

MIP|W

Birmingham

AS and A2 Level Course Outlines

Biology

The course covers the following topics that are common to all specifications but students should check carefully that sessions are relevant to their own particular studies:

Topic 1 (AS) - Biological Molecules & Cells: Carbohydrates, proteins, lipids; Enzymes; Cell structure; cell membrane structure; function of organelles; mechanisms of transport across membranes; osmosis, active transport, diffusion, facilitated diffusion.

Topic 2 (AS) - Nucleic Acids & Protein Synthesis; Genes & Mitosis: Structure of DNA and RNA; Semi-conservative replication; Protein synthesis; Nature of the gene; the cell cycle and mitosis and meiosis.

Topic 3 (AS) - Exchange Surfaces and Transport Systems in Plants and Animals: Surface area to volume ratio, Exchange surfaces, lungs and gas exchange, Heart and transport systems in animals, Gas exchange in plants, Transport systems in plants.

Topic 4 (AS) - Health and Disease: Pathogens; The immune system and principles of immunology; Primary and Secondary Immune Response; Vaccination; Causes of disease; Causes of lung disease; Causes of heart disease.

Topic 5 (AS) - Biodiversity and Evolution: Biodiversity, Classification systems; Principles of taxonomy; Species diversity; mutations; Simpson's diversity index; Evolution; Conservation; Adaptations to the environment

Topic 6 (A2) - Genetics, Variation & Selection, Gene Technology: Mendelian inheritance including codominance, Multiple alleles and sex linkage; Natural selection and speciation; Gene therapy, Genetic fingerprinting; PCR

Topic 7 (A2) - Photosynthesis & Respiration: Light dependent and light independent stages of photosynthesis; Adaptation of the leaf for photosynthesis; Glycolysis; Krebs cycle and oxidative phosphorylation.

Topic 8 (A2) - Homeostasis: Endocrine glands of mammals; Control of blood glucose; Structure of the skin and mechanisms of temperature control; Control of heart rate and breathing rate

Topic 9 (A2) - Nervous Control: Structure of sensory and motor neurons; The action potential and its propagation; Structure and function of synapses and reflex arcs; The brain; Muscles

Topic 10 (A2) - Environment & Ecology: Nutrient cycles, Energy flow in ecosystems; Food production; Succession; Ecological techniques