledonous stem.	Monocotyledonous stem, eg. tradescantia, microscope, Razors.	KLB BK IV. PP111-2.	

6	3,4	Arrangement of tissues in a dicotyledonous stem.	Draw and label a transverse section of a dicotyledonous stem. Draw and label a transverse section of herbaceous and woody stems.	Examine transverse section of a dicotyledonous stem, herbaceous and woody stems.	Herbaceous stem, microscope, slides, Razors.	KLB BK IV. PP 111-5	
	5	Stem tissues.	Identify some stem tissues. Explain the role of stem tissues.	Drawing and labeling diagrams; Discussion.	<i>Illustrative diagrams.</i>	KLB BK IV. PP 113-5	
7	1	Wilting in plants.	Compare the rate of wilting of herbaceous and woody stems. Account for difference in rate of water loss.	Uproot herbaceous and woody plants; Observe tem for about 30 min; Brief discussion.		KLB BK IV. P 116	
	2-3	The exoskeleton.	Describe the structure of the exoskeleton.	Examine movement of a live arthropod; Observe muscles of the hind limb of a grasshopper; Relate the observations to the function of the exoskeleton.	A live arthropod, E.g. grasshopper, millipede.	KLB BK IV. PP 116-7	
	4-5	The endoskeleton.	Describe the structure of the endoskeleton.	Observe skeleton of a vertebrate; Compare it with an exoskeleton. Discuss the contrasting features.	<i>The human skeleton.</i>	KLB BK IV. PP 117-8	
	5	TEST					
8	1	Locomotory features of a finned fish.	Identify the locomotory features of a finned fish.	Observe external features of a tilapia. Drawing and labeling; Discussion.	<i>A freshly killed tilapi</i>		

	2-3	Locomotion in a finned fish.	Explain how locomotion occurs in a finned fish. Explain how a fish is adapted to locomotion in its habitat.	Review external features of a tilapia. Detailed discussion.	<i>A freshly killed tilapia.</i>	KLB BK IV. PP 117-8	
	4	Tail power of a fish.	Calculate the tail power of a fish.	Measure length of tail, length of a tilapia fish. Calculations. Discussion on significance of tail power in locomotion.	<i>A freshly killed tilapia.</i>	KLB BK IV. PP 118-9	
	5	Support and movement in mammals.  The skull and rib cage.	Describe the structure of the skull and rib cage.	Observe the human skull and rib cage of a rat / rabbit. Detailed discussion.	<i>Human skull, rib cage of rat / rabbit.</i>	KLB BK IV. PP 119-120	
9	1-2	The vertebral column.  Cervical and thoracic vertebrae.	Describe the features of the vertebral column. Identify types of vertebrae. Explain adaptations of cervical and thoracic vertebrae to their functions.	Examine cervical and thoracic vertebrae.	<i>Cervical and thoracic vertebrae.</i>	KLB BK IV. PP 121-2	
	3-4	Thoracic and lumbar vertebrae.	Explain adaptations of Thoracic and lumbar vertebrae to their functions.	Examine thoracic and lumbar vertebrae. Draw labeled diagrams; Brief discussion.	<i>Thoracic and lumbar vertebrae.</i>	KLB BK IV. PP 122-3	
9	5	The sacral and caudal vertebrae.	Describe the features of the sacral and caudal vertebrae. Explain adaptations of sacral and caudal vertebrae to their functions.	Examine sacral and caudal vertebrae. Draw labeled diagrams; Brief discussion.	<i>Sacral and caudal vertebrae.</i>	KLB BK IV. P 124	

10	1-2	The appendicular skeleton.	Describe the features of the appendicular skeleton.	Examine the appendicular skeleton of a rabbit /sheep. Brief discussion..	<i>Appendicular skeleton of a rabbit /sheep.</i>	KLB BK IV. PP 124-5	
	3,4	Fore limb.	Identify bones of the fore limb.	Examine bones of the fore limb; Drawing labeled diagrams; Discussion.	<i>Bones of the fore limb.</i>	KLB BK IV. PP 126-7	
	5	Hind limb.	Identify bones of the hind limb.	Examine bones of the hind limb; Drawing labeled diagrams; Discussion.	<i>Bones of the hind limb.</i>	KLB BK IV. P 127	
11-13	END OF TERM EXAMS - TRIAL EXAM						

SCHEME OF WORK			BIOLOGY FORM FOUR			TERM THREE	
W NO	L/ NO	TOPIC/ SUBTOPIC	LESSON / SPECIFIC OBJECTIVES	TEACHING / LEARNING ACTIVITIES	MATERIALS / RESOURCES	REF.	REMARKS

1	1	Movable joints.	Identify features of movable joints.	Examine the synovial joint. Brief discussion.	Synovial joint model.	KLB BK IV. P 127	
	2	Ball and socket joint.	Identify features of ball and socket joint.	Examine the synovial joint. Discuss observations.	Synovial joint model.	KLB BK IV. P 128	
	3,	The hinge joint.	Identify features of hinge joint.	Examine a hinge joint.	<i>Illustrative diagrams.</i>	KLB BK IV. PP 128-9	
	4	Movement of a joint.	Describe movement of a joint.	Observe movement of the fore arm;  Discussion.			
	5	PRACTICAL TEST					
2	1	Skeletal muscles.	Describe features of skeletal muscles.	Examine diagrams of skeletal muscles; Brief discussion.	<i>Illustrative diagrams.</i>	KLB BK IV. PP 129-30	
	2-3	Smooth or visceral muscles.	Describe features of smooth muscles.	Examine diagrams of smooth muscles; Brief discussion.	<i>Illustrative diagrams.</i>	KLB BK IV. PP 129-30	
	4-5	Cardiac muscles.	Describe features of smooth muscles.	Examine diagrams of smooth muscles; Brief discussion; Topic review.	<i>Illustrative diagrams.</i>	KLB BK IV. PP 130-1	
		<i>REVISION FOR K.C.S.E. EXAMINATION</i>					
		<i>K.C.S.E EXAMINATION</i>					