Edexcel Course Guidelines

AS Specification

Topics in Edexcel AS workbook *(unless indicated)*

Unit 1 (6BI01) : Lifestyle, Transport, Genes and Health

Topic 1: Lifestyle, Health and Risk

Water as a solvent. Carbohydrate and lipid structure and function. Condensation and hydrolysis.	Biological Molecules
Limitations to diffusion. Mass transport systems. Mammalian heart. Cardiac cycle. Blood vessels.	Healthy Lifestyle, Healthy Heart
*Describe how the effect of caffeine on heart rate can be studied in *Daphnia*. Include ethical issues.	Practical Biology & Research Skills
Blood clotting and CVD.	Healthy Lifestyle, Healthy Heart
CVD, risk factors, prevention,treatment.	
Blood cholesterol levels, HDL:LDL ratio.	
*Describe how to measure vitamin C level in food.	
Energy budgets and its effect on weight.	
Illness data and mortality rates. Risk perception.	

Topic 2: Genes and Health

Membrane structure. Osmosis. Transport processes.	Membranes & Exhange Surfaces
*Practical investigation of membrane structure.	
Gas exchange surfaces. Mammalian lung.	
Amino acids, proteins, enzymes.	
*Investigation of enzyme reaction rates.	Practical Biology & Research Skills
Nucleotides, nucleic acids, DNA replication, genetic code, genes, protein synthesis.	Proteins, Genes & Health
Mutations: causes and consequences of CF.	
Monohybrid inheritance, pedigree analysis.	
Gene therapy. Somatic versus germ line therapy.	
Genetic profiling and screening.	
Prenatal testing: amniocentesis, CVS. Ethics.	

Unit 2 (6B102): Development, Plants and the Environment

Topic 3: The Voice of the Genome

Prokaryotic v eukaryotic cells. Ultrastructure of eukaryotic cells. Function of rER and Golgi. Tissues.	Cells & Microscopy
Mitosis for growth and asexual reproduction.	
*Identify the stages of mitosis.	
Meiosis as a source of variation.	Variation & Heredity
Mammalian gametes. Mammal and plant fertilisation.	
Stem cell research and definitions.	
*Describe how to demonstrate totipotency by using plant tissue culture techniques.	
Cell specialisation through gene expression.	
Effects of environment on genotype expression.	
Polygenic inheritance.	

Topic 4: Biodiversity and Natural Resources

Compare plant and animal cell ultrastructure.	Cells & Microscopy
Starch and cellulose. Cellulose microfibrils. Compare and identify sclerenchyma and xylem.	
*Describe how to measure tensile strength.	Plants as Resources
Importance of water and inorganic ions to plants.	
*Describe how to practically investigate mineral deficiencies and antimicrobial properties in plants.	
Drug testing protocols.	
Biodiversity, endemism. Measuring biodiversity. Niche. Adaptation to niche.	Biodiversity & Evolution
Natural selection, adaptation, and evolution.	
Taxonomy methods.	
Conservation methods.	

Unit 3 (6B103): Practical Biology & Research Skills

Includes skilful and safe use of apparatus, precise measurements and observations, proper data presentation and analysis. Prepare a report based upon a site visit or specific issue.	Practical Biology & Research Skills

A2 Specification

Topics in Edexcel A2 workbook *(unless indicated)*

Unit 4 (6B104): The Natural Environment & Species Survival

Topic 5: On the Wild Side

Chloroplast. Biochemistry of photosynthesis.	Energy & Ecosystems
Productivity, plant respiration. Energy transfer.	
Carbon cycle. Reducing CO_2 levels.	
Distribution and control of organism numbers.	
*Describe how to reliably study the ecology of a habitat (biotic and abiotic measurements).	
Niche. Organism distribution and abundance.	
Ecological succession.	
Global warming, causes and effects.	Global Warming & Evolution
*Describe how to investigate effect of temperature on an organisms developmental rate.	
Analyse and interpret global warming evidence.	
Natural selection, gene mutation, and evolution.	
Reproductive isolation and speciation.	
Evidence for evolution.	

Topic 6: Infection, Immunity and Forensics

Genetic code. Protein synthesis, role of RNA.	Genes, Proteins & Relationships
Post transcriptional modifications.	
DNA profiling.	
*Describe how DNA can be amplified by PCR, and separated using gel electrophoresis.	
Compare the structure of bacteria and viruses.	The Fight Against Disease
Microbes, decomposition and the carbon cycle.	
Pathogen infection routes. Barriers to infection.	
Bacterial infection: TB. Viral infection: HIV.	
Non-specific defences. Antigen and antibodies.	
B- and T-cells. Acquiring immunity.	
Evolutionary race theory for HIV and TB.	
Antibiotics and their mode of action.	
*Describe testing antibiotic efficiency on bacteria.	
Hospital acquired infections. Control and treatment.	
Forensics to estimate time of death.	

Unit 5 (6B105): Energy, Exercise and Coordination

Topic 7: Run For Your Life

Muscle fibre structure. Fast vs slow twitch.	Muscles & Energy
Muscle contraction. Movement.	
Aerobic respiration.	
*Describe how to investigate respiration.	
Role of ATP. Glycolysis and cellular respiration. ATP synthesis. ETC. Chemiosmosis. Lactate.	
Cardiac muscle control. ECGs, CVD diagnosis. Cardiac output control and ventilation.	Homeostasis & Exercise
*Describe testing effects of exercise on breathing.	
Negative feedback. Homeostasis. Thermoregulation.	
Hormones as gene switches.	
Exercise: too much v too little. Medical technologies for sport injuries. Performance enhancement.	

Topic 8: Grey Matter

Plant photoreceptors. Environmental cues.	Sensing & Responding
Neruones. Synapses. Vision.	
Nervous v hormonal regulatory systems.	
Structure and function of the human brain.	
Imaging: MRI, fMRI, CT scans.	
Brain development theories. Visual window.	
*Describe how to investigate habituation.	
Ethics of using animals for research.	
Chemical imbalances. Drugs at synaptic connections. HGP and drug development.	Drug Development AS: Plants as Resources
Drugs produced by GMOs. Risks and benefits.	

Unit 6 (6B106): Practical Biology & Investigative Skills

Planning and implementing practicals: observations and recording, data interpretation and analysis, evaluation and communication of results.	Practical Biology & Investigative Skills