



Curriculum Map for Triple Science Biology Year 11

YEAR 11	Autumn 1	Autumn 2
Topics	Homeostasis In Action Reproduction	Variation & Evolution Genetics & Evolution
Substantive Knowledge – The Knowledge and Content Taught By The Teacher	<ul style="list-style-type: none">Students continue on from Year 10 by looking at homeostasis and the regulation of body temperature.They will learn how the body uses the kidney to remove waste products and how to replicate the kidney outside of the body before transplant by using dialysis.In the reproduction topic, students learn about the different types of reproduction (sexual and asexual) and how DNA links into what makes us who we are.They will also learn about inherited disorders and how we can screen for them and the ethics behind this.	<ul style="list-style-type: none">Student will lead on from looking at genetics to learning about variation and evolution in detail.Students will learn about how humans can intervene in this to our advantage with selective breeding, genetic engineering and cloning, along with the ethics surrounding these.
Disciplinary Knowledge – The Knowledge Scientists Need So They Can Collect, Understand and Evaluate Scientific Evidence	<ul style="list-style-type: none">Development and Discovery of DNADevelopment of Treating Kidney DisordersDevelopment of Discovering and Treating Genetic Disorders	<ul style="list-style-type: none">Theories of Evolution and Evidence of EvolutionCloning and its Development Over TimeGenetic Engineering and it's Development Over TimeSelective Breeding and it's Development Over Time
Skills	<ul style="list-style-type: none">Showing why issues around contraception cannot be answered by science alone.Explaining every day and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and argument.Understanding how the developments of microscopy techniques have enabled IVF treatments to develop.Understanding social and ethical issues associated with IVF treatments.Evaluating from the perspective of patients and doctors the methods of treating infertility.	<ul style="list-style-type: none">Modelling behaviour of chromosomes during meiosis.The historical developments of our understanding of the causes and prevention of malaria.Interpreting a diagram of DNA structure but will not be required to reproduce it.Appreciating that embryo screening and gene therapy may alleviate suffering but consider the ethical issues which arise.Explaining the benefits and risks of selective breeding given appropriate information and consider related ethical issues.Interpreting information about genetic engineering techniques and to make informed judgements about issues

	<ul style="list-style-type: none"> Modelling insertions and deletions in chromosomes to illustrate mutations 	concerning cloning and genetic engineering, including GM crops.
Links To Prior Learning	<ul style="list-style-type: none"> DNA Introduction covered in Year 8 	<ul style="list-style-type: none"> Genetic Engineering covered briefly in Year 8
Literacy/ Numeracy	<ul style="list-style-type: none"> Calculations in Cell Division Graph Reading Skills Key Word Literacy Literacy - Structuring Ethical Arguments and Evaluations 	<ul style="list-style-type: none"> Calculations in Cell Division Graph Reading Skills Key Word Literacy Literacy - Structuring Ethical Arguments and Evaluations
Cross Curricular	<ul style="list-style-type: none"> Philosophy & Ethics - The Ethics Surrounding Transplants PSCHE - Sexual Reproduction History - Discovering DNA and Medicine Through Time 	<ul style="list-style-type: none"> History - Evolution and Natural Selection Philosophy & Ethics - Creationism Versus Evolution
Assessment	<ul style="list-style-type: none"> Homeostasis and Response Assessment 	<ul style="list-style-type: none"> Various Tests Throughout the Unit

