Year 13 Biology Curriculum Summary

YEAR GROUP: 13 **SUBJECTS: Biology**

When?	Knowledge	Understanding	Assessment
Populations in Ecosystems	Will be able to: • 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.	• 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

When?	Knowledge	Understanding	Assessment
Populations and Evolution	Will be able to: • 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	• 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

When?	Knowledge	Understanding	Assessment
	Will be able to: • 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	• 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.	**Assessment**: Response to Stimuli Test

When?	Knowledge	Understanding	Assessment
Response to Stimuli	how it works • Describe how receptors work together in the eye. • Describe the autonomic nervous system and its role in controlling heart rate	• 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 × V • Students should be able to use information provided to predict and explain the effects of specific drugs on a synapse.	
Nervous Coordination and Muscles	Will be able to: • 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	• 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.	**Assessment:** Nervous

When?	Knowledge	Understanding	Assessment
	• 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		Coordination and Muscles Test
Homeostasis	Will be able to: • Describe and explain the nature and importance of homeostasis	• Students should be able to interpret information relating to examples of negative and positive feedback.	**Assessment:** Energy and Ecosystem Test

When?	Knowledge	Understanding	Assessment
	• Distinguish between negative and positive feedback • Explain the roles of glucagon , insulin and adrenaline in regulating blood glucose levels • Descried 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.	• 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.	