Science – Biology

ALDER Community High School

KS4

Year 10 Autumn	**Topic 1 – Key concepts in Biology**
	Microscopes
	Microscope calculations
	Microscope investigation
	Animal cells including core practical microscopy investigation
	Plant cells including core practical microscopy investigation
	Specialised cells
	Bacterial cells
	Enzymes and digestion
	Enzyme action
	Enzyme activity core practical investigation
Year 10 Autumn	**Topic 2 – Cells and control**
	Mitosis
	Growth in animals
	Growth in plants
	Stem cells
	The nervous system
	Neurotransmission speeds
	The brain (GCSE Biology only)
	Brain and spinal cord problems (GCSE Biology only, H)
	Eye structure (GCSE Biology only)
	Common eye defects (GCSE Biology only)
Year 10 Spring	**Topic 3 – Genetics**
	Sexual and asexual reproduction (GCSE Biology only)
	Meiosis
	DNA
	The genome
	DNA extraction
	The genetic code (GCSE Biology only, H)
	Protein synthesis (GCSE Biology only, H)
	Variation and mutation
	Genetic variants and phenotype (GCSE Biology only, H)

	Alleles
	Punnett squares and predicting phenotype
	Family trees and sex determination
	Gregor Mendel (GCSE Biology only)
	Multiple and missing alleles (GCSE Biology only, H)
Year 10 Spring/Summer	**Topic 4 – Natural selection and genetic modification**
	Evidence for human evolution
	Darwin and Wallace
	Natural Selection
	Bacterial resistance
	Classification
	Selective breeding
	Genetic engineering including the Bt toxin gene (second lesson H)
	Tissue culture (GCSE Biology only)
	Fertilisers and biological control (GCSE Biology only)
Year 10 Summer	**Topic 5 – Health, disease and the development of medicines**
	Health and disease
	Cardiovascular disease
	Nutrition, deficiency diseases and food tests (GCSE Biology only)
	Risk factors and non-communicable diseases
	Bacterial and viral diseases
	Viral life cycles (GCSE Biology only)
	Fungal and protist diseases
	STIs and natural human defences
	Plant diseases and defences (GCSE Biology only, H)
	The immune system
	Antibiotics and the development of medicine
	Antibiotics core practical investigation (GCSE Biology only)
	Monoclonal antibodies (GCSE Biology only, H)
Year 11 Autumn	**Topic 6 – Exchange and transport in animals**
	The human circulatory system
	The human heart and double circulatory system
	Human blood cells and blood vessels
	Moving into and out of the blood (diffusion, osmosis and active transport)

	Diffusion and surface area to volume ration including Fick's Law (GCSE Biology only)
	Exchange surfaces and transport systems
	Cellular respiration
	Respiration core practical investigation
Year 11 Autumn/Spring	**Topic 7 – Plant structures and their functions**
	Photosynthesis
	Factors affecting photosynthesis core practical investigation
	Limiting factors and the inverse square law (H)
	Absorbing water and mineral ions
	Osmosis core practical investigation
	Transpiration
	Translocation
	Plant adaptations to extreme environments (GCSE Biology only)
	Plant hormones (GCSE Biology only)
	Uses of plant hormones (GCSE Biology only, H)
Year 11 Spring	**Topic 8 – Animal coordination, control and homeostasis**
	Human endocrine system
	Control of blood glucose (glucagon release H)
	Type 1 and type 2 diabete
	Adrenalin and thyroxine (H)
	The menstrual cycle and contraception
	Hormonal control of the menstrual cycle and ART(H)
	Thermoregulation (GCSE Biology only, vasoconstriction and vasodilation H)
	The kidneys, nephron structure and kidney failure (GCSE Biology only)
	Maintaining water balance (GCSE Biology only, H)
Year 11 Spring/Summer	**Topic 9 – Ecosystems and material cycles**
	Components of an ecosystem
	Transfers of biomass between trophic levels (GCSE Biology only)
	Estimating population size using quadrats (core practical investigation)
	Estimating population size and distribution using belt transects (core practical investigation)
	Pollution and indicator species (GCSE Biology only, H)
	Parasitism and mutualism
	Biodiversity

	Factors affecting human food security (GCSE Biology only)
	The water cycle
	The carbon cycle
	The nitrogen cycle
	Factors affecting the rate of decomposition (GCSE Biology only)