

Unit 1 Suggested Class Periods by Topic

Syll ref:	Topic and Learning Outcomes	Classes	Level	G/Lines	Resources	Methodologies
	The Scientific Method and Characterisitcs of Life	4		7		
1.1.1	Define the term: Biology.		O & H			
1.1.2	State the process of the Scientific Method					
	State the limitations of value of the Scientific Method including					
1.1.3	State the principles of experimentation					
	The characteristics of life	3	O & H	9		
1.2.1	A Search for a Definition of Life					
	Define the term: metabolism.					
1.2.2	Define the term: life					
1.2.3	Definition and identification of the "characteristics of life",					
	Food		O & H	11		
	Name three reasons for requiring food as 1. Source of energy	11				
1.3.1	Name six common chemical elements in foods:CHNOPS					
1.3.2	State composition of biomolecular units Eg carbohydrates Cx(H2O)y					
1.3.3	Name the element components, biomolecular components					
1.3.4	And sources of: carbohydrates, fats & oil, protein & vitamin.					
	Definition of the term: Anabolic , Definition of the term: Catabolic.					
1.3.5	Structural Role of Biomolecules					
1.3.6	Metabolic Role of Biomolecules					
1.3.7	State the requirements & use of any 2 minerals in plants and animals					
1.3.8	State the requirements & use of water in plants and animals					
	<i>To conduct a qualitative test for: starch,</i>					
	<i>To conduct a qualitative test for: fats</i>					
	<i>To conduct a qualitative test for: a reducing sugar</i>					
	<i>To conduct a qualitative test for: protein</i>	4	O & H	58		

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Syll ref:	Topic and Learning Outcomes	Classes	Level	G/Lines	Resources	Methodologies
1.4.1	Ecology theory	13	O & H			
	Ecology			15		
	Define the term: ecology.					
1.4.2						
	Define the term: ecosystem.					
	Name a range of ecosystems demonstrating diversity.					
1.4.3						
	Biosphere Explain the term: biosphere			16		
	.					
1.4.4	Habitat					
	Define the term: habitat.					
	Name examples of habitats.					
1.4.5	Environmental Factors					
	Define and give examples of factors in to land and water environments					
	Abiotic, biotic and climatic factors					
	Define and give examples of edaphic factors in terrestrial environments					
1.4.6	Energy Flow			17		
	Name the sun as the primary source of energy.					
	Name feeding as the pathway of energy flow.					
	Present a grazing food chain.					
	Present a food web.					
	Draw and construct a pyramid of numbers and explain their use.					
1.4.7	Niche Explain the term: niche and give examples.					
1.4.8	Nutrient Recycling					
	Define the term: nutrient recycling by organisms.					
	Outline and draw the Carbon Cycle. Outline and draw the Nitrogen Cycle.					

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1.4.9	Human Impact on the environment			18		
	Pollution					
	Conservation					
	Waste management					
	Role of micro organisms					
1.4.10	Pyramid of Numbers			19		
	Explain the limitations of use regarding the size of organisms and the relationship to scale.					
	State two inferences that can be made regarding the shape of the pyramid.					
	Explain the energy loss shown in the pyramid.					
1.4.11	Ecological Relationships					
	Name factors that can control populations.					
	Define and give one example of the following factors: Competition					
	Predation					
	Parasitism and Symbiosis					
1.4.12	Population Dynamics			19		
	Outline the contributory factors or variables in the Predator/Prey Relationships					
	State the effects on the Human Population due to:					
1.5	Ecology field study	10		21		
	Overview Selected Ecosystem					
	Present an overview of diversity of life forms in an ecosystem.					
1.5	Obs & Study of Ecosystem					
	Identify a number of habitats from the selected ecosystem.					
	Identify and apply of collection apparatus.					
	Identify five plants and animals using simple keys.					
	Identify and use various apparatus required for collection methods					

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1.5	Organism Distribution			22		
	Explain the difference between a Qualitative & Quantitative study					
	Complete frequency & % Cover techniques.					
	Present result for a quantitative study of plants and animals.					
1.5	Choice of Habitat			23		
	Correlate choice of habitat for organisms in study area to Abiotic Factors					
	Investigate and report on any 3 Abiotic Factors.					
1.5	Organisms Adaptations					
	Explain the necessity for and examples of adaptations					
	State one adaptation by one organism in the selected ecosystem.					
1.5	Organisms Role in Energy Transfer					
	Explain and identify the role of the organism in energy transfers.					
	Draw a food chain, web and pyramid of the study area.					
1.5	Analysis					
	Explain the necessity for analysis & assessment					
	Identify any local ecological issues and complete habitat report					

