

Subject Curriculum Overview for Academic Year 2022/2023

Subject: A Level Biology		Subject Leader: Abigail Harker	Year Group: 13	AUTUMN TERM
Topic	Key Learning Points		Key Vocabulary	Assessments
Populations and sustainability	<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"> Understand interactions between populations and how factors determine population Understand the significance of limiting factors on the carrying capacity Understand the difference between conservation and preservation Understand how ecosystems are managed and maintained including the reasons why 		<ul style="list-style-type: none"> Population Interspecific Intraspecific Competition Preservation 	<p>Formative Assessment:</p> <ul style="list-style-type: none"> Teachers constantly assess students, (for example using questioning, mini-whiteboards, and short quizzes) and provide immediate verbal feedback during the lesson. <p>Summative Assessment:</p> <ul style="list-style-type: none"> Year 13 students have test weeks in late October, mid-December and internal mock exams in late February. <p>Homework and Independent study:</p> <ul style="list-style-type: none"> Student's complete tutorial questions for each topic, based on the content delivered in lesson and workshops where they apply their knowledge to exam-style questions. Students complete write up and discussion of practical work in their lab book.
Cellular control	<p><i>End Point: To understand the regulation of gene expression including examples</i></p> <ul style="list-style-type: none"> Describe that gene expression can be regulated in different ways Explain control at a transcriptional level and post-transcriptional level Understand how development of body plans in different organisms is controlled including the role of Hox genes, mitosis and apoptosis Understand why homeobox gene sequence is highly conserved within organisms 		<ul style="list-style-type: none"> Insertion Deletion Substitution Mutations Lac operon Transcription 	
Patterns of inheritance	<p><i>End Point: To understand how DNA results 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"> Understand gene mutations including their effects Explain the process of and use data to identify the appearance of genetic linkage, Sex linkage, genetic codominance and epistasis Understand and use the chi-squared test and the Hardy-Weinberg principle Understand the processes of natural selection, evolution and selective breeding 		<ul style="list-style-type: none"> Variation Monogenetic Dihybrid Multiple alleles Codominance Gene linkage Epistasis 	
Communication and homeostasis	<p><i>End Point: Understand the principles behind homeostasis and hormonal controls</i></p> <ul style="list-style-type: none"> Understand and analyse the structure, roles and processes of the kidney and liver Know the processes of negative and positive feedback and their role in homeostasis Understand the processes of temperature, glucose and water level control Understand structure and function of the endocrine system including examples 		<ul style="list-style-type: none"> Hormone Endocrine system Excretion Homeostasis 	
Animal responses and neuronal communication	<p><i>End Point: To understand the different ways animal responses are coordinated how these processes can be investigated</i></p> <ul style="list-style-type: none"> Understand the structure, organisation and function of the nervous system Understand how hormones and the nervous system work to coordinate the heart and how this can be investigated Understand the structure of muscles and how they function including the role of the nervous system Understand the processes that occur in the nervous system including synaptic transmission, action potential, reflexes and responses 		<ul style="list-style-type: none"> Peripheral nervous system (NS) Autonomic NS Somatic NS Resting potential Action potential Synapse Pacinian corpuscle 	

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Plant responses	<p><i>End Point: To understand the different ways plant responses are coordinated how these processes can be investigated</i></p> <ul style="list-style-type: none"> Understand the different type of stimuli plants respond to Understand the different plant hormones including how they work and they're used commercially Understand how they role of different plant hormones can be investigated 		<ul style="list-style-type: none"> Geotropism Phototropism Auxin Gibberellin Apical dominance 	<p>Formative Assessment:</p> <ul style="list-style-type: none"> Teachers constantly assess students, (for example using questioning, mini-whiteboards, and short quizzes) and provide immediate verbal feedback during the lesson. <p>Summative Assessment:</p> <ul style="list-style-type: none"> Year 13 students have test weeks in late October, mid-December and internal mock exams in late February. <p>Homework and Independent study:</p> <ul style="list-style-type: none"> Student's complete tutorial questions for each topic, based on the content delivered in lesson and workshops where they apply their knowledge to exam-style questions. Students complete write up and discussion of practical work in their lab book.
Photosynthesis	<p><i>End Point: To understand the biochemical reaction of photosynthesis</i></p> <ul style="list-style-type: none"> Understand how ATP is made through oxidative phosphorylation Understand the structure and role of the chloroplast Understand the light-dependent reaction and light-independent reaction of photosynthesis. Understand the factors impacting photosynthesis and how these can be investigated 		<ul style="list-style-type: none"> Chloroplasts Photosynthetic pigments Photosynthesis Ribulose biphosphate 	
Respiration	<p><i>End Point: To understand the biochemical reaction of respiration</i></p> <ul style="list-style-type: none"> Understand the structure and role of the mitochondria Understand the processes of aerobic and anaerobic respiration including glycolysis, link reaction, Krebs cycle and the electron transport chain 		<ul style="list-style-type: none"> Glucose ATP Mitochondria Chemiosmosis 	
Cloning and biotechnology	<p><i>End Point: To understand the biochemical reaction of respiration</i></p> <ul style="list-style-type: none"> Understand how natural and artificial clones can form in animals and plants Understand how artificial clones can be used including the advantages and disadvantages of doing this Understand how microorganisms can be used and cultured including the factors that impact their growth and how these can be investigated Understand the uses and processes involved with immobilising enzymes 		<ul style="list-style-type: none"> Enucleation Clone Microorganism Closed Culture Fermentation Immobilised enzymes Aseptic technique 	
Manipulating genomes	<p><i>End Point: To understand how DNA is sequenced and it can be used in agriculture and medicine</i></p> <ul style="list-style-type: none"> Understand the processes of DNA profiling, DNA sequencing, Electrophoresis, genetic engineering and gene therapy Understand how the processes above can be used for both agricultural and medical use including the advantages and disadvantages for each 		<ul style="list-style-type: none"> DNA profiling Polymerase chain reactions Genome sequencing Gene therapy Genetic engineering 	

