	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
12	**Introduction to course** **Topic 1** **SPEC 3.1.1 Biological molecules** Carbohydrates, Monosaccharides Disaccharides, Polysaccharides, Reducing and Non-reducing sugars Starch, Glycogen & Cellulose, Intro & Emulsion Test Triglicerides & Phospholipids **Mid topic assessment** Proteins, Dipeptide bonds The role of H – ionic bonds and disulphide bridges. Structure & Properties of proteins, Enzyme catalysis and activation energy. Induced-fit model, specifically **RP11 Dilution series** **RP1 enzyme-controlled reaction** **Topic 2** **SPEC 3.3.1 Exchange** Exchange organisms and environment Gas exchange in single-celled Gas exchange in fish **RP5 Fish gill dissection** Gas exchange in the plant leaf Limiting water loss Human gas-exchange system Mechanism of breathing Enzymes and digestion Absorption of the products of digestion **Mid topic assessment**	**Topic 1** **SPEC 3.3.4 Mass Transport** Haemoglobin Transport of oxygen by haemoglobin Circulatory system of a mammal The structure of the heart **RP5 Heart Dissection** Cardiac cycle Blood vessels Xylem Phloem Transport in plants, potometer **Mid topic assessment** **Topic 2** **SPEC 3.1.5 Nucleic acids** Structure & Importance DNA and RNA DNA replication Energy and ATP Water and its functions **Topic 3** **SPEC 3.2.1 Cell structure** Structure of eukaryotic cells, eukaryotic & Prokaryotic Structure of prokaryotic cells and viruses Methods of Studying cells Microscopes All cells arise from other cells, The cell cycle **RP2 Mitosis Root tip squash** **Mid topic assessment**	**Topic 1** **SPEC 3.2.3 Transport across membranes** The structure of the cell-surface membrane. Fluid mosaic model Cell-surface membrane Diffusion, Methods of crossing membranes, Data analysis of movement across membranes Osmosis & Water potential / Visking tubing exp ATP Active transport, Co-transport **RP3 Water potential plant tissue** **RP4 Permeability of cell-surface membranes** **Topic 2** **SPEC 3.4.1 Genetic information** Genes and the triplet code DNA and chromosomes Structure of ribonucleic acid Protein synthesis, Splicing Transcription and translation Comparison of DNA, mRNA, tRNA Protein assembly **Synoptic essay The importance of proteins in the control of processes and responses in organisms.**	**Topic 1** **SPEC 3.2.4 Defence** Defence mechanisms Phagocytosis T-lymphocytes and cell mediated immunity B-lymphocytes and humoral immunity Antibodies Vaccination HIV RP6 Antimicrobials **Mid topic assessment** **Synoptic essay practice The importance of shapes fitting together in cells and organisms** **Topic 2** **SPEC 3.4.3 Genetic diversity** Mutations Meiosis and genetic variation Independent segregation Crossing over Genetic diversity and adaptation Types of selection Graph analysis selection Recap antibiotic resistance **RP6 Aseptic technique** **Mid topic assessment** **Synoptic essay The causes of disease in humans**	**Topic 1** **SPEC 3.4.5 Biodiversity** Species and taxonomy Diversity within a community Species and human activity Investigating diversity Quantitative investigations of variation **Topic 2** Synoptic essay practice Data handling revision Units and prefixes, standard form revision **Statistics revision** Revision Chi-squared to calculate probability Student t-test Correlation coefficient **RP Catch up sessions - in lessons and after school**	
13	**Topic 1** **SPEC 3.5.1 Overview of photosynthesis** LDR Light independent reaction **RP7 Chromatography leaf pigments** **RP8 Dehydrogenase activity in chloroplasts** **Mid topic assessment** **Topic 2**	**Topic 1** **SPEC 3.5.3 Energy and ecosystems** Food chains and energy transfer Energy transfer and productivity Nutrient cycles Natural and artificial fertilisers Environmental issues concerning nitrogen fertilisers **Mid topic assessment** **Topic 2**	**Mocks** **Topic 1** **SPEC 3.6.1 Response to stimuli** Survival and response Plant growth factors Reflex arc Receptors Control of heart rate **Mid topic assessment** **Topic 2**	**Topic 1** **SPEC 3.6.4 Homeostasis** Feedback mechanisms Blood glucose Diabetes Nephron – blood water potential Osmoregulation Role of hormones in osmoregulation **Topic 2** **SPEC 3.8.4 Recombinant DNA technology**	**Full Mock** **Revision** **Statistics revision, practical skills, Chi-squared** **Study Leave**	

	SPEC 3.5.2 Respiration Glycolysis Link reaction, Krebs cycle Oxidative phosphorylation Anaerobic respiration **RP9 Respiration in yeast** **Mid topic assessment** **Plan Synoptic essay A cycle is a biological pathway or process in which the end product of one cycle becomes the starting point for the next. Write an essay about cycles in biology** **Topic 3** **SPEC 3.7.1 Studying inheritance** Monohybrid, probability and genetic crosses Dihybrid inheritance Co-dominance Sex linkage Autosomal linkage Epistasis Chi ^{2} **Mid topic assessment**	**SPEC 3.7.2 Populations and evolution** Population genetics Variation in phenotype Natural selection, effects on evolution Isolation and speciation **Topic 3** **SPEC 3.7.4 Populations in ecosystems** Variation in population size Competition Predation Investigating populations Succession Conservation of habitats **RP10 Choice chambers** **RP12 Field study distribution** **Synoptic essay The causes and importance of variation and diversity in organisms.**	**SPEC 3.6.2 Nervous coordination** Neurones and nervous coordination The nerve impulse Passage of action potential Speed of nerve impulse Structure and function synapse Transmission across synapse Structure of skeletal muscle contraction of skeletal muscle **Mid topic assessment** **Topic 2** **SPEC 3.8.1 Gene mutations** Stem cells Regulation of transcription and translation Epigenetic control of gene expression Gene expression and cancer Gene expression and cancer - genome projects	Producing DNA fragments - in vivo gene cloning - vectors, in vitro gene cloning – PCR Locating genes, genetic screening and counselling - Genetic fingerprinting Sex linkage, autosomal linkage Mid topic Assessment, Exam practice, synoptic essay practice Epistasis **Mid topic assessment** **Synoptic essay Using DNA in science and technology** **RP Catch up sessions - in lessons and after school**	