Unit 2 Suggested Class Periods by Topic

Syll ref:	Topic and Learning Outcomes	Classes	Level	G/Lines	Resources	Methodologies
	Cell structure	8	O & H	27		
2.1.1	Compare the use of the light m/scope to the TEM.					
	Cell Structure & Function					
2.1.4	Cell Ultrastructure					
	Prokaryotic & Eukaryotic					
	<i>Use of light Microscope</i>					
	<i>Prepare and examine plant cells</i>					
	<i>Prepare and examine cheek cells</i>					
	Movement through a cell	3	O & H	33		
2.2.6	Movement Through Cell Membranes					
	Give examples of diffusion and osmosis.					
	<i>To demonstrate osmosis</i>					
	Enzymes	12	O & H	31/33		
	Define the term: enzymes					
2.2.3	Explain the role of enzymes in plants and animals					
	Explain the effects of ph & temperature on enzyme activity.					
	State the procedure and advantages of Bioprocessing.					
	State the use of Bioprocessing.					
	<i>To investigate the effect of ph on enzyme activity</i>					
	<i>To investigate the effect of temperature on enzyme activity</i>					
	<i>To prepare an enzyme immobilisation</i>					
	<i>To investigate the effect of denaturation on enzymes</i>					
2.2.7	Active site theory with referene to specificity					
	Explanation of the term "optimum activity" with referenece to pH					
	Heat denaturation of proteins					

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Syll ref:	Topic and Learning Outcomes	Classes	Level	G/Lines	Resources	Methodologies
	Respiration					
2.2.5	Definition of the term: aerobic respiration.	8				
	Explain the role of aerobic respiration.					
	Express aerobic respiration by a balanced equation.					
	State the nature of respiration from syllabus.					
	Definition of the term: anaerobic respiration.					
	Express anaerobic respiration by a balanced equation.					
	State the nature and role of fermentation.					
	State the cellular location of the first & second stage.					
	Explain the role of microorganisms in fermentation.					
	Explain the role of microorganisms including bioprocessing.					
	Define Bioreactors					
	<i>Prepare & show the production of alcohol by yeasts</i>					
	Photosynthesis					
2.2.4	Define the term: photosynthesis.	12	O & H	32/34		
	Express photosynthesis as a balanced reaction.					
	State the nature of photosynthesis from the syllabus.					
	State the role & location of chlorophyll.					
	Explain the nature of electron carriage.					
	Identify the light source, CO ₂ & water for photosynthesis.					
	Explain how human intervention can play a role in photosynthesis.					
	Explain the Light Stage/Dark Stage					
H 2.2.9	State the two-pathway system of electron carriage.					
	1. Direct to chlorophyll			49		
	2. Trapped by NADP+					
	<i>Investigate influence of light intensity on rate of photosynthesis</i>					

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Syll ref:	Topic and Learning Outcomes	Classes	Level	G/Lines	Resources	Methodologies
	Cell Continuity	5		36		
2.3.1	Cell Continuity & Chromosomes	3	O & H			
	Explain the terms: cell continuity & chromosomes.					
2.3.2						
	Haploid, Diploid Define the terms: haploid & diploid number.					
2.3.3	The Cell Cycle		O & H	37		
	Describe the cell activities in he state of non-division: (mitosis).					
2.3.4	Mitosis Define the term: mitosis.					
	Explain the process in simple terms with some diagrams.					
	<i>Define cancer and state causes.</i>					
2.3.5	Function of Mitosis		O & H			
	State the primary function of mitosis for single-celled vs multi-cell. Organisms.					
2.3.6	Meiosis	2	O & H	38		
	Define the term: meiosis.					
2.3.7	Functions of Meiosis		O & H			
	State the functions of meiosis.					
H2.3.8	Stages of Mitosis		H			
	Present a detailed study with names of stages and labelled diagrams					
	Cell diversity	2	O & H	39		
2.4	Define the term: tissue.					
	Define the term:organ.					
	Define the term: organ system.					
	Explanation of tissue culture					
	Give two examples of tissue culture					

