



*At St Peter's we believe that a broad and balanced curriculum with a strong academic core is a right for all pupils. We seek to encourage pupils to explore subjects of interest around their in-school learning and to enhance their curriculum experience through enrichment.*

| Autumn 1   | Autumn 2   | Spring 1   | Spring 2  | Summer 1  | Summer 2   |
|--|--|--|---|---|--|
| Unit of Work/Big Question  | Unit of Work/Big Question  | Unit of Work/Big Question  | Unit of Work/Big Question   | Unit of Work/Big Question   | Unit of Work/Big Question  |
| <b>B1.2 What happens in cells</b><br><b>B2.1 Supplying the cell</b>  | <b>B2.1 Supplying the cell</b><br><b>B2.2 The challenges of size:</b><br>Exchange surfaces   | <b>B2.2 The challenges of size:</b> Animal transport<br><b>B2.2 The challenges of size:</b> Plant transport  | <b>B2.2 The challenges of size:</b> Plant transport<br><b>B3.1 Coordination and control -the nervous system</b>   | <b>B3.1 Coordination and control -the nervous system</b><br>The eye and the brain<br><b>B3.2 Coordination and control -the endocrine system</b>   | <b>B3.2 Coordination and control -the endocrine system</b><br><b>B3.3 Maintaining internal environments</b>  |
| Knowledge  | Knowledge  | Knowledge  | Knowledge   | Knowledge   | Knowledge  |
| <b>Cell structures recap</b> <ul style="list-style-type: none"> <li>The structure of animal and plant cells</li> <li>Describe how light microscopes and staining can be used to view cells</li> <li>The differences between prokaryotic and eukaryotic cells</li> <li>The structure of a bacterial cell</li> <li>Explain how electron microscopy has increased our understanding of sub-cellular structures</li> <li>The magnification equation: <i>Image / Magnification x Object</i></li> </ul> <b>DNA and Protein Synthesis</b> <ul style="list-style-type: none"> <li>The structure of DNA</li> <li>How DNA codes for proteins</li> <li>The stages of protein synthesis</li> </ul> <b>Enzymes recap</b> <ul style="list-style-type: none"> <li>The mechanism of enzyme action including: the role of enzymes in metabolism, the role of the active site, enzyme specificity (lock and key hypothesis)</li> <li>Factors affecting the rate of enzyme controlled reactions (pH, temperature, substrate and enzyme concentration)</li> </ul> <b>Transport into and out of cells</b> <ul style="list-style-type: none"> <li>Transport of substances into and out of cells through</li> </ul> | <b>The cell cycle &amp; cell specialisation</b> <ul style="list-style-type: none"> <li>The stages of the cell cycle</li> <li>The importance and stages of DNA replication</li> <li>Cell division by mitosis</li> <li>The importance of cell differentiation in producing specialised cells</li> <li>The functions of stem cells in embryonic and adult animals, and meristems in plants</li> <li>The difference between embryonic and adult stem cells in animals</li> </ul> <b>Exchange surfaces</b> <ul style="list-style-type: none"> <li>Explain the need for exchange surfaces and a transport system in multicellular organisms in terms of surface area : volume ratio</li> <li>Describe some of the substances transported into and out of a range of organisms in terms of the requirements of those organisms</li> </ul> | <b>Animal Transport</b> <ul style="list-style-type: none"> <li>Describe the human circulatory system</li> <li>Explain how red blood cells and plasma are adapted to their transport functions in the blood</li> <li>Explain how the structure of the blood vessels (arteries, veins, capillaries) are adapted to their functions</li> <li>Describe the structure of the mammalian heart and explain how it is adapted for its function</li> </ul> <b>Photosynthesis recap</b> <ul style="list-style-type: none"> <li>Describe photosynthetic organisms as the main producers of food and therefore biomass for life on Earth</li> <li>Describe the process of photosynthesis: endothermic reaction, reactants and products, two stage process, location of the reaction in the chloroplasts</li> <li>Explain the effect of temperature, light intensity &amp; carbon dioxide concentration on the rate of photosynthesis, and explain their interaction in limiting the rate of photosynthesis.