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Revision	<p><i>End point: To synthesise content taught over the last two years with exam technique. To use embedded routines for revision to consolidate key knowledge and ensure it can be retrieved in an exam setting.</i></p> <ul style="list-style-type: none"> • Students are guided to structure their revision • Students have access to a Lesson resources if they need to go back to the original source as well as past paper questions, full past papers for timed practice and extra resources such as a guided revision workbook. These should be used for practising recall. • To help structure their revision students are provided with an exemplar revision timetable and checklist of content. • Students are given a list of purchasable revision resources and class teachers will guide parents at parents evening to the ones that are most helpful for their child. • Students are guided to a wealth of online resources to help support their revision. For example: <ul style="list-style-type: none"> - SENECA - OAK Academy - Save my exams (OCR) • The morning of exams there are optional drop in sessions run by subject specialists focused on reinforcing key points for the specific exam of the day as well as boosting confidence. 	<p>Formative Assessment:</p> <ul style="list-style-type: none"> • Teachers constantly assess students, (for example using questioning, mini-whiteboards, and short quizzes) and provide immediate verbal feedback during the lesson. <p>Summative Assessment:</p> <ul style="list-style-type: none"> • Year 13 students have test weeks in late October, mid-December and internal mock exams in late February. <p>Homework and Independent study:</p> <ul style="list-style-type: none"> • Student's complete tutorial questions for each topic, based on the content delivered in lesson and workshops where they apply their knowledge to exam-style questions. • Students complete write up and discussion of practical work in their lab book. 		

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How parents can support learning in the subject this academic year

All students are provided with their own copy of a text book for home and study room use but there are a variety of other good resources available including revision note books and revision guides. Please contact your child's Biology Teacher if you would like any direction to appropriate resources that you could buy.

Students in the sixth form are set at least 6 hours of homework and independent study per week for each subject. In Biology A level this takes the form of:

- Tutorial questions
- Workshop booklets
- Lab book work
- Reviewing notes from lessons

Parents can support learning by ensuring that students use their free time effectively and are completing all of the homework and independent study. In the event that students are struggling with independent work it is helpful if the teacher can be contacted as soon as possible to enable them to support your child to catch up.

Recommended Reading

Please find below some suggested Science books/magazines/websites that students may find interesting. These are linked to the topics that are covered in school and so may extend and strengthen their knowledge but are primarily focused on instilling a sense of curiosity and wonder:

- Selfish Gene - Richard Dawkins
- Creation - Adam Rutherford
- Genome - Matt Ridley
- Pointing from the Grave - Samantha Weinberg
- The Immortal Life of Henrietta Lacks - Rebecca Skloot
- A Crack in Creation - Jennifer Doudna
- Pandemic 1918 - Catharine Arnold
- The Telomere Effect - Elizabeth Blackburn
- Bad Pharma - Ben Goldacre

Points to note

Biology A level is assessed using three written exams at the end of Y13.

1. Paper 1 makes up 37% of the final grade is 2hr 15min long and includes information from modules 1,2,3 and 5, 10% of which will be math-based skill questions.
2. Paper 2 makes up 37% of the final grade is 2hr 15min long and includes information from modules 1,2,4 and 6, 10% of which will be math-based skill questions.
3. Paper 3 makes up 26% of the final grade is 1hr 30min long and includes more application questions with information from all modules required

The assessment of practical skills is a compulsory requirement of the course of study for A level Biology. It will appear on all students' certificates as a separately reported result, alongside the overall grade for the qualification. Students' practical work will be assessed by teachers, using common practical assessment criteria (CPAC) that are consistent across exam boards.