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Syll ref:	Topic and Learning Outcomes	Classes	Level	G/Lines	Resources	Methodologies
2.5.1	Genetics	36	O & H	40		
	Variation of Species	2				
	Explain the diversity of organisms.					
	Define the term: species.					
			O & H			
2.5.2	Heredity & Gene Expression					
	Define the terms: heredity & gene expression.					
	State examples of heredity and gene expression.					
2.5.3	Genetic Code		O & H	41		
	Define the term: gene.					
	State the role of the gene.					
	Explain the chromosome structure.					
2.5.4	DNA Structure, Replication & Profiling	2		41		
	State a simple structure for DNA.					
	Explain the coding and non-coding segments of DNA.					
	State that RNA is a complementary structure to DNA.					
	State the function mRNA					
	State the nature of replication for DNA		O & H			
	Define the term: DNA profiling	2				
	Name two applications for DNA profiling.		O & H			
	Explain the process of genetic screening.					
2.5.5	Protein Synthesis Describe the nature of protein synthesis.			42		
2.5.6	Genetic Inheritance	6		42		
	Define the term: Gamete and Gamete formation.					
	State the function of gametes in sexual reproduction.					
	Define the following terms: fertilisatio/.allele/ homozygous & heterozygous.					
	genotype/ phenotype; dominance/ recessive.; recessive/ incomplete dominance		O & H			
	Explain the F1 (unlinked traits)-homozygous parents					

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Syll ref:	Topic and Learning Outcomes	Classes	Level	G/Lines	Resources	Methodologies
	Explain the F1 (unlinked traits)-heterozygous parents					
	Explain the F1 (unlinked traits)-sex determination					
	Explain & use Pedigree Charts & Punnett Squares					
2.5.7	Causes of Variation	2	O & H	43		
	<i>Explain the term: variation & give examples within human populations</i>					
	State that variation is caused by: Sexual Reproduction and mutation					
	Define the term: mutation.	2				
	Name 2 agents of mutation. (Chromosomal & genetic).					
2.5.8						
	Evolution	2		43		
	Define the term: evolution.		O & H			
	State the Theory of Natural Selection.					
	Outline the contribution of Darwin/Wallace.					
	Explain the evidence from any one source regarding evolution.					
2.5.9						
	Genetic Engineering	2		43		
	Explain the process of genetic engineering					
	Outline the process involving: isolation/transformation/expression					
	Name 3 Applications: 1 plant, 1 animal, 1 micro-org re genetic engineering.					
H2.5.10	Origin of Science of Genetics	2	H	44		
	Outline the work of Gregor Mendel.					
H2.5.11	Law of Segregation		H			
	State & explain the Law of Segregation.					
H2.5.12	Law of Independent Assortment					
	State & explain the Law of Independent Assortment.					

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Syll ref:	Topic and Learning Outcomes	Classes	Level	G/Lines	Resources	Methodologies
H2.5.13	Dihybrid Cross	4	H	44		
	Show the F2 using Punnett Squares					
	Define the term: linkage.					
	Show Linkage: 1:1:1:1 with dihybrid het X recess					
	Explain the term: Sex-Linkage	2				
	Explain the term: Non-nuclear inheritance using mito & chloroplast as examples.					
H2.5.14	Nucleic Acid Structure & Function (Ext)	2	H	45		
	State that DNA structure includes: Sugar, phosphate & bases					
	Draw the nucleotide structure.					
	Name the Purine-pyrimidine couples					
	Name the complementary bases					
	Name the existence of hydrogen bonds in the structure.					
	Name the structure as the Double helix.					
H2.5.15	Protein Synthesis (Ext)	4	H	45		
	State the location of protein synthesis.					
	Explain protein synthesis in relation to DNA, mRNA, tRNA, rRNA					
	Practical - Isolate DNA	2				

