

Roundwood Park School



KS5 Biology

Our curriculum follows the Edexcel Biology A (Salters-Nuffield) specification. This is a context-led specification and it provides the students at RPS a clear frame of reference for the understanding of the key biological principals. We are confident that this is a good specification for RPS as it embraces the practical skills necessary to help our scientists develop and prepare them for the next stage of their education and helps the students develop their Science Capital. In fact, the 18 Core practicals ensure a thorough development of each A-Level biologist's practical skills. The real- world application of new break throughs in science such as the use of Stem Cells, Drug testing and Genetic Engineering gives the students valuable insights to the potential careers and cultural applications of the scientific ideas discussed in lessons. These help our students grow their Science Capital, especially in terms of how they can pursue their scientific journey beyond RPS.

Building on the skills and concepts introduced at KS3 and KS4, the KS5 Biology curriculum refines the understanding of experimental design and consolidates the application of mathematical skills. We also have embedded the ASPIRE skills throughout the Biology, making sure that every opportunity is taken to link the ideas covered on the specification to opportunities to develop both ASPIRE and WS skills. The learning habits included in the "Learning to Understand" quadrant of the ASPIRE board in particular strike a chord with the core values in Science. Our students are given multiple opportunities to solve problems, and the experimental process we follow consolidates their logical thinking and resourcefulness in many different contexts.

In Biology, the curriculum is taught with each teacher taking responsibility for a Topic, so two topics are covered in parallel. This allows the department to produce assessments covering two topics, preparing students for the style of examination that they will sit at the end of the course. Each topic builds on points introduced in previous topics, so they are taught in the chronological order from Topic 1 to Topic 8 to ensure logical and coherent coverage.

Year / term	Teacher A	Teacher B	Assessment
Year 12 Autumn term	Topic 1: Lifestyle, health & risk Heart structure Blood Vessels Cardiac Cycle Atherosclerosis Circulatory Systems Water Estimating risk (Maths) Blood Pressure Risk factors Carbohydrates Immobilised enzymes Lipids Cholesterol Energy budget (Maths) Obesity indicators (Maths) Studies How does Caffeine affect heart rate (Core Prac) Antioxidants (Core prac) Treatments	Topic 2: Genes & Health Cystic Fibrosis Gas Exchange surfaces & Fick's Law Rate of Diffusion PRACTICAL (agar) Cell Membranes Amino acids & Proteins Beetroot CORE PRACTICAL Osmosis & Diffusion PRACTICAL (circus of practicals) Transport across cells DNA, RNA, mRNA, tRNA DNA PRACTICAL (extract DNA from fruit) DNA replication Meselson & Stahl's Experiment Polypeptide Synthesis Genetic Code Mutations CFTR Mutation and CF Enzyme CORE PRACTICAL Monohybrid Crosses Genetic Screening & Ethics	Bridging assessment (Sept) October Topic 1 & 2 assessment November Topic 1 & 2 assessment December Topic 1 & 2 assessment Daphnia Core practical Vit C Core practical Beetroot Core practical Enzymes Core practical
Super Curricular	Biology Literature club Read "Selfish Gene" Dawkins		

Year / term	Teacher A	Teacher B	Assessment
Year 12 Spring term	Topic 3: Voice of the Genome Eukaryote cells Prokaryote cells & magnification MATHS Microscope lesson PRACTICAL Protein trafficking Gametes Meiosis Sex linked & Linkage Chi Squared MATHS Mitosis & Mitosis CORE PRACTICAL Stem cells FOP & gene expression Epigenetics	Topic 4: Biodiversity and Natural Resources Plant Cell structure Cellulose structure Xylem structure and function Phloem structure and function Core practical – Vascular Bundles Importance of Water and mineral ions. Core practical – Sick plants (mineral deficiencies) Core practical – Tensile strength of plant fibres Development of drug testing Core practical – Antimicrobial properties of plants Uses of starch	January Topic 3 & 4 assessment February Topic 3 & 4 assessment March Topic 3 & 4 assessment Vascular bundles Core practical Mitosis Core practical Sick plants Core practical Tensile strength Core practical Antimicrobial properties Core practical
Super Curricular	Biology Literature club Zoo Field trip Read “Almost like a whale” Jones		

