Curriculum Map: Combined Science Biology Year 10

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Content Declarative knowledge 'I Know'	**Topic: B4 Bioenergetics** Know the raw materials and energy source for photosynthesis. Know that photosynthesis is an endothermic reaction. State the equation for photosynthesis and know the chemical formulae of all reactants and products. List the limiting factors that influence the rate of photosynthesis. Know the variables for the experiment. State the extra materials that plant cells need to produce proteins. State the word equation for aerobic respiration. Know the chemical formulae of all reactants and products of aerobic respiration and write the balanced equation. Give the word equation for anaerobic respiration in animals. State the word equation for anaerobic respiration in plants and yeast. Define the terms muscle fatigue and oxygen debt. Define the term metabolism and provide examples of metabolic reactions. Describe and explain the role of the liver in metabolism.		**Topic: B5 Homeostasis & Response** Know the definition of homeostasis including identifying stimuli, receptors, coordination centres and effectors Know that homeostatic mechanisms involve a nervous and chemical response Know the function of receptors, coordination centres and effectors in a homeostatic response. Be able to give some examples of these mechanisms Know the structures and features of the nervous system Know how the nervous system coordinates a response. Know the pathway of impulses from receptor to effector. Know what a synapse is and how a synapse works using chemical transmission. Know why the pituitary gland is called the "master gland" and describe the role of hormones released by endocrine glands Know the names and positions of some organs/glands/ hormones/ target tissues in the body Know that blood glucose levels are controlled by the pancreas and name the hormones involved Know how glucagon interacts with insulin to control blood glucose levels (produce flow chart/diagram) and explain the importance of maintaining blood glucose levels Know what happens when glucose levels change. Describe the difference between two types of diabetes Know the risk factors and treatments for type 1 and type 2 diabetes Know how lifestyle choices affect the risk of developing type 2 diabetes. Know the role of all the hormones in the menstrual cycle. Know why fertility changes with age in men and women.		**Topic: B7 Ecology** Know definitions for key words including population, community, habitat, ecosystem, interdependence. Know the resources that organisms compete for. Know examples of biotic and abiotic factors. Know the three types of adaptations – structural, behavioural, functional. Know animal adaptations including to cold climates, camouflage and dry climates. Know the definition and an example of an extremophile. Know that materials are recycled to provide the building blocks for future organisms. Know the main process involved in the carbon cycle and the water cycle. Know the definition for biodiversity. Know that the future of the human species relies on us maintaining a good level of biodiversity. Know the impacts of a rapidly increasing human population. Know how acid rain is formed and how it affects living organisms. Know how air pollution causes global dimming and smog. Know how human activities pollute the land and the water. Know how to describe the process of deforestation. Know that levels of CO_2 and CH_4 in the atmosphere are increasing and contribute to global warming. Know why peat bogs are being destroyed. Know the causes and effects of global warming. Know how waste, deforestation, and global warming all have an impact on biodiversity.	

		Know the changes that happen to males and females during puberty (including naming all the hormones in the menstrual cycle). Know oestrogen and testosterone as reproductive hormones in men and women, and name some bodily responses to these hormones (including the menstrual cycle). Know what contraception is and list examples. Be able to categorise these as either hormonal or non hormonal. Know the mechanism of action of contraceptives Know how FSH and IVF can be used to help fertility Know what adrenaline and thyroxine do in the body Know how negative feedback systems work	
Skills Procedural Knowledge 'I know how to'	Demonstrate via graphs how limiting factors influence the rate of photosynthesis. Explain the shape of the limiting factors graphs. Explain how the experiment could be adapted to test other limiting factors. Understand and use inverse proportion – the inverse square law and light intensity in the context of photosynthesis. Know how to use inverse proportion – the inverse square law and light intensity in the context. Safely carry out a practical to investigate the effect of changing light intensity on the rate of photosynthesis. Describe how plants use the glucose they make. Review the practical tests for starch, sugars, and protein. Describe how the different factors that affect the rate of photosynthesis interact. Describe where in the cell aerobic respiration takes place. Explain why living organisms need to respire (how the energy released is used). Describe how humans can manipulate the environment in which plants grow. Explain the term "oxygen debt" and how it is paid back. Describe the changes to heart rate and breathing rate and volume during exercise.	**Required Practical:** Plan and carry out an investigation, choosing appropriate ways to measure reaction time and considering the risks and ethics of the investigation. Be able to translate information about reaction times between numerical and graphical forms.	Know how to explain what a stable community is, using examples. **Required practical**: Know how to use random sampling with quadrats to measure the population of a species in an area. Know how to use systematic sampling with transects and quadrats to measure the distribution of a species across a changing environment. Know how to calculate and then use the mean, median and mode of sets of data. Know how to construct a food chain for an ecosystem. Know how to describe and explain predator-prey relationships. Know how to explain the term bioaccumulation in the context of pesticides in water. Know how to explain the term eutrophication.

Strategies Conditional Knowledge 'I know when to'	Be able to plan a practical to investigate the effect of changing light intensity on photosynthesis depending on the information presented. Evaluate data collected during response to exercise required practical by constructing and analysing the appropriate table and graph.	Evaluate data regarding measurement of response to stimuli. Explain the need to respond to environmental stimuli/changes. Know when to apply knowledge to novel situations of the nervous system. Compare and contrast the nervous and endocrine system. Apply knowledge to suggest and explain how hormones change the body. Understand how to apply my knowledge of hormones and the menstrual cycle to suggest how hormone based contraceptives work. Evaluate the different methods of contraception in detail.	Understand how human activities can reduce biodiversity and recognise that we should try to stop this. Evaluate why deforestation and peat bog destruction occurs and explain their impact on CO_2 levels and biodiversity. Understand key strategies to reduce the impact of human activities on ecosystems and maintain biodiversity.
Key Questions	How do plants use the glucose they produce during photosynthesis? What are the limiting factors that affect the rate of photosynthesis? What is the difference between aerobic and anaerobic respiration? How does the human body respond to exercise?	What is homeostasis and why is it so important? What are reflex actions and why are they so important for survival? How do hormones control responses such as the release of a mature egg in the human menstrual cycle ?	What is adaptation and why is it so important? Why is the cycling of materials in nature so vital to life on Earth? What is global warming and why does it matter? How can we make food production more efficient?
Assessment topics	Mid topic test (20 minutes) after 8 lessons. End of topic test (25 minutes)	Mid topic test (18 minutes) after 6 lessons. End of topic test (32 minutes)	Mid topic test (20 minutes) after 8 lessons. End of topic test (36 minutes)
Cross curricular links/Character Education	Maths – drawing of graphs, calculations PE – exercise and the body's response, including production of lactic acid and oxygen debt Geography – manipulation of environmental conditions for plants (farming)	Maths – Graph skills and calculations PSHCE – Ethics around contraception, IVF etc Physics/PE – Reaction Time	Geography – environment and climate change Character education – moral responsibility to preserve and protect the Earth Maths – calculations to estimate the abundance of a species