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Syll ref:	Topic and Learning Outcomes	Classes	Level	G/Lines	Resources	Methodologies
	Microbiology	17	O & H	49		
3.1.1	Name the Five Kingdom System of Classification.	1				
3.1.2	Distribution of bacteria and fungi in nature					
3.1.3	Monera	4	O & H	50		
	Name 3 main types of bacterial cells.					
	State the factors affecting growth of micro-organisms.					
	Define the terms: Pathogenic, antibiotics					
	Name 2 Beneficial & 2 Harmful bacteria					
3.1.4	Fungi	4	O & H	51		
	Define the terms: saprophytic & parasitic.					
	State the structure & life cycle of Rhizopus.					
	Explain nutrition in fungi.					
	Outline the structure & reproduction of Yeast.					
	Name 2 Beneficial & 2 Harmful fungi.					
	Mention that there are Edible and Poisonous fungi.					
	Identify and state functions for the following structures:					
	Rhizoid, sporangium, gametangium, zygospore.					
3.1.5	Laboratory Procedures for Micro-organisms	2	O & H	52		
	State precautions used when working with micro-organisms.					
	Define the terms: Asepsis & Sterility					
	Outline containment & disposal methods in relation to microbes.					
	<i>Investigate growth of leaf yeasts using agar plates</i>	2				
3.1.6	Protista	2				
	Explain the structure of Amoeba: nucleus & sub-cellular structure					

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H3.1.9	Nature of Bacteria & Fungi	1	H	53		
	Explain the Prokaryotic nature of bacteria.					
H3.1.10	Explain the Eukaryotic nature of fungi.					
	Growth Curves	1	H	53		
3.1.7	The Flowering Plant	0	O & H	52		
	Flowering Plant Taught in unit 3					
3.1.8	Animal - The Human	0	O & H	52		
	Human Taught in unit 3					
3.2.1	Structure of a flowering plant	8	O & H	54		
	Organisational Complexity of Flowering Plants					
	State the structure & function for the following:					
	Root, stem, leaves, flower, seed, vascular structure					
	Explain the term, Meristem and name locations this tissue is found.					
	Locate Dermal/Ground/Vascular tissue					
	Name the xylem and phloem as examples of vascular tissue.					
	Vascular tissue-structure & function					
	Identify Monocots & Dicots under the headings: Woody/Herbaceous.					
	Arrangement of floral parts, Arrangement of vascular bundles,					
	Ts of a dicot stem					
3.3.1	Transport in Flowering Plants	2	O & H	57		
	State the autotrophic nature of plants.					
	Describe the uptake of water					
	Describe the uptake of minerals					
	Describe the uptake of CO ₂ including: respiring cells/stomata					
	Describe the transport of products of photosynthesis					

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H3.3.7	Cohesion-Tension Model	1	H	60		
	Explain attractive forces of water molecules as it relates to Cohesion.					
	Explain the role of cohesive properties of water.					
	Explain the role of transpiration for this model.					
	Outline the work of Dixon/Joly.					
3.3.2	Modified Plant Food Storage Organs	1	O & H	58		
	Name 1 example of root, stem, leaf modifications as food storage organs.					
3.2.2	The circulatory and lymph System			55		
	Describe the structure & organisation of the Circulatory System.	12	O & H			
	State the role of muscle tissue & valves.					
	Outline the 2 circuit circ system.					
	Draw structure of the heart, main blood pathways					
	State that cardiac supply is via cardiac artery & vein.					
	Present an understanding of Heartbeat/control/pulse/blood pressure					
	Explain the effect of smoking, diet & exercise on circ system.					
	Outline the structure & function of the Lymph System including:					
	Lymph nodes/vessels					
	Name 3 functions of the Lymphatic System.					
	State blood composition, including role of blood cells/platelets/plasma					
	Explain blood grouping: (A,B,AB,O) and the Rhesus factors.					
H3.2.3	Blood Cells (Ext)		H	56		
	State existence & location of SA and AV nodes					
	Explain the heart cycle (Systole/Diastole).		H	56		
H3.2.4	Heartbeat Control					
	Explain the heart cycle (Systole/Diastole).					
	Practical To dissect a Heart					