</li> </ul> | <b>Plant Transport</b> <ul style="list-style-type: none"> <li>Substances transported in plants (water, minerals, sugar [sucrose])</li> <li>Name xylem and phloem as the transport tissue in plants and state the substances transported in each</li> <li>Describe the transpiration stream &amp; translocation</li> <li>Explain how the structure of the xylem and phloem are adapted to their functions in the plant</li> <li>The distribution of xylem &amp; phloem in the root, stem, leaves</li> <li>Explain how water and mineral ions are taken up by plants, relating the structure of the root hair cells to their function</li> <li>Describe the process of transpiration and explain the effect of light intensity, temperature and air movement on the rate of transpiration</li> <li>describe how a simple potometer can be used to investigate factors that affect the rate of water uptake</li> </ul> <b>The Nervous System</b> <ul style="list-style-type: none"> <li>Describe the structure of the nervous system</li> <li>Explain how the components of the nervous system can produce a coordinated response</li> </ul> | <b>The Eye</b> <ul style="list-style-type: none"> <li>Explain how the main structures of the eye are related to their functions (cornea, iris, pupil, lens, retina, optic nerve, ciliary body, suspensory ligaments)</li> <li>Describe common defects of the eye and explain how some of these problems may be overcome (colour blindness, short-sightedness and long-sightedness)</li> </ul> <b>The Brain</b> <ul style="list-style-type: none"> <li>describe the structure and function of the brain (cerebrum, cerebellum, medulla, hypothalamus, pituitary)</li> <li>explain some of the difficulties of investigating brain function</li> <li>explain some of the limitations in treating damage and disease in the brain and other parts of the nervous system</li> </ul> <b>The Endocrine System</b> <ul style="list-style-type: none"> <li>Describe the principles of hormonal coordination and control by the human endocrine system</li> <li>Explain the roles of thyroxine and adrenaline in the body including thyroxine as an example of a negative feedback system</li> </ul> | <b>The Endocrine System (cont)</b> <ul style="list-style-type: none"> <li>Describe the role of hormones in human reproduction including the control of the menstrual cycle (FSH, oestrogen, LH, progesterone and testosterone)</li> <li>Explain the interactions of FSH, LH, oestrogen and progesterone in the control of the menstrual cycle</li> <li>Explain the use of hormones in contraception and evaluate hormonal and non-hormonal methods of contraception</li> <li>explain the use of hormones in modern reproductive technologies to treat infertility</li> </ul> <b>Homeostasis</b> <ul style="list-style-type: none"> <li>Define homeostasis &amp; explain the importance of maintaining a constant internal environment in response to internal and external change</li> <li>Describe the function of the skin in the control of body temperature</li> <li>Explain how insulin controls blood sugar levels in the body</li> <li>Explain how glucagon interacts with insulin to control blood sugar levels in the body</li> <li>Compare type 1 and type 2 diabetes and explain how they can be treated</li> <li>Explain the effect on cells of</li> </ul> |

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| diffusion, osmosis and active transport   |  |  | <ul style="list-style-type: none"> <li>Explain how the structure of a reflex arc is related to its function</li> </ul>  |  | <ul style="list-style-type: none"> <li>osmotic changes in body fluids</li> <li>Describe the function of the kidneys in maintaining the water balance of the body</li> <li>Describe the gross structure of the kidney and the structure of the kidney tubule</li> <li>Describe the effect of ADH on the permeability of the kidney tubules</li> <li>Explain the response of the body to different temperature and osmotic challenges</li> </ul> |
| Skills & Procedural Knowledge   | Skills & Procedural Knowledge  | Skills & Procedural Knowledge  | Skills & Procedural Knowledge   | Skills & Procedural Knowledge  | Skills & Procedural Knowledge  |
| <p><b>Cell structures recap</b></p> <ul style="list-style-type: none"> <li>Prepare a microscope slide of onion epidermis to be viewed under a light microscope.</li> <li>Biological drawing skills. Use a light microscope to produce labelled scientific drawings of biological specimens.</li> <li>Use of the equation <math>Image / Magnification \times Object</math> to calculate magnification, actual object size</li> <li>Writing numbers in standard form and calculating with numbers written in standard form</li> </ul> <p><b>Enzymes recap</b></p> <ul style="list-style-type: none"> <li>Investigation into the effect of hydrogen peroxide concentration on the rate of catalase activity</li> <li>Calculation of rates of reaction</li> </ul> <p><b>Supplying the cell</b></p> <ul style="list-style-type: none"> <li>Investigation into changes in mass of vegetable chips when placed in sucrose/salt concentrations of varying concentrations</li> <li>Calculating percentage gain and loss of mass</li> <li>Graph drawing skills</li> </ul> | <p><b>Cell cycle &amp; cell specialisation</b></p> <ul style="list-style-type: none"> <li>Observation of mitosis in stained root tip cells</li> <li>Examination of a range of specialised cells using a light microscope</li> </ul> <p><b>Exchange Surfaces</b></p> <ul style="list-style-type: none"> <li>calculation of surface area, volume and surface area : volume ratio</li> <li>Investigating surface area : volume ratio using hydrochloric acid and gelatine cubes stained with phenolphthalein</li> </ul> | <p><b>Animal Transport</b></p> <ul style="list-style-type: none"> <li>Investigation of a blood smear using a light microscope.