Year / term	Teacher A	Teacher B	Assessment
<p>Year 12 Summer term</p>	<p>Topic 3: Voice of the Genome Lac Operon Phenotype, genotype and the environment Polygenic inheritance</p> <p>Topic 5: On the Wild side Ecology definitions Distribution in habitats (abiotic & biotic factors) Niche Ecology field work (Core practical) Succession</p>	<p>Topic 4: Biodiversity and Natural Resources How has human activity threatened the variety of life/extinction Calculating Biodiversity Ecological Niche Natural Selection & Darwin Classification Hardy Weinberg calculations Zoos and Seed banks</p> <p>Topic 6: Infection, Immunity and Forensics Forensics – time of death DNA profiling & PCR</p>	<p>April Topic 3 & 4 assessment May Topic 3 & 4 assessment Topics 1-4 mock exam Ecology field work Core practical</p>
<p>Super Curricular</p>	<p>Biology literature club Biology field trip Look for work experience over summer break</p>		

Year / term	Teacher A	Teacher B	Assessment
Year 13 Autumn term	Topic 5: On the Wild side Photosynthesis overview Light dependent reaction Hill Reaction (Core practical) Chloroplasts NPP Trophic level calculations Evidence for climate change Anthropogenic causes of climate change Models of climate change Effects of climate change Temp v enzyme activity Evolution Speciation Q10 (core practical) Brine shrimp (core practical) Carbon Cycle Reforestation	Topic 6: Infection, Immunity and Forensics Decomposition & recycling of carbon Gel electrophoresis CORE PRACTICAL (Kew gardens) Bacteria and Viruses Gram staining PRACTICAL TB HIV Barrier to infection and Non-specific responses Antigens & Antibodies Role of B and T cells Protein Synthesis & post transcriptional changes Types of immunity including: vaccinations Evolutionary race Antibiotics Antibiotic CORE PRACTICAL Hospital prevention & control	Baseline assessment (Sept) October Topic 5 & 6 assessment November Topic 5 & 6 assessment Paper 1 Mock exam Hill reaction Core practical Brine shrimp Core practical Q10 Core practical Gel Electrophoresis Core practical Antibiotics Core practical
Super Curricular	Biology Literature club Kew Wakehurst field trip Read "Sapiens" Horari		

Year / term	Teacher A	Teacher B	Assessment
Year 13 Spring term	Topic 7 Run for your life Joint structure Sliding filament theory Glycolysis Link reaction and krebs cycle Oxidative phosphorylation Core practical: respirometers Anaerobic respiration Cardiac cycle Cardiac output Core practical: Interpreting spirometer traces Homeostasis, feedback and thermoregulation Types of muscle fibres Effects of exercise Medical technology Performance enhancement Regulation of gene expression	Topic 8: Grey Matter Neurones Pupil Reflex PRACTICAL Receptors Nerve Impulse Action Potential Action Potential exam Q's Synapses Photoreceptors in the eye Photoreceptors in plants PRACTICAL Nervous v's Hormonal System & Eye Dissection Phytochromes Brain Brain imaging Critical Period/Window Hubel and Wiesel Experiments Making sense of what we see Animals in medical research Habituation CORE PRACTICAL Parkinson's Disease Depression Drugs on Synapses Human Genome Sequencing GMO Nature v's Nurture	January Topic 7 & 8 assessment February Topic 7 & 8 assessment March Topic 7 & 8 assessment Spirometer Core practical Respirometer Core practical Habituation Core practical Paper 2 mock exam
Super Curricular	Biology literature club Read "Homo Dieus" Horari		