Curriculum Map KS4 Biology

Year 10	Bioenergetics	Ecology
Content- WHAT will be learned? What previous learning can be linked? Why this order/**sequence**?	Builds on Cell Biology from Y9 and Y8 Plant Power and Y7 Swifter, Higher, Stronger. Y9 Chemistry atmosphere link also. Students explore how light energy is harnessed by plants which produces oxygen for our atmosphere. We look at how reactants and products are transported throughout plants in their transport systems. Aerobic respiration uses oxygens to oxidise glucose and release energy for processes in all living things. Anaerobic respiration doesn't require oxygen and produces different products in different types of organism (some useful , some not).	Builds on Year 8 Plant Power and Bioenergetics knowledge of plants. A lot of cross inks to KS3/KS4 Geography. In this unit we learn that the Sun is a source of energy that passes through ecosystems. Materials including carbon and water are continually recycled by the living world, being released through respiration of animals, plants and decomposing microorganisms and taken up by plants in photosynthesis. All species live in ecosystems composed of complex communities of animals and plants dependent on each other and that are adapted to particular conditions, both abiotic and biotic. These ecosystems provide essential services that support human life and continued development. For humans to continue to benefit from these services, we need to engage with the environment in a sustainable way. In this section we will explore how humans are threatening biodiversity as well as the natural systems that support it. We will also consider some actions we need to take to ensure our future health, prosperity and well-being.
Skills- What will be developed?	Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. Evaluate methods and suggest possible improvements and further investigations. Microscopy for studying leaf structure Numeracy skills below	Recognise when to apply a knowledge of sampling techniques to ensure any samples collected are representative. Ecological fieldwork. Evaluate methods and suggest possible improvements and further investigations. Explain that the process of peer review helps to detect false claims and to establish a consensus about which claims should be regarded as valid (in relation to climate data) Numeracy skills below
Key 'How'/'Why' Questions- What **powerful knowledge** will be gained? What	Key Concepts: How does photosynthesis occur in plants and how are reactants supplied, and products transported around plants?	Key Concepts: How does energy flow through ecosystems?

areas/themes/concepts will be explored?	Why does aerobic respiration occur in all organisms and how is this process different to photosynthesis? How do we investigate the rate of photosynthesis or prove if leaves have been photosynthesising? How does the human body change in response to exercise and how does this relate to respiration? How do other parts of animal and plant metabolisms differ?	What factors influence the distribution of species in an ecosystem? What is biodiversity and how can we sample it accurately, and in a valid manner? How are materials cycled through ecosystems? How are humans impacting biodiversity both positively and negatively? How can ensure sustainability? How are humans impacting the climate and how can we overcome this? How strong is the evidence for climate change?
SEND- how will support be seen? Seating plans? Simplified questions?	Keyword box for each lesson, knowledge organisers for the unit. Scaffolded tasks and sentence starters in appropriate units. Off colour backgrounds and dyslexia friendly fonts to avoid visual overload. Glossary for overlearning key vocabulary. Checking in with students regularly in lesson.	Keyword box for each lesson, knowledge organisers for the unit. Scaffolded tasks and sentence starters in appropriate units. Off colour backgrounds and dyslexia friendly fonts to avoid visual overload. Glossary for overlearning key vocabulary. Checking in with students regularly in lesson.
Assessment- What? Why?	Summative: 1 x 12 mark assessment during the unit 1 x 25 mark assessment at the end of the unit Formative: regular plenary quizzes and starter retrieval practice to check understanding. Tiered assessment. Shorter unit so only 1 mid unit assessment required.	Summative: 2 x 12 mark assessment during the unit 1 x 25 mark assessment at the end of the unit Formative: regular plenary quizzes and starter retrieval practice to check understanding. Tiered assessment including triple tier as more extra triple content from this unit onward.
What **memory for learning** skills will be required- modelling? Concrete answers? Retrieval?	Modelling answers Concrete examples Interleaving activities Retrieval practice quizzes throughout Students creating their own revision quiz questions for peers	Same techniques as previous unit. Part way through this unit, year 9s will pause for mock revision and skills such as mind mapping, producing flash cards and retrieval quizzing are modelled to students in teacher led revision lessons.
Literacy- reading, extended accurate writing and oracy opportunities	Spelling of scientific key vocabulary in crossword. Reading comprehension on greenhouses article. Meaning of scientific key vocabulary.	Sentence structure modelling for describing the carbon cycle. Meaning of scientific key vocabulary. Use of concise bullet points and full sentences modelled to summarise transpiration.

	How to write scientific evaluation. Use of 'however' or opposing words. Summary words to show judgement. How to write scientific comparisons.	
Numeracy/computing skills	Calculation of rates by dividing by time. Choice of appropriate units for time and conversion of units. E.g. seconds to minutes or mm to cm. Inverse square law – factorials increases/decreases Use of tangents to calculate a rate (higher tier only) Balancing symbol equations	Translate information between graphical and numerical forms; and extract and interpret information from charts, graphs and tables. Use a scatter diagram to identify a correlation between two variables. Interpreting observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions.
Character development	Financial appreciation that conditions used to increase food production have a cost which may affect profit margins, in real world decision making.	Becoming a global citizen. Moral obligation of humans to safeguard and conserve biodiversity to protect the environment and ensure sustainable development ensure consideration for the environment and being able to make climate conscious decisions.
Equality/Diversity opportunities	The need to feed a growing human population fairly and globally, particularly in nations with lower food security.	Disproportionate **i**mpacts of climate change. Food security and societal, political and environmental factors affecting this.
Homework/Independent learning	Quizzes and retrieval practice (see schedule). Links to myGCSEscience.com and use of knowledge organisers.	Quizzes and retrieval practice (see schedule). Links to myGCSEscience.com and use of knowledge organisers.
CIAG coverage/links	Agriculture Performance Analyst Botanist Horticulture Accountancy	Environment officer Climate scientist Hydrologist Horticulture Zoologist