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	Human Nutrition					
3.3.3 - 3.3.6	Nutrition in Humans	5	O & H	59		
	The Human Digestive System					
	Blood Transport of Nutrients					
	A Balanced Human Diet					
	Human Breathing System					
3.3.4	Macrostructure and basic function of the breathing tract in humans.	4		62		
	Essential features of the alveoli and capillaries as surfaces for gas exchange					
	Description of the mechanism of the breathing system in the exchange of gas					
	Breathing Disorders: Choose between asthma and bronchitis;					
	Discuss one possible cause, prevention, and treatment					
H3.4.7	Explain how CO ₂ is a controlling factor in the breathing system	1	H	64		
	Homeostasis	2	O & H	61		
3.4.1	Define the term: homeostasis.					
3.4.2	Necessity for Homeostasis					
	Explain the need for homeostasis.					
3.4.6	Excretory System	5	O & H	63		
	Explain the role of the excretory system in homeostasis.					
	State the function, location, products of the skin/lungs/urinary system.					
	Outline the basic macrostructure & function for urinary excretory sys: (Kidney/Ureters/Urinary Bladder/Urethra)					
	Explain the role of Kidney in regulating body fluids.					
	Identify the site of filtration and reabsorption					
	Describe pathway of urine from kidney to urethra					

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3.4.8	Nephron			64		
	Outline the structure & associated blood supply & draw a diagram.					
	Explain urine formation,					
	Outline the sites & action of reabsorbtion					
	State that reabsorbing water is under the influence of ADH.					
3.4.5	Plant Excretion	2		62		
	Outline the role of leaves as an excretory organ of plants.					
3.5.2	Plant responses	5		65		
	Responses in Flowering Plants					
	Explain the term: growth regulation.					
	Define the following terms: tropisms, phototropism, geotropism/ thigmatropism, hydrotropism, chemotropism.					
	Name examples of phototropism & geotropism.					
	Define the term: growth regulator.					
	Outline the transport of regulators via the vascular system.					
	Explain the term: Combined Effect					
	Explain the term: Growth Promoter.					
	Explain the term: Growth Inhibitor					
	Name 4 methods of anatomical/chemical adaptations that protect plants.					
	State 2 examples of the use of plant regulators.					
	<i>To investigate the effect of IAA on plant tissue</i>	2				
H3.5.5	Auxins	1	H			
	Outline a study of auxins as a plant growth regulator					
	Outline Production Sites/Function/Effects					
	Compare action of auxins to hormones.					
H3.5.6	Plant Growth Regulators & Animal Hormones (Ext)	1	H			
	Explain the mechanism of response to 1 external stimulus.					

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3.5.1	Structures for Responses		O & H	65		
	Outline the Chemical or Hormonal System/Nerves/Sense organs/ Skeletal/Muscular/Immune					
	Responses in Humans					
3.5.3	The Nervous System	5		66		
	Outline the nervous system components: CNS & PNS					
	Outline the structure & function of the neuron					
	Outline impulse movement & synapse.					
	Explain activation & inactivation of neurotransmitter.					
	Explain the role & position of 3 types of neurons					
	Outline the CNS, brain & spinal cord.					
	State location & function of cerebrum/hypothalamus/ pituitary gland/cerebellum/medulla oblongata					
	Draw diagrams of spinal cord					
	Outline disorders from NS disorders: paralysis/Parkinson's					
	Discuss cause prevention and treatment of one of the above					
	Outline PNS including the location nerve fibres & cell bodies.					
	State the role, structure & mechanism of the Reflex arc.					
	The Senses	4		68		
	Outline the senses with the brain as an interpreting centre.					
	Explain the senses with a study of the ear and eye.					
	Outline corrective measures for short/long sightedness or hearing.					
	The Endocrine System	5		69		
	Define the term: hormone.					
	Outline the Endocrine System.					
	Compare nerve action					
	Distinguish between exocrine & endocrine glands.					
	State the location of the principal glands in the human.					
	Outline for each gland, one hormone & its' function.					

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	Explain 1 Hormone giving a description of : deficiency symptoms, excess symptoms & corrective measures.					
	Name 2 examples of hormone supplements & their use.					
	Describe the feedback mechanism of 1 animal hormonal system.					
	The Skeleton and Muscles	5	O & H	70		
	Describe the structure & function of the muscoskeletal system.					
	Name components of axial skeleton as: (skull/vert/ribs/sternum)					
	State the position & function of discs in vertebrae.					
	State the components of the appendicular skeleton:					
	Outline the macroscopic anatomy of a long bone including: medullary cavity, compact bone, spongy bone and cartilage.					
	State the function of the following: cartilage/compact bone/spongy bone-including marrows).					
	Classify, locate & state the function of joint types:					
	Discuss either arthritis/osteoporosis, include Cause/Prevention/Treatment					
	Outline the role of cartilage & ligaments.					
	Outline the role of tendons.					
	Outline the general relation of muscle to skeleton.					
	State an example of an antagonistic pair of muscles.					
H3.5.8	Growth & Development in Bones	1		72		
	Explain the role of osteoblasts in bone growth & replacement.					
	Explain the process of terminating development of adult height.					
	Outline the process of bone renewal & the role of calcium in bone.					
2.5.3	The Human Defence System	3		70		
	Outline the Defence System					
	Outline the nature & role of phagocytic white blood cells.					
	Outline the Specific Defence System					
	Define the term: Induced Immunity, vaccination and immunisation					

