BIOLOGY CURRICULUM MAP: [AQA 7402]

Specific careers that utilise skills from **Biology** might include:

- Forensic Sciences
- Environmental Sciences
- Marine Biology
- Medicine, Nursing and Dentistry
- Veterinary Science
- Physiotherapy
- Pharmacy.

Opportunities for further study:
Biology can lead to both undergraduate and apprenticeship opportunities. Some courses include medicine, veterinary science, biomedical research, forensic science, environmental science, nutrition, physiotherapy and many more.

Students will be assessed on units 1 -4, the paper 1 exam. They will also be given a paper 2 and 3 paper on the topics they have studied so far.

Mock exams

Terms 1 and 2: Energy transfer and Genetics, and Populations

Teacher 1:
Students will continue with unit 5 focusing on the reactions in both aerobic and anaerobic respiration. They will then consider the transfer of energy between organisms and the impacts this has on productivity and farming.
Teacher 2:
Students will continue with unit 7 learning about population genetics and taking their knowledge of natural selection and evolution further. They will consider speciation and the interdependence of species. Finally they will study primary succession and the conservation of habitats.

Terms 3 and 4: Organisms responses and The control of gene expression

Teacher 1:
In unit 6 students will study nerve impulses and their role in reflexes, muscle coordination and control of heart rate. Students will also consider hormonal response in both the control of glucose levels and osmoregulation.
Teacher 2:
In unit 8 students learn about the regulation of transcription and translation; the importance of the epigenome. They will consider how DNA technologies are used in industry and consider a range of techniques including; PCR, gel electrophoresis and DNA fingerprinting. Students will then begin practicing the essay for paper 3.

Term 5: Revision

With both teachers, students will revise and refine exam technique. They will spend time here focusing on the essay and how to structure this, they will also continue with reactive and general revision with a focus on exam questions.

Further study and career pathways

Over the summer, students will review their knowledge from year one of the course and ensuring this is embedded ahead of year 13.

Students will be assessed on... Units 1 – 4 , the topics covered in the paper 1 exam.

Mock exams

Year 13

Terms 5 and 6: Photosynthesis and Inherited Change

Teacher 1:
Students will begin unit 5, they will learn about photosynthetic pigments and their role in both the light – dependent reaction and light – independent reaction.

Teacher 2:
Students will begin unit 7, they will learn a variety of mechanisms of inheritance including monohybrid, dihybrid, codominance, sex- linkage, autosomal linkage and epistasis.

Paper 2: Units 5 - 8

In this unit, students will study:

- Energy Transfer in and between organisms
- Organisms respond to changes in their environments
- Genetics, populations, evolution and ecosystems
- The control of gene expression

Terms 3 and 4: Exchange and Genetic Information

Teacher 1:
In unit 3 students will learn how different organisms exchange substances with their surroundings, looking at gas exchange in fish, mammals and insects; digestion; plant transport; haemoglobin and the circulatory system

Teacher 2:
In unit 4 students will learn about DNA and protein synthesis in eukaryotes and prokaryotes. They will go on to consider the role of mutations in selection. Finally, they will begin to look at diversity within communities and how biologists investigate this diversity.

KS5 trips and visits where possible:

- Sutton Courtenay Environmental Education Centre – Sampling Required Practical
- Using PCR to investigate human evolution workshop with Oxford Natural History Museum

Year 12

Paper 1: Units 1 - 4

In this unit, students will study:

- Biological molecules
- Cells
- Organisms exchanging substances with their environments
- Genetic information, variation and Relationships

Terms 1 and 2: Biological molecules and Cells

Teacher 1:
In unit 1 students will learning the structure of key biological molecules including, carbohydrates, lipids, proteins. They will explain the action of enzymes and enzyme inhibition. Finally, they will study DNA and DNA replication and its importance.
Teacher 2:
In unit 2students will learn how scientists study cells and their structure. They will gain a greater depth of understanding of the cell cycle. They will go further in their understanding of transport in cells focusing on diffusion, active transport, osmosis and co-transport. Finally, students will focus on the immune system and how this works to fight pathogens.

Non-Examined Assessment:

Throughout the two-year course students will complete 12 required practicals. These work to investigate the theory but also develop students' practical skills and techniques in science.

KS5 extra-curricular opportunities:

- Mentoring of lower years
- Clubs like A level Grade Booster

Year 13

Year 13 Terms 1 and 2: **Energy transfer and Genetics, and Populations**

Why this?

- Energy transfer will look at key reactions such as respiration that takes place in all living things and is a fundamental reaction in Biology.
- Genetics and populations, allows students to delve deeper into the evolution of species and how ecologists work to conserve species.

Why now?

- The energy transfer topic requires knowledge of cell transport and cell structure learnt in year 12.
- Genetics and populations requires students already have the knowledge of genetic diversity and selection that was learnt in year 12.

Year 13 Terms 3 and 4: **Organisms responses and The control of gene expression**

Why this?

- Organisms responses gives students a greater insight into the nervous system and the role of hormones in helping an organism to survive
- The control of gene expression highlights to students some uses of DNA in industry but begins to address the complexities in the regulation of gene expression.

Why now?

- The response topic relies on key knowledge on cell structure and transport that were discussed in year 12.
- The control of gene expression requires knowledge of DNA structure, and protein synthesis learnt in year 12.

Year 13 Terms 5: **Revision**

Why this?

Having encountered the full course, students practise exam technique and revision for the final few weeks before exams.

Why now?

All units have been covered: this part of the course will interleave knowledge and exam skills responsively to student need.

Year 12

Year 12 Terms 1 and 2: **Biological molecules and Cells**

Why this?

These two topics will introduce students to the fundamentals in Biology which will be integral for the future topics covered.

Why now?

- It bridges the gap between GCSE taking content they are familiar with but extending to an A level standard.
- The knowledge learnt will be required to allow understanding of future topics.
- Students will begin to develop their practical skills in readiness for the practical assessment of the course.

Year 12 Terms 3 and 4: **Exchange and Genetic Information**

Why this?

- Students will gain an insight into how organisms exchange with their environment allowing them to survive.
- Students will gain a greater depth of knowledge of the incredible processes taking place in our cells allowing them to function and driving selection.

Why now?

- The exchange topic requires knowledge of transport learnt in the cells' topic – without this the principles of exchange cannot be explained.
- The genetic information topic requires knowledge learnt both in cells and biological molecules - understanding of DNA structure and enzymes as well as protein production.

Year 12 Term 5 and 6: **Photosynthesis and Inherited Change**

Why this?

- Photosynthesis is an integral reaction in Biology that has allowed for the generation of biomass for all living things.
- Inherited change gives students a greater understanding of variation between individuals and how characteristics are inherited.

Why now?

- The photosynthesis reactions require knowledge of biological molecule and cell transport in order to explain the steps in these key reactions.
- The inherited change topic relies on the understanding from genetic information where students learnt how DNA is used as an information molecule.