</li> <li>Investigating heart structure by dissection</li> </ul> <p><b>Photosynthesis recap</b></p> <ul style="list-style-type: none"> <li>Use of the inverse square law and light intensity in the context of factors affecting photosynthesis</li> </ul> | <p><b>Plant Transport</b></p> <ul style="list-style-type: none"> <li>Examining the position of the xylem/phloem in root, stem and leaf tissues using a light microscope</li> <li>Investigation of transpiration rates from a plant cutting</li> <li>calculation of rate and percentage gain/loss of mass</li> <li>Work out the rate of transpiration in volume of water/time</li> </ul> | <p><b>The Eye</b></p> <ul style="list-style-type: none"> <li>Investigation of eye structure by dissection</li> </ul> | <p><b>Homeostasis</b></p> <ul style="list-style-type: none"> <li>Investigation of the structure of the structure of a kidney by dissection</li> </ul>  |
| Key Assessment Task (KAT)   | Key Assessment Task (KAT)  | Key Assessment Task (KAT)  | Key Assessment Task (KAT)   | Key Assessment Task (KAT)  | Key Assessment Task (KAT)  |
| Y10 Separate Biology KAT 1  | Y10 Separate Biology Assessment 1  | Y10 Separate Biology KAT 2   | Y10 Separate Biology Assessment 2   | Y10 Separate Biology KAT 3   | Y10 Separate Biology Assessment 3  |



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| <b>Unit of Work/Big Question</b>   | <b>Unit of Work/Big Question</b>  | <b>Unit of Work/Big Question</b>  | <b>Unit of Work/Big Question</b>   | <b>Unit of Work/Big Question</b>   | <b>Unit of Work/Big Question</b> |
| <b>B3.2 Plant Hormones</b><br><b>B4.1 Ecosystems</b>   | <b>B5.1 Inheritance</b>   | <b>B5.2 Evolution and Natural Selection</b><br><b>B6.2 Feeding the human race</b><br><b>B6.3 Monitoring and Maintaining Health: Health and disease</b>  | <b>B6.3 Monitoring and Maintaining Health</b><br>Communicable disease<br>Non-communicable disease  | <b>B6.1 Monitoring and Maintaining the Environment</b><br><br><b>Exam Revision</b>   |                                  |
| <b>Knowledge</b>   | <b>Knowledge</b>  | <b>Knowledge</b>  | <b>Knowledge</b>   | <b>Knowledge</b>   | <b>Knowledge</b>                 |
| <p><b>Plant Hormones</b></p> <ul style="list-style-type: none"> <li>Explain how plant hormones are important in the control and coordination of plant growth and development, with reference to the role of auxins in phototropisms and gravitropisms</li> <li>Describe some of the variety of effects of plant hormones, relating to auxins, gibberellins and ethene</li> <li>Describe how people use plant hormones to control plant growth (selective herbicides, root cuttings, seedless fruit, altering dormancy)</li> </ul> <p><b>Ecosystems</b></p> <ul style="list-style-type: none"> <li>Define habitat, population, community, ecosystem</li> <li>Describe different levels of organisation in an ecosystem from individual organisms to the whole ecosystem</li> <li>Explain how abiotic and biotic factors can affect communities</li> <li>Describe the importance of competition &amp; interdependence (parasitic, mutualistic &amp; predator-prey relationships) in a community</li> <li>Define decomposition &amp; explain the role of microorganisms in</li> </ul> | <p><b>Inheritance</b></p> <ul style="list-style-type: none"> <li>Recap DNA structure, how DNA codes for proteins and protein synthesis</li> <li>Define mutations</li> <li>Explain the effects of mutations in coding DNA on protein structure &amp; function (including enzyme active sites) and explain how the effects of these mutations can be harmful, beneficial</li> <li>Describe that in between sections of coding DNA there are sections of non-coding DNA and that mutations in non-coding DNA can alter how gene are expressed (related to stopping transcription of mRNA)</li> <li>Explain some of the advantages and disadvantages of asexual and sexual reproduction in a range of organisms</li> <li>Explain the terms diploid, haploid and gamete</li> <li>Explain the role of meiotic cell division in: halving the chromosome number to form gametes so that this maintains diploid cells when gametes combine, and as a source