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H3.5.7	Human Immune System (Ext)	2	H	72		
	Outline the role of lymphocytes(B and T cells)					
	Explain the role of B cells in antibody production & T cells					
3.5.4	Viruses	3	O & H	71		
	Identify the problem of definition.					
	State that there is a variety of shapes.					
	Outline the basic structure of viruses.					
	Explain the process of viral reproduction.					
	State 2 harmful, 1 beneficial example of viruses.					
3.6.1	Reproduction in Flowering Plants	20	O & H	73		
	Sexual:					
	State the structure & function of the floral parts					
	State that: Pollen grain produces male gamete.					
	State that: Embryo sac produces an egg cell & polar nuclei.					
	Define the terms: pollination, self-pollination					
	Outline methods of pollination					
	Define the term: fertilisation.			74		
	Outline seed structure & function					
	Explain embryo & food supply (endosperm or seed leaves)					
	Classify plants as monocotyledon or dicotyledon					
	Distinguish between monocotyledon or dicotyledon					
	Make reference to non-endospermic seed.					
	Outline fruit formation.					
	Outline seedless fruit production by genetic variety & growth regulators.					
	Outline fruit & seed dispersal					
	Explain & emphasise the need for dispersal					
	Define the term: dormancy.			75		
	State advantages of dormancy.					
	Explain dormancy in agricultural & horticultural practice.					
	Define the term: Germination.					

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	Explain the factors necessary in germination.					
	Outline the stages of seed development					
	State that vegetative propagation is asexual reproduction.					
	Name 1 example of vegetative propagation from stem, root, leaf, bud.					
	Compare reproduction by seed and by vegetative reproduction.					
	Outline 4 methods of artificial propagation in flowering plants.					
H3.6.3	Sexual Reproduction in Flowering Plants (Ext)		H			
	Outline pollen grain development from microspore mother cells					
	Outline embryonic sac development including: megaspore mother cell,					
H3.6.4	meiotic division, cell disintegration, mitotic division in the production of 8 cells					
3.6	<i>Investigate the Effects of H₂O, O₂ and temperature on Germination</i>					
3.6.2	<i>Investigate the Use Starch agar to Show Digestive Activity</i>					
	Sexual Reproduction in Humans	18	O & HL	76		
	Outline the general structure of the reproductive system					
	State the functions of the main parts of the reproductive system.					
	Outline the role of meiosis to produce sperm & ova (egg) cells.					
	Define the term: secondary sexual characteristics.					
	Outline the role of oestrogen, progesterone & testosterone.					
	Outline the menstrual cycle: events & role of oestrogen and progesterone					
	Explain copulation.			77		
	Outline the nature of birth control i					
	State the location of fertilisation.					
	Outline infertility.					
	State 1 cause of male infertility.					
	State the availability of corrective measures.					
	State 1 cause female infertility .					
	State the availability of corrective measures.					
	Explain implantation, placenta formation & function.		H			

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	Outline the birth process.					
	Explain In-vitro fertilisation & implantation.					
	Outline milk production & breastfeeding including biological benefits.					
H3.6.4	Human Embryo Development (Ext)		H	78		
	Outline the sequence of development from fertilised egg					
	Explain the term: germ layer.					
	Name the 3 germ layers & the associated organs/systems developed.					
	Outline the development of the embryo up to third month.					
H3.6.5	Sexual Reproduction in Humans (Ext)		H	79		
	Detailed study of the menstrual cycle & hormonal control					
	Outline 1 menstrual disorders from: endometriosis or fibroids. Examine					
	Cause/Prevention/Treatment					