Science – Biology

MAGHULL HIGH SCHOOL – CURRICULUM MAP

	Lessons Sequence					
TOPIC (S) **ECOLOGY**	1. Communities 2. Biotic and abiotic factors 3. Adaptations 4. Food chains, predator prey relationships. 5. Quadrats and transects (req prac) 6. Decomposition		7. Carbon cycle 8. Water cycle 9. **Decomposition (req prac)** 10. **Impact of environmental change** 11. Biodiversity & maintaining biodiversity 12. Waste management 13. Land use Deforestation		14. Global warming 15. **Trophic levels & pyramids of biomass** 16. **Transfer of biomass** 17. **Food security** 18. **Farming techniques** 19. **Sustainable fisheries** 20. **Role of biotechnology**	
Knowledge & Skills development	• Organisation of an ecosystem. • Define and list biotic and abiotic factors. • Describe adaptations of plants and animals to different habitats. • Describe and explain interdependence including from a graph. • Use a quadrat and transect to measure distribution of a plant species. • Calculating mode, median, mean and plotting graphs. • Describe the conditions needed for decay. • Describe the stages of the water cycle. • Explain the conditions needed for decomposition. How gardeners and farmers increase rate of decomposition. • Biogas generators. • Practical skills effect of temperature on the rate of decay of fresh milk. Possible use of data loggers. • Hoe environmental changes affect the distribution of species in an ecosystem. • Describe the stages of the carbon cycle including the impact of the industrial revolution. • Define biodiversity and discuss the roles humans have in maintaining biodiversity incl conservation programmes. • Outline ways of managing waste. The impact of an increasing population on the amount of waste and land needed.			• Define deforestation. Outline the impact an increasing human population has had on the amount of deforestation. • Describe and explain how global warming occurs. • Describe the difference between trophic levels in an ecosystem using key words. Role of decomposers. • Define biomass and construct pyramids of biomass in the correct order. • State the amount of biomass transferred between each trophic level. • Explain how biomass is lost. • Describe some of the biological factors affecting levels of food security. Define food security. • Describe and explain how to increase the efficiency of food production. • Describe what is happening to fish stocks and the steps being taken to conserve these. • Describe and explain some biotechnological and agricultural solutions to demands of the growing human population. • Modern biotechnology techniques enable large quantities of microorganisms to be cultured for food. • Role of *Fusarium* to produce mycoprotein. • Bacteria to produce insulin. GM crops providing imporved nutritional value.	
Assessment / Feedback Opportunities	Targeted questioning throughout topic	Teacher assessment of practical skills during investigation - verbal	Knowledge recall quick quizzes	Deep marking of written task in students books	Topic Test	Targeted exam questions – teacher or self-assessed

Cultural Capital	• Use of quadrats and transects • Global warming and the impact of the USA/Chinese government
SMSC / Promoting British Values **(Democracy, Liberty, Rule of Law, Tolerance & Respect)**	• Waste management & recycling. • Impact of humans on the environment • Working in groups during practicals or research tasks
Recommended Reading	• Following methods • Food packaging • Newspaper articles on plastic waste, conservation etc • Recommended Read: The Ecology Book: Big Ideas Simply Explained (DK) • Recommended Read: Life on Earth (David Attenborough)
Key Vocabulary	Independent Variable, Dependent Variable, Control Variables, Method, Conclusion, Precaution, Evaluation, Reliable, Precision, Valid, Anomaly, Describe, Explain, Compare, Analyse, Calculate, Suggest, Decomposers, Carbon Cycle, Water cycle, Food chain, Producer, Trophic level, Predator/ Apex predator, Prey, Biodiversity, Pollution, Acid rain Deforestation, Global warming, Conservation, Recycling, Ecosystem, Competition, Interdependence, Abiotic, Biotic, Adaptation, surface area to volume ratio, **Sustainable Pyramid of biomass, Biotechnology, Fermenter Mycoprotein, Efficiency of food production Fishing quota**, carbon dioxide, precipitate, quadrat, transect, distribution, quadrat, transect, conservation, oxygen, warmth, moisture, **decomposition, enzymes, secrete**
Digital Literacy	SharePoint resources including topic quizzes Possible use of excel to plot graphs and analyse data, powerpoint, word, etc to present information, internet for research
Cross-Curricular Links	Geography - Impact of deforestation on native people Food technology – food security PHSCE Numeracy/Maths – averages (means), reading scales, graph plotting, lines of best fit, using and rearranging equations, using scientific calculators
Careers	Waste management, Conservationist, Environmental scientist, Politician (climate change)