	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Theme/Big Idea	**Topic 5: On the wild side.** This topic uses the context of climate change to develop understanding of a wide range of biological ideas. The topic uses the iconic example of the polar bear and the Arctic tundra as the storyline to introduce the topic and it is returned to at various points through the topic. The topic content starts with a consideration of ecosystems, the role of biotic and abiotic factors in determining the number and distribution of organisms in a habitat, and succession with the idea of niche revisited. The reliance of ecosystems on photosynthesis and the transfer of energy between trophic	**Topic 6: Immunity, Infection and Forensics** This topic uses forensic biology to introduce a wide range of biological ideas. It uses a storyline that concerns the discovery of two dead bodies. A series of questions is posed, such as: How are these people identified? When did they die? What caused their deaths? Could their deaths have been prevented? The topic then presents the biology that is needed to answer these questions and develop understanding of a wide range of biological ideas. The topic revisits and builds on areas covered in Year 1 and in Topic 5, for example cell structure and function, succession,	**Topic 7 Run for your life and Topic 8 Grey Matter** **Topic 7 -** This topic uses the context of movement and, in particular, speed of running to develop understanding of a range of biological ideas. The context introduced and revisited at points throughout compares the fast-moving cheetah and the slower but long-distance travels of wildebeest, and also human sprinters and long-distance athletes. The action of muscles is considered, from the use of antagonistic pairs to the detail of the sliding filament theory. After studying the different types of respiration that are required for sprint and endurance activities, the topic looks at how cardiac output and ventilation are	**Topic 7 Run for your life and Topic 8 Grey Matter** **Topic 8 -** This context for this topic is the misinterpretation of buffalo as insects when viewed for the first time across an open plain. This is based on the work of the anthropologist Colin Turnbull with Kenge, a Bambuti pygmi. Using this context the topic is structured to present a wide range of biological ideas related to the functioning of the nervous system and detection of stimuli. The development, structure and function of the brain are studied, along with how these are revealed through imaging techniques. Ideas about visual development, perception and learning are also introduced using the context. The final part of the topic widens out to revisit	**Revision and exams**	

	levels is studied before looking in detail at climate change.	protein synthesis, evolution and DNA technology	controlled to ensure that there is a continuous supply of ATP for muscle contraction. It then returns to apply some of the ideas to the different types of muscle fibres. The topic also examines thermoregulation as an example of homeostasis. Negative and positive feedback are included. The topic goes on to consider some of the effects for humans of too much or too little exercise.	synapses by looking at the effects of drugs. The use of personalised medicine and genetic modification of organisms close the topic.		
Content What are they learning? (including keywords)	**What are they learning** Pathogens & Disease: Microorganisms (bacteria, viruses, fungi) cause infectious diseases and are transmitted in different ways. Immune System: Defends the body using white blood cells, antibodies, and phagocytosis. Specific vs Non-specific Defence:	**What are they learning** DNA Structure & Profiling: DNA has a unique base sequence; DNA profiling uses variable regions (STRs) to identify individuals. PCR (Polymerase Chain Reaction): Amplifies small DNA samples → used in forensics and medical testing.	**What are they learning** ATP & Energy: ATP is the immediate energy source for cells; it releases energy when hydrolysed to ADP + Pi. Respiration: Aerobic: uses oxygen → high ATP yield Anaerobic: no oxygen → lactate produced + less ATP	**What are they learning** Brain Structure: The brain has regions (cerebrum, cerebellum, medulla) that control thinking, coordination, and vital functions. Nervous Communication: Neurons transmit electrical impulses; synapses use neurotransmitters to pass signals.		

	Non-specific: barriers (skin) + phagocytes Specific: lymphocytes produce antibodies for specific antigens Vaccination: Introduces antigens to stimulate memory cells → faster secondary immune response. Antibiotics & Resistance: Antibiotics treat bacterial infections, but overuse leads to resistant strains (superbugs). **Key words** Pathogen Antigen Antibody Phagocyte Lymphocyte Immune response Vaccination Memory cells Antibiotics	Electrophoresis: Separates DNA fragments by size to produce a DNA profile for comparison. Monoclonal Antibodies: Identical antibodies produced from one clone → used in pregnancy tests and disease detection. Ethics & Issues: DNA use raises concerns (privacy, misuse, false positives in forensic evidence). **Key words** DNA profiling STR (short tandem repeat) PCR Primer DNA polymerase Electrophoresis Fragment	Muscle Structure & Contraction: Sliding filament theory — actin and myosin filaments slide to shorten muscle fibres. Exercise Physiology: Increased heart rate, breathing rate, and oxygen delivery during exercise. Oxygen debt occurs after anaerobic activity. Training Adaptations: Regular exercise improves cardiovascular efficiency, muscle strength, and endurance. **Key words** ATP ADP Respiration Aerobic Anaerobic Lactate Oxygen debt	Learning & Memory: Memory involves changes in synapses (plasticity); repetition strengthens neural pathways. Brain Damage & Disorders: Injuries, strokes, and diseases (e.g. Alzheimer's) affect brain function and behaviour. Studying the Brain: Techniques like MRI, fMRI, and case studies help understand brain structure and function. **Key words** Cerebrum Cerebellum Medulla Neuron Synapse Neurotransmitter Plasticity Reflex		

