	*Unit 3	Unit 4	Unit 5
Unit Title	B3: Infection and Response	B4: Bioenergetics	B5: Homeostasis and Response
Approximate Number of Lessons	10-16 lessons	10 lessons	13-24 lessons
Curriculum Content	Pathogens are microorganisms such as viruses and bacteria that cause infectious diseases in animals and plants. They depend on their host to provide the conditions and nutrients that they need to grow and reproduce. They frequently produce toxins that damage tissues and make us feel ill. We can avoid diseases by reducing contact with them, as well as how the body uses barriers against pathogens. Once inside the body our immune system is triggered which is usually strong enough to destroy the pathogen and prevent disease. When at risk from unusual or dangerous diseases our body's natural system can be enhanced by the use of vaccination. Since the 1940s a range of antibiotics have been developed which have proved successful against a number of lethal diseases caused by bacteria. Unfortunately, many groups of bacteria have now become resistant to these antibiotics. The race is now on to develop a new set of antibiotics.	Plants harness the Sun's energy in photosynthesis in order to make food. This process liberates oxygen which has built up over millions of years in the Earth's atmosphere. Both animals and plants use this oxygen to oxidise food in a process called aerobic respiration which transfers the energy that the organism needs to perform its functions. Conversely, anaerobic respiration does not require oxygen to transfer energy. During vigorous exercise the human body is unable to supply the cells with sufficient oxygen and it switches to anaerobic respiration. This process will supply energy but also causes the build-up of lactic acid in muscles which causes fatigue.	Cells in the body can only survive within narrow physical and chemical limits. They require a constant temperature and pH as well as a constant supply of dissolved food and water. In order to do this the body requires control systems that constantly monitor and adjust the composition of the blood and tissues. These control systems include receptors which sense changes and effectors that bring about changes. The structure and function of the nervous system brings about fast responses. The hormonal system usually brings about much slower changes. Hormonal coordination is particularly important in reproduction since it controls the menstrual cycle. An understanding of the role of hormones in reproduction has allowed scientists to develop not only contraceptive drugs but also drugs which can increase fertility.
Links to prior learning	 KS3 National curriculum: The effects of recreational drugs (including substance misuse) on behaviour, health and life processes. The impact of exercise, asthma and smoking on the human gas exchange system 	 KS3 National curriculum: Cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts 	 KS3 National curriculum: Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta

		 The similarities and differences between plant and animal cells The role of diffusion in the movement of materials in and between cells The structural adaptations of some unicellular organisms The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms. The role of leaf stomata in gas exchange in plants. 	 Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.
Cultural Capital Opportunities	Researchers and doctors from Addenbrookes Hospital have produced a short video which will teach you all about bacteria including where they occur, how we detect them, how our body fights them and what mechanisms we have for treating infections. You can follow the journey of a bacteria and discover how a simple infection can progress to sepsis - a serious life- threatening condition which can affect anyone of any age. You can also take a virtual tour of the microbiology lab at Addenbrookes and find out how the scientists detect and identify bacteria. There are also links to downloadable activity sheets. <u>https://www.youtube.com/channel/UCHYU W_k3HrmHiyWkrT5KYsQ?guided_help_flow</u> =5	TED talk: https://www.ted.com/talks/joanne_chory_how_ supercharged_plants_could_slow_climate_chang @ Photosynthesis and Respiration simulation: https://www.biologysimulations.com/cell- energy-sim Visit to Cambridge botanical gardens.	TED talks: https://www.ted.com/talks/joelle_rabow_male tis_the_psychology_of_post_traumatic_stress disorder https://www.ted.com/talks/john_amory_how_ a_male_contraceptive_pill_could_work https://www.ted.com/talks/melinda_gates_let_ s_put_birth_control_back_on_the_agenda https://www.ted.com/talks/emma_bryce_how_ _do_your_hormones_work https://www.ted.com/talks/nassim_assefi_and_ _brian_a_levine_how_in_vitro_fertilization_ivf_ works Science Museum and Natural History Museum in London (check opening and exhibits available).

	TED talk: <u>https://www.ted.com/talks/bill_gates_mos</u> <u>quitos_malaria_and_education?language=e</u> <u>n</u> Latest microbiology magazine: <u>https://microbiologysociety.org/members-</u> <u>outreach-resources/microbiology-</u> <u>today/current-issue.html</u>		
Assessment Focus	B3 Exam style questions	B4 Exam style questions	B5 Exam style questions
Name of Knowledge	B3 Infection and Response - available from	B4 Bioenergetics - available from Science	B5 Homeostasis and Response - available from
Organiser			

* All Year 10 students who are studying Triple Science will also cover specific Triple content from B1 and B2 at the start of the year.