of genetic variation</li> <li>Explain the following terms: genome, chromosome, gene, allele, dominant, recessive, homozygous,</li> </ul> | <p><b>Evolution and Natural Selection</b></p> <ul style="list-style-type: none"> <li>Describe evolution as a change in the inherited characteristics of a population over time, through a process of natural selection, which may result in the formation of new species</li> <li>State that there is usually extensive genetic variation within a population of a species</li> <li>Explain how evolution occurs through the natural selection of variants that have given rise to phenotypes best suited to their environment</li> <li>Describe the evidence for evolution (fossils and antibiotic resistance in bacteria)</li> <li>Describe the impact of developments in biology on classification systems (natural and artificial classification systems and use of molecular phylogenetics based on DNA sequencing)</li> <li>Describe the work of Darwin and Wallace in the development of the theory of evolution by natural selection and explain the impact of these ideas on modern biology</li> <li>Describe the use of seedbanks as a store of biodiversity</li> </ul> <p><b>Feeding the human race</b></p> <ul style="list-style-type: none"> <li>Describe some of the biological factors affecting levels of food</li> </ul> | <p><b>Communicable Disease</b></p> <ul style="list-style-type: none"> <li>Explain how communicable diseases are transmitted in animals and explain how their transmission can be reduced or prevented</li> <li>Explain how communicable diseases are transmitted in plants and explain how their transmission can be reduced or prevented</li> <li>Describe the following plant diseases: viral tobacco mosaic virus TMV, fungal Erysiphe graminis barley powdery mildew, bacterial Agrobacterium tumefaciens crown gall disease</li> <li>Describe how plant diseases are detected &amp; identified in the field and in the laboratory</li> <li>Describe physical and chemical plant defence responses to disease</li> <li>Describe the following human infections: Athlete's foot, Salmonella food poisoning, chlamydia, herpes, HIV/AIDS</li> <li>describe the non-specific defence systems of the human body against pathogens</li> <li>Explain how white blood cells and platelets are adapted to their defence functions in the blood</li> <li>Explain the role of the immune system of the human body in defence against disease</li> <li>Explain the use of vaccines and</li> </ul> | <p><b>Monitoring and Maintaining the Environment</b></p> <ul style="list-style-type: none"> <li>Explain how to carry out a field investigation into the distribution and abundance of organisms in a habitat and how to determine their numbers in a given area including: sampling techniques (random and transects, capture-recapture), use of quadrats, pooters, nets, keys and scaling up methods</li> <li>Describe both positive and negative human interactions within ecosystems and explain their impact on biodiversity</li> <li>Explain some of the benefits and challenges of maintaining local and global biodiversity</li> <li>Evaluate the evidence for the impact of environmental changes on the distribution of organisms, with reference to water and atmospheric gases</li> </ul> <p><b>Exam Revision</b></p> |                                  |

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| <p>decomposition</p> <ul style="list-style-type: none"> <li>Recall that many different materials cycle through the abiotic and biotic components of an ecosystem, including carbon and nitrogen</li> <li>The stages of the carbon cycle</li> <li>The stages of the nitrogen cycle</li> <li>The stages of the water cycle explain its importance to living organisms</li> <li>Describe the differences between the trophic levels of organisms within an ecosystem (including use of the terms producer &amp; consumer)</li> <li>Interpret and construct pyramids of numbers &amp; biomass</li> <li>Explain how biomass is lost between trophic levels (related to egestion, excretion, respiration)</li> <li>Calculate the efficiency of biomass transfers between trophic levels and explain how this affects the number of trophic levels in a food chain</li> </ul> | <p>heterozygous, genotype and phenotype</p> <ul style="list-style-type: none"> <li>Explain single gene inheritance (homozygous and heterozygous crosses involving dominant and recessive genes)</li> <li>Predict the results of single gene crosses (use of Punnett squares)</li> <li>Describe sex determination in humans using a genetic cross</li> <li>Recall that most phenotypic features are the result of multiple genes rather than single gene inheritance</li> <li>Describe how the work of Mendel has