Learning Journey – B7 Ecology

What have I done previously in my learning journey?	
Previously….	You have learnt previously about relationships in an ecosystem. This has involved learning about: • the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops • the importance of plant reproduction through insect pollination in human food security • how organisms affect, and are affected by, their environment, including the accumulation of toxic materials.
In this topic…	You will 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. In order to continue to benefit from these services humans 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.

We will develop our learning by studying the following each lesson:	RAG	Skills in Science checklist
B7.01 Competition • Describe factors that affect the survival of organisms in their habitat • Explain how one species depends on others for survival • Describe what is meant by a stable community • Describe what is meant by abiotic and biotic factors • Give examples of abiotic and biotic factors		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.02 Adaptations • Describe and explain how structural, behavioural and functional adaptations, in a range of organisms help them to survive in their habitat • Define the term extremophile and give general examples		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.03 Food Chains • Explain what a food chain shows • Explain that photosynthetic organisms are the producers of biomass for life on Earth • Identify producers, primary, secondary and tertiary consumers in a food chain • Interpret and explain population curves		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.04 Investigating Populations RP • Describe how to carry out random sampling of organisms using a quadrat • Describe when and how a transect should be used • Evaluate data gathered by using a quadrat and transect • Calculate area, mean, median, mode and range • Explain why sample size is important to obtain valid results		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.05 The Carbon and Water Cycle • Explain the importance of cycles to living things in relation to limited resources. • Describe the stages of the carbon cycle. • Explain the role of microorganisms in cycling materials through an ecosystem.		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.06 Decomposition (Biology Only) • Calculate rate changes in the decay of biological material • Translate information between graphical and numerical form • Plot and draw appropriate graphs selecting appropriate scales for axes		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication

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B7.07 Investigating the Effect of Temperature on the Rate of Decay of Fresh Milk • Carry out an investigation by measuring pH change • Present data in a graph and draw conclusions		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.08 Impact of Environmental Change (Biology Only / HT only) • Evaluate the impact of environmental changes on the distribution of species in an ecosystem		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.09 Biodiversity and Waste Management • Define the term biodiversity. • Explain how biodiversity can affect climate, food supplies and physical environment. • Describe the problems associated with an increasing human population. • Describe how water, air and land can be polluted by waste.		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.10 Global Warming • Explain the terms greenhouse effect and global warming. • Explain with the aid of a diagram how levels of carbon dioxide and methane contribute to global warming • Describe the possible effects of global warming.		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.11 Deforestation and Land Use • Define the term deforestation. • Explain why vast tropical areas have been cleared of trees. • Explain the effects of deforestation on carbon dioxide levels and biodiversity. • Explain what peat is and why it is important to preserve areas of peat.		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.12 Maintaining Biodiversity • Describe programmes introduced to maintain biodiversity. • Explain and evaluate conflicting pressures on maintaining biodiversity		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.13 Trophic Levels (Biology Only) • Describe the differences between the trophic levels of organisms within an ecosystem		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.14 Pyramids of Biomass (Biology Only) • Construct accurate pyramids of biomass from appropriate data • Describe pyramids of biomass • Explain how biomass is lost between the different trophic levels • Calculate the efficiency of biomass transfers between trophic levels • Explain how the efficiency of biomass transfers between trophic levels affects the number of organisms at each level		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.15 Factors Affecting Food Security (Biology Only) • Describe some of the biological factors affecting levels of food security • Interpret population and food production statistics to evaluate food security		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.16 Farming Techniques (Biology Only) • Understand that some people have ethical objections to some modern intensive farming methods • Evaluate the advantages and disadvantages of modern farming techniques		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication

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B7.17 Sustainable Fisheries • Understand how application of different fishing techniques promotes recovery of fish stocks		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication
B7.18 Role of Biotechnology • Describe and explain some possible biotechnical and agricultural solutions, including genetic modification, to the demands of the growing human population		☐ Scientific Methods ☐ Practical ☐ Number Skills ☐ Application ☐ Communication

Key Vocabulary

Competition	**Habitat**	**Ecosystem**	**Community**	**Population**	**Abiotic**	**Biotic**	**Behavioural adaptation**	**Structural adaptation**
Functional adaptation	**Extremophile**	**Survival**	**Food chain**	**Producers**	**Primary consumers**	**Secondary consumers**	**Prey**	**Predator**
Population	**Quadrat**	**Random sampling**	**Distribution**	**Transect**	**Mean values**	**Sample size**	**Carbon cycle**	**Microorga-nisms**
Decay	**Decomposers**	**Carbon dioxide**	**Photosynthesis**	**Combustion**	**Biodiversity**	**Pollution**	**Waste**	**Global warming**
Greenhouse gas	**Warmer**	**Deforestation**	**Peat bog**	**Carbon dioxide**	**Water-logged**	**Protection**	**Recycling**	**Hedgerows**

Future Learning	Further study at A Level of Biology looks further at ecosystems and involves learning that: • ecosystems range in size from the very large to the very small • biomass transfers through ecosystems and the efficiency of transfer through different trophic levels can be measured • microorganisms play a key role in recycling chemical elements • ecosystems are dynamic systems, usually moving from colonisation to climax communities in a process known as succession • the dynamic equilibrium of populations is affected by a range of factors • humans are part of the ecological balance, and their activities affect it both directly and indirectly • effective management of the conflict between human needs and conservation help to maintain sustainability of resource
In careers	Ecologists study the relationship between plants, animals and the environment. Day-to-day tasks will depend on the sector in which you work. For example, as an ecological scientist you could: • carry out fieldwork • survey and record information on plants, animals, environmental conditions and biodiversity • deliver lessons or lectures You could work in the countryside, at a university or in a laboratory. Your working environment may be outdoors in all weathers.