YEAR 11	Spring 1	Spring 2
Topics	Genetics & Evolution Adaptations, Interdependence & Competition	Adaptations, Interdependence & Competition
Substantive Knowledge – The Knowledge and Content Taught By The Teacher	<ul style="list-style-type: none"> Students will follow on from evolution by looking at the evidence for evolution - fossils and antibiotic resistance. They will learn how we classify organisms into different categories and why this is important. Students then start to look into our final overarching topic of ecology, linking all the previous topics together and focussing on field work and investigation techniques. 	<ul style="list-style-type: none"> Students will learn about competition and adaptation in plants and animals, and how this helps them to survive in various conditions and situations.
Disciplinary Knowledge – The Knowledge Scientists Need So They Can Collect, Understand and Evaluate Scientific Evidence	<ul style="list-style-type: none"> Evidence of evolution, the theories surrounding evolution and how they have developed. Changes in antibiotic resistance over time. Development of the classification systems. 	<ul style="list-style-type: none"> Theories of adaptation linking to evolution and the changes over time.
Skills	<ul style="list-style-type: none"> Using the theory of evolution by natural selection in an explanation. How the theory of speciation has developed over time. How our current understanding of genetics has developed over time. 	<ul style="list-style-type: none"> Appreciating that the theory of evolution by natural selection developed over time and from information gathered by many scientists. Recording first-hand observations of organisms.

	<ul style="list-style-type: none"> The data now available to support the theory of evolution. Appreciating why the fossil record is incomplete. 	<ul style="list-style-type: none"> Extracting and interpreting information from charts, graphs and tables.
Links To Prior Learning	<ul style="list-style-type: none"> Extinction and Classification briefly introduced in Year 8. 	<ul style="list-style-type: none"> Adaptations and Competition introduced in Primary School and Year 7
Literacy/ Numeracy	<ul style="list-style-type: none"> Calculations Around Antibiotic Resistance Distribution Data Collection and Graphs Recording of Data and its Analysis Literacy - Structuring a Time Line and Developing Key Word Usage. 	<ul style="list-style-type: none"> Graph Reading Skills Regarding Competition Literacy - Developing a Synoptic Response
Cross Curricular	<ul style="list-style-type: none"> Geography - Fossil Creation Maths - Collecting Data 	<ul style="list-style-type: none"> Geography - Competition and Adaptation Art - Animal and Plant Adaptation Drawings
Assessment	<ul style="list-style-type: none"> Assessment on Inheritance, Variation and Evolution 	<ul style="list-style-type: none"> End of Topic Questions

YEAR 11	Summer 1	
Topics	Organising An Ecosystem Biodiversity & Ecosystem	
Substantive Knowledge – The Knowledge and Content Taught By The Teacher	<ul style="list-style-type: none"> Students will link together the ecology unit and look at the nutrient cycles and the impact of change on the environment. They will learn how certain factors can affect the food production in the world and how we can create sustainable food production throughout all countries. 	
Disciplinary Knowledge – The Knowledge Scientists Need So They Can Collect, Understand and Evaluate Scientific Evidence	<ul style="list-style-type: none"> Development of predator prey relationships and how they change over time. Global warming theories and how we are changing the planet. Managing biodiversity. 	
Skills	<ul style="list-style-type: none"> Interpreting graphs used to model predator-prey cycles. Interpreting and explain the processes in diagrams of the carbon cycle and the water cycle. Explaining how waste, deforestation and global warming have an impact on biodiversity. Understanding the conflict between the need for cheap available compost to increase food production and the need to conserve peat bogs and peatlands as habitats for biodiversity and to reduce carbon dioxide emissions. Understanding that the scientific consensus about global warming and climate change is based on systematic reviews of thousands of peer reviewed publications. Explaining why evidence is uncertain or incomplete in a complex context. 	

	<ul style="list-style-type: none"> • Interpreting population and food production statistics to evaluate food security. • Understanding that some people have ethical objections to some modern intensive farming methods. • Evaluating the advantages and disadvantages of modern farming techniques.
Links To Prior Learning	<ul style="list-style-type: none"> • Feeding Relationships covered in Year 7 • Carbon Cycle covered in Year 8
Literacy/ Numeracy	<ul style="list-style-type: none"> • Calculations of Decay Rates • Graph Reading on Impact of Change • Literacy - Writing an Ethical Argument based on Two Sides to a Story. This will incorporate research techniques and evaluation skills to develop a logical conclusion.
Cross Curricular	<ul style="list-style-type: none"> • Geography - Global Warming and Carbon Cycle • PSCHÉ - Impact of Change on the World
Assessment	<ul style="list-style-type: none"> • Assessment on Ecology