

Year Group: 13	Subject: Biology	Term: Autumn 2021
Topic	Key Learning points	Assessment
<p>Populations and sustainability</p>	<p><i>End Point: To understand what a population of organisms is, the factors that affect them and how they can be conserved</i></p> <ul style="list-style-type: none"> • Define population, describe interactions between populations and recall factors the determine population size • Explain the significance of limiting factors on the carrying capacity of an environment • Define conservation and preservation and describe the difference between them • Explain the economic, social and ethical reasons for conservation of biological resources • Explain how management of ecosystems can provide resources in sustainable ways • Explain the management of environmental resources • Explain the effects of human activity on environmental resources 	<p>Students will be formatively assessed during each topic by past paper questions completed in lesson time.</p>
<p>Communication and homeostasis</p>	<p><i>End Point: To understand the principles behind how homeostasis is controlled in humans</i></p> <ul style="list-style-type: none"> • Define homeostasis as monitoring and responding to any deviation from the body's steady state • Describe the differences between receptors and effectors • Describe the differences between negative feedback and positive feedback. • Describe the need for communication systems in multicellular organisms. • Describe the need for response to changes in the internal and external environment. • Describe the communication between cells by cell signalling 	<ul style="list-style-type: none"> • Students will complete homework assignments as ongoing assessment of understanding. • Teachers will provide students with targeted feedback, based on their test performance.
<p>Hormonal control</p>	<p><i>End Point: To understand how the endocrine system works to regulate the temperature and blood glucose levels including what happens when blood glucose is not regulated</i></p> <ul style="list-style-type: none"> • Describe how the endocrine system communicates via secretion of hormones • Describe the structure and functions of the adrenal glands • Describe the physiological and behavioural responses involved in temperature control in endotherms • Describe behavioural responses involved in temperature control in ectotherms. • Describe the function and histology of the pancreas including hormones secreted. • Recall how blood glucose concentration is regulated • Describe how potassium channels and calcium channels in the beta cells of the pancreas control insulin secretion. • Describe the reasons for, causes and potential treatments of Type 1 and Type 2 diabetes mellitus 	
<p>Excretion as Homeostasis</p>	<p><i>End Point: To understand the structure of the kidney and its role in excretion linked to homeostasis and hormonal control</i></p> <ul style="list-style-type: none"> • Explain the importance of removing metabolic wastes from the body • Describe the gross structure and histology of the liver and link to function • Describe the roles of the liver in storage of glycogen, detoxification and the formation of urea • Describe the gross structure and histology, mechanisms of action and functions of the kidney • Recall principles of homeostasis including negative feedback and effectors and receptors • Describe the control of the water potential of the blood • Describe the effects of kidney failure and its potential treatments 	

	<ul style="list-style-type: none"> • Explain how treatments such as dialysis and transplants can treat and cure kidney failure • Recall the structure and function of antibodies • Describe how excretory products can be used in medical diagnosis. • Explain how monoclonal antibodies can be used in diagnostic tests 	
<p style="text-align: center;">Animal Response</p>	<p><i>End Point: To understand how the nervous systems works to coordinate responses within the body</i></p> <ul style="list-style-type: none"> • Describe the effects of hormones and nervous mechanisms on heart rate • Investigate the impact of temperature on heart rate • Describe the structure of mammalian muscle and how nerve impulses are transmitted to muscles • Describe the sliding filament model of muscular contraction and the role of ATP • Explain how the supply of ATP is maintained in muscles by creatine phosphate • Describe the organisation and function of the mammalian nervous system • Explain the survival value of reflex actions with reference to knee jerk reflex and blinking reflex • Describe the structure of the human brain and the functions of its parts 	
<p style="text-align: center;">Patterns of inheritance</p>	<p><i>End Point: To understand how variations in DNA result in different types of variation, including how this can lead to different types of evolution and be manipulated by artificial selection.</i></p> <ul style="list-style-type: none"> • Describe the different types gene mutations and explain the possible effects of these mutations • Describe how mutations and sexual reproduction can lead to genetic variation within a species • Describe the difference between genetic and environmental factors and their effect on variation • Explain the process of genetic linkage and explain Sex linkage and genetic codominance • Analyse and create genetic diagrams to show patterns of inheritance • Use phenotypic ratios to identify linkage (autosomal and sex linkage) and epistasis • Use the chi- squared test to determine the significance of the difference between observed and expected results • Recall the process of evolution occurs due to natural selection and explain the factors that can affect evolution • Explain the role of isolating mechanisms in the evolution of new species • Explain the process of artificial selection and describe the uses of artificial selection in both plants and animals • Explain the importance of maintaining resources of genetic material for use in selective breeding • Evaluate the ethical issues surrounding the use of artificial selection • Use the Hardy- Weinberg principle to calculate allele frequencies in populations 	
<p style="text-align: center;">Cellular control</p>	<p><i>End Point: To understand the regulation of gene expression including examples of the Lac operon and Hox genes</i></p> <ul style="list-style-type: none"> • Describe that gene expression can be regulated in different ways • Explain control at a transcriptional level • Explain control at a post- transcriptional level • Describe the genetic control of the development of body plans in different organisms • Describe how the homeobox gene sequence is highly conserved within organisms • Explain the role of the Hox genes in control body plan development • Explain the importance of mitosis and apoptosis in controlling body form development 	