



Year 13 Biology Learning Journey

When?	Knowledge	Understanding	Assessment
Populations in Ecosystems	Will be able to: <ul style="list-style-type: none"> • Explain what is meant by biotic, abiotic, biosphere, community and habitat and how they affect the population of a species. • Explain what is meant by interspecific competition and how it affects population size. • Explain the predator/prey relationship and how it affects the population size of both. • Carry out an investigation to measure population size. • Describe what is meant by conservation and how managing succession can help conserve habitats. 	<ul style="list-style-type: none"> • Students investigate the distribution of organisms in a named habitat using randomly placed frame quadrats, or a belt transect • Students use both percentage cover and frequency as measures of abundance of a sessile species. • Students could use the mark-release-recapture method to investigate the abundance of a motile species • Students use turbidity measurements to investigate the growth rate of a broth culture of microorganisms. • Students use a logarithmic scale in representing the growth of a population of microorganisms. 	Assessment: Populations in Ecosystems Test (44 Marks)
Populations and Evolution	Will be able to: <ul style="list-style-type: none"> • Investigate the frequency of observable phenotypes within a population. • Describe how individuals within a population may show a wide range of variation in phenotype and the causes of this variation. • Describe how predation, disease and competition for the means of survival result in differential survival and reproduction, i.e. natural selection. • Explain the effects of stabilising, directional and disruptive selection. • Describe how new species arise 	<ul style="list-style-type: none"> • Students collect data about the frequency of observable phenotypes within a single population. • Students calculate allele, genotype and phenotype frequencies from appropriate data using the Hardy–Weinberg equation. • Students apply their knowledge of sampling to the concept of genetic drift. • Students devise an investigation to mimic the effects of random sampling on allele frequencies in a population. 	Assessment: Population and Evolution Test (44 Marks)
Response to Stimuli	Will be able to: <ul style="list-style-type: none"> • Describe taxes, kineses and tropisms and how each increases an organism's chances of survival. • Explain phototropism and gravitropism in flowering plants and the role which growth factors such as IAA play. • Describe and explain how a reflex arc works. • Describe the structure of the Pacinian corpuscle and explain how it works • Describe how receptors work together in the eye. • Describe the autonomic nervous system and its role in controlling heart rate 	<ul style="list-style-type: none"> • Students design and carry out investigations into the effects of indoleacetic acid on root growth in seedlings. • Students could design and carry out investigations into the sensitivity of temperature receptors in human skin • Students could design and carry out investigations into the habituation of touch receptors in human skin • Students could design and carry out investigations into the resolution of touch receptors in human skin. • Students design and carry out an investigation into the effect of a named variable on human pulse rate. • Students use values of heart rate (R) and stroke volume (V) to calculate cardiac output (CO), using the formula $CO = R \times V$ • Students should be able to use information provided to predict 	Assessment: Response to Stimuli Test (41 Marks)

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Nervous Coordination and Muscles	<p>Will be able to:</p> <ul style="list-style-type: none"> • Describe the different types of neurone and the structure of the neurones • Describe what is meant by action potential and resting potential and its role in creating a nerve impulse • Describe how the electrical impulse travels across axons • Describe the structure and function of synapses • Describe how information is transported across a synapse • Describe in detail the structure of skeletal muscle • Explain what is meant by antagonistic muscles and how they operate • Describe where the energy for muscle contraction comes from 	<p>and explain the effects of specific drugs on a synapse.</p> <ul style="list-style-type: none"> • Students examine prepared slides of skeletal muscle using an optical microscope. • Students investigate the effect of repeated muscular contraction on the rate of muscle fatigue in human volunteers. 	<p>Assessment: Nervous Coordination and Muscles Test (40 Marks)</p>
Homeostasis	<p>Will be able to:</p> <ul style="list-style-type: none"> • Describe and explain the nature and importance of homeostasis • Distinguish between negative and positive feedback • Explain the roles of glucagon, insulin and adrenaline in regulating blood glucose levels • Describe the difference between type 1 and 2 diabetes and how both can be treated. • Describe the structure of a nephron and how they control water levels in the body • Describe the roles of the hypothalamus, posterior pituitary and ADH in osmoregulation. 	<ul style="list-style-type: none"> • Students should be able to interpret information relating to examples of negative and positive feedback. • Students should be able to evaluate the positions of health advisers and the food industry in relation to the increased incidence of type II diabetes. 	<p>Assessment: Energy and Ecosystem Test (43 Marks)</p>