contributed to the development of our understanding of genetics</li> <li>Define variant to mean the same as allele. Recall that all variants arise from mutations, and that most have no effect on the phenotype, some influence phenotype and a very few determine phenotype</li> <li>Define variation. Describe genetic and environmental causes of variation. Describe that the genome, and its interaction with the environment, influence the development of the phenotype of an organism. Describe, giving examples, the differences between discontinuous &amp; continuous variation</li> </ul> | <p>security</p> <ul style="list-style-type: none"> <li>Describe and explain some possible agricultural solutions to the demands of the growing human population</li> <li>Explain the impact of the selective breeding of food plants and domesticated animals</li> <li>Describe genetic engineering as a process which involves modifying the genome of an organism to introduce desirable characteristics</li> <li>Describe the main steps in the process of genetic engineering</li> <li>Explain some of the possible benefits and risks of using gene technology in modern agriculture</li> <li>Describe and explain some possible biotechnological solutions to the demands of the growing human population</li> </ul> <p><b>Health and Disease</b></p> <ul style="list-style-type: none"> <li>describe the relationship between health and disease</li> <li>Describe the difference between communicable &amp; non-communicable diseases</li> <li>Define pathogen and state the main types of pathogen that cause communicable diseases (viruses, bacteria, protists and fungi)</li> <li>Describe the interactions between different types of disease (HIV and tuberculosis; HPV and cervical cancer)</li> </ul> | <p>medicines (antibiotics, antivirals and antiseptics) in the prevention and treatment of disease</p> <ul style="list-style-type: none"> <li>Describe the processes of discovery and development of potential new medicines (preclinical and clinical testing)</li> <li>Explain the aseptic techniques used in culturing organisms</li> </ul> <p><b>Non-communicable disease</b></p> <ul style="list-style-type: none"> <li>Recall that many non-communicable human diseases are caused by the interaction of a number of factors: cardiovascular diseases, many forms of cancer, some lung (bronchitis) and liver (cirrhosis) diseases and diseases influenced by nutrition, including type 2 diabetes</li> <li>Analyse the effect of lifestyle factors (exercise, diet, alcohol and smoking) on the incidence of non-communicable diseases at local, national and global levels</li> <li>Evaluate some different treatments for cardiovascular disease (lifestyle, medical and surgical)</li> <li>Describe cancer as the result of changes in cells that lead to uncontrolled growth and division</li> <li>Describe how monoclonal antibodies are produced and describe some of the ways in which monoclonal antibodies can be used</li> <li>Discuss potential benefits and risks associated with the use of stem cells in medicine</li> <li>Explain some of the possible benefits and risks of using gene technology in medicine</li> <li>Discuss the potential importance for medicine of our increasing understanding of the human genome</li> </ul> |  |   |
| <p><b>Skills &amp; Procedural Knowledge</b></p>  | <p><b>Skills &amp; Procedural Knowledge</b></p>   | <p><b>Skills &amp; Procedural Knowledge</b></p>   | <p><b>Skills &amp; Procedural Knowledge</b></p>   | <p><b>Skills &amp; Procedural Knowledge</b></p>  | <p><b>Skills &amp; Procedural Knowledge</b></p> |
| <p><b>Plant Transport</b></p> <ul style="list-style-type: none"> <li>Investigate the effects of phototropism using seedlings</li> </ul>  | <p><b>Inheritance</b></p> <ul style="list-style-type: none"> <li>Understand and use the concept of probability in predicting the outcome of genetic crosses</li> </ul>  |   | <p><b>Communicable disease</b></p> <ul style="list-style-type: none"> <li>Investigation into growth bacterial cultures using aseptic techniques</li> <li>Investigation into the effectiveness of antimicrobial agents on the growth of a bacterial lawn</li> <li>Calculate cross-sectional areas of bacterial cultures and clear agar jelly using tr2</li> </ul>  | <p><b>Monitoring and Maintaining the Environment</b></p> <ul style="list-style-type: none"> <li>Investigation into the distribution and abundance of organisms in an ecosystem using ecological sampling techniques</li> </ul> |   |

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| Y11 Separate Biology KAT 1 | Y11 Separate Biology Assessment 1 | Y11 Separate Biology Mock Exam 1 | Y11 Separate Biology Mock Exam 2 |                           |                           |