Curriculum Map Year 12 - Biology (AS)

Topic Name	Term	Content / skills developed with link to NC / exam board subject content (if applicable)	Reflection on previous learning	Progress to future learning	Global Citizenship links	Qatar National Identity links
Molecules and Proteins (Unit 3 practical work embedded)	**1**	• Understand the importance of water as a solvent in transport, including its dipole nature • Understand how molecules can be synthesised • know the molecular structure of a globular protein and a fibrous protein and understand how their structures relate to their functions	**Year 11 - Diet and Health, DNA and Inheritance**	**Year 12 – Transport across membranes and membrane structure**	**PRIDE - Independence**	**Conscious thinking** about my **Health**
Transport (Unit 3 practical work embedded)	**1**	• Understand why many animals have a heart and circulation (mass transport to overcome the limitations of diffusion in meeting the requirements of organisms) • Understand the role of haemoglobin in the transport of oxygen and carbon dioxide	**Year 11 – Transport Across Membranes**	**Year 12, unit 2 – Cells and Development**	**PRIDE - Perseverance**	**Conscious thinking** about my **Health**
Diet and Health (Unit 3 practical work embedded)	**1**	• Understand how people use scientific knowledge about the effect of diet and the risks of CVD	**Year 11 – Diet and Health**	**Year 13 – Energy, Microbiology**	**PRIDE - Responsibility**	**Conscious thinking** about my **Health**

		• Be able to analyse and interpret quantitative data on illness and mortality rates to determine health risks, including distinguishing between correlation and causation and recognising conflicting evidence		**and Immunity, Statistical tests**		**Conscious thinking** about my **Future**
Membranes (Unit 3 practical work embedded)	**1**	• Know the structure and properties of cell membranes and understand how models such as the fluid mosaic model of membrane structure are interpretations of data used to develop scientific explanations of the structure and properties of cell membranes • Understand the involvement of carrier and channel proteins in membrane transport	**Year 11 – Cell Structure and Transport**	**Year 13 - Immunity**	**PRIDE - Dedication**	
DNA and Gene Expression (Unit 3 practical work embedded)	**1**	• know the basic structure of mononucleotides and the structures of DNA and RNA • understand how Meselson and Stahl's classic experiment provided new data that	**Year 11 – DNA and Inheritance**	**Year 13 – Gene Technology**	**PRIDE - Responsibility**	**Conscious thinking** about my **Health**

		supported the accepted theory of replication of DNA and refuted competing theories • understand the nature of the genetic code (triplet code, non-overlapping and degenerate) • Understand how the expression of a gene mutation in people with cystic fibrosis impairs the functioning of the gaseous exchange, digestive and reproductive systems				
Cell Structure (Unit 3 practical work embedded)	**2**	• Know the ultrastructure of eukaryotic cells, including nucleus, nucleolus, ribosomes, rough and smooth endoplasmic reticulum, mitochondria, centrioles, lysosomes and Golgi apparatus and understand their functions • Know the ultrastructure of prokaryotic cells, including cell wall, capsule, plasmid, flagellum, pili, ribosomes and circular DNA and understand their functions	**Year 11 – Cells and Their Structure**	**Year 13 – Microbiology and Immunity**	**PRIDE - Independence**	**Conscious thinking** about my **Health** **Conscious thinking** about my **Future**

Reproduction (Unit 3 practical work embedded)	**2**	• Understand how mammalian gametes are specialised for their functions • Know the process of fertilisation in mammals, including the acrosome reaction, the cortical reaction and the fusion of nuclei • Know the process of fertilisation in flowering plants, starting with the growth of a pollen tube and ending with the fusion of nuclei	**Year 11 – Reproduction and Inheritance**	**Year 13 – Gene Technology**	**PRIDE - Responsibility**	**Conscious thinking** about my **Future** **Conscious thinking** about my **Family**
Development (Unit 3 practical work embedded)	**2**	• Understand how some phenotypes are affected by multiple alleles for the same gene, or by polygenic inheritance, as well as the environment, and how polygenic inheritance can give rise to phenotypes that show continuous variation • Understand how cells become specialised through differential gene expression, producing active mRNA, leading to the synthesis of proteins which, in turn, control cell processes or	**Year 11 - Inheritance**	**Year 13 – Gene Expression**	**PRIDE Engagement**	**Conscious thinking** about my **Family**

		determine cell structure in animals and plants				
Plant Structure and Function (Unit 3 practical work embedded)	**2**	• Know the structure and ultrastructure of plant cells including cell wall, chloroplast, amyloplast, vacuole, tonoplast, plasmodesmata, pits and middle lamella and be able to compare it with animal cells and understand their functions • Know the similarities and differences between the structures of, the position in the stem, and the function of sclerenchyma fibres (support), xylem vessels (support and transport of water and mineral ions) and phloem (translocation of organic solutes)	**Year 11 – Plant cells**	**Year 13 – Ecology and Biodiversity**	**PRIDE - Responsibility**	**Conscious thinking** about my **Actions** **Conscious thinking** about my **Environment**
Biodiversity and Conservation (Unit 3 practical work embedded)	**2**	• Know how biodiversity can be measured within a habitat using species richness, and within a species using genetic diversity by calculating the heterozygosity index • Understand how the Hardy-Weinberg	**Year 11 - Ecology**	**Year 13 - Biodiversity**	**PRIDE - Responsibility**	**Conscious thinking** about my **Environment**

		equation can be used to see whether a change in allele frequency is occurring in a population over time • Be able to evaluate the methods used by zoos and seed banks in the conservation of endangered species and their genetic diversity, including scientific research, captive breeding programmes, reintroduction programmes and education				