	Resistance	Monoclonal antibody Antigen Forensics	Actin Myosin Sliding filament	MRI fMRI		
Skills How are they learning it?	CORE PRACTICAL 11: Investigate photosynthesis using isolated chloroplasts (the Hill reaction). (2b, 2d, 5a – See appendix 1) CORE PRACTICAL 12: Investigate the effect of temperature on the initial rate of an enzyme-catalysed reaction, to include Q10. (2c, 4b, 5b – See appendix 1) CORE PRACTICAL 13: Investigate the effects of temperature on the development of organisms (such as seedling growth rate, brine shrimp hatch rates). (1a, 2d, 4a – See appendix 1)	CORE PRACTICAL 14: Use gel electrophoresis to separate DNA fragments of different length. (2b, 3a, 5a) CORE PRACTICAL 15: Investigate the effect of different antibiotics on bacteria. (1a, 3a, 3b)	CORE PRACTICAL 16: Investigate rate of respiration. (2b, 3a, 4b) CORE PRACTICAL 17: Investigate the effects of exercise on tidal volume, breathing rate, respiratory minute ventilation and oxygen consumption using data from spirometer traces. (2a, 4a, 5a)	CORE PRACTICAL 18: Investigate habituation to a stimulus. (2d, 3b, 5b)		
Key Questions	How does the immune system respond to pathogens? What is the difference between specific and non-specific immunity? How do vaccines provide immunity?	How is a DNA profile created and used? What is the role of PCR in amplifying DNA? How does gel electrophoresis separate DNA fragments?	What is the role of ATP in energy transfer? What is the difference between aerobic and anaerobic respiration? How does the sliding filament mechanism work?	What are the functions of different brain regions? How do neurons transmit impulses and communicate at synapses?		

	Why do antibiotics not work on viruses? How does antibiotic resistance develop?	How are monoclonal antibodies produced and used? What are the ethical issues of DNA technology?	What causes oxygen debt and how is it repaid? How does training improve performance?	How does learning affect brain structure (plasticity)? What are the effects of brain damage or disease? How do scientists study the brain safely and effectively?		
Assessment (specific assessed piece(s); milestone(s))	**Peer assessment** – HWK practical question **Summative 1** – Topic 5 assessment synoptic **3 CPAC assessments –** Core practicals 11, 12 and 13	**Peer assessment** – HWK practical question **Summative 1** – End of year exams and AS Papers 1 and 2 **2 CPAC assessments –** Core practicals 14 and 15	**Peer assessment** – HWK practical question **Summative 1** – 2 synoptic tests **2 CPAC assessments –** Core practicals 16 and 17	**Peer assessment** – HWK practical question **Summative 1** – Full A-level papers **1 CPAC assessments –** Core practicals 18		

Appendix 1

CPAC 1:

Follows written procedures (a) Correctly follows instructions to carry out the experimental techniques or procedures.

CPAC 2:

Applies investigative

approaches and methods

when using instruments and

equipment (a) Correctly uses appropriate instrumentation, apparatus and materials (including ICT) to carry out investigative activities, experimental techniques and procedures with minimal assistance or prompting. (b) Carries out techniques or procedures methodically, in sequence and in combination, identifying practical issues and making adjustments when necessary. (c) Identifies and controls significant quantitative variables where

applicable, and plans approaches to take account of variables that cannot readily be controlled. (d) Selects appropriate equipment and measurement strategies in order to ensure suitably accurate results.

CPAC 3:

Safely uses a range of

practical equipment and

materials (a) Identifies hazards and assesses risks associated with these hazards, making safety adjustments as necessary, when carrying out experimental techniques and procedures in the lab or field. (b) Uses appropriate safety equipment and approaches to minimise risks with minimal prompting.

CPAC 4:

Makes and records

observations (a) Makes accurate observations relevant to the experimental or investigative procedure. (b) Obtains accurate, precise and sufficient data for experimental and investigative procedures and records this methodically using appropriate units and conventions.

CPAC 5:

Researches, references and

reports (a) Uses appropriate software and/or tools to process data, carry out research and report findings. (b) Sources of information are cited demonstrating that research has taken place, supporting planning and conclusions.