



What have I done previously in my learning journey?				
Previously....	You have learnt previously about cells, reproduction and inheritance. This has involved: - Describing cells as the fundamental units of living organisms and explaining how genetic information is stored within the nucleus. - Explaining the functions of chromosomes, genes and DNA in inheritance. - Describing how characteristics can be inherited from parents and how variation occurs within a species. - Comparing sexual and asexual reproduction and explaining how reproduction contributes to variation and continuity of species. - Describing the role of cell division in growth, repair and reproduction. - Explaining how adaptations help organisms survive and reproduce in their environment. - Describing simple models of natural selection, evolution and the importance of biodiversity. - Using scientific evidence to explain inheritance, variation and the relationships between living organisms.			
In this topic...	You will learn about inheritance, variation and evolution, including how genetic information is passed from one generation to the next through DNA, genes and chromosomes. You will study sexual and asexual reproduction, the differences between mitosis and meiosis, and how genetic diagrams can be used to predict inheritance patterns. You will explore how variation arises within populations, how selective breeding and genetic engineering can be used to alter characteristics, and how evolution by natural selection explains the development of species over time. You will also learn how fossils provide evidence for evolution, how antibiotic resistance develops, and how modern classification systems are used to organise living organisms based on evolutionary relationships. This topic develops your ability to analyse scientific evidence, interpret genetic information and evaluate the social, ethical and biological implications of advances in genetics and biotechnology.			
We will develop our learning by studying the following each lesson:		British Values	RAG	Skills in Science checklist
B6.01 DNA - Define genome, chromosome, gene and DNA. - Describe the structure of DNA. - Discuss the importance of studying the human genome.		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect		☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
B6.02 Reproduction - Describe the difference between sexual and asexual reproduction. - Explain the difference between mitosis and meiosis.		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect		☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
B6.03 Mitosis V Meiosis - Describe the difference between sexual and asexual reproduction. - Explain the difference between mitosis and meiosis.		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect		☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
B6.04 Sex determination and genetic diagrams - Define and use the terms: gametes, genotype, phenotype, dominant recessive, homozygous and heterozygous. - Complete a Punnett square to show the outcomes of genetic crosses.		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect		☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
B6.05 Embryo Screening and Family Trees Describe what embryo screening is and used for		☐ Democracy ☐ Rule of law ☐ Tolerance		☐ Development of scientific thinking ☐ Experimental skills and strategies



Discuss ideas and opinions about the economic, social and ethical issues concerning embryo screening.	☐ Individual liberty ☐ Mutual respect	☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
B6.06 Variation - Classify characteristics as being due to genetic, environmental or a combination of these causes. - Give examples of continuous and discontinuous variation. - Decide the best way to present information about variation in tables and charts.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
B6.07 Selective Breeding - Explain why humans selectively breed plants and animals. - Describe the process of selective breeding and give examples. - Explain the benefits and risks of selective breeding in plants and animals.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
B6.08 Genetic Engineering - Define the term genetic engineering. - Explain advantages and disadvantages of genetic engineering. - Evaluate the use of genetic engineering.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
B6.09 Evolution - Describe Darwin's theory of evolution by natural selection. - Describe the main stages of natural selection. - Define the term mutation. - Explain why mutation may lead to more rapid change in a species.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
B6.10 Fossils - Define the term 'fossil'. - Describe how fossils may be formed. - Explain why scientists cannot be certain how life began on Earth. - Explain how fossils provide evidence for evolution.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
B6.11 Antibiotic Resistance - State why bacteria evolve rapidly. - Explain how antibiotic resistance develops by natural selection. - Discuss how we can reduce the development of antibiotic-resistant strains.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
B6.12 Classification - Use the binomial system. - Explain why the classification system has changed. - Interpret evolutionary trees.	☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills

Key Vocabulary

DNA	Gene	Chromosome	Evolution	Selective breeding	Genetic engineering	Nucleotide	Base	Phosphate	Complimentary
Homozygous	heterozygous	Classification	Meiosis	Mitosis	Sexual reproduction	Asexual reproduction	Phenotype	Genotype	Punnett square



Inherited	Genetic	Variation	Fossils	Antibiotic resistance	Mutation	Nucleic acid			
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Future Learning	<u>Biodiversity</u> • Classification is a means of organising the variety of life based on relationships between organisms and is built around the concept of species. • Originally classification systems were based on observable features but more recent approaches draw on a wider range of evidence to clarify relationships between organisms • Adaptation and selection are major factors in evolution and make a significant contribution to the diversity of living organisms.
	<u>Genetics and Evolution</u> • Transfer of genetic information from one generation to the next can ensure continuity of species or lead to variation within a species and possible formation of new species. • Reproductive isolation can lead to accumulation of different genetic information in populations potentially leading to formation of new species. • Sequencing projects have read the genomes of organisms ranging from microbes and plants to humans. This allows the sequences of the proteins that derive from the genetic code to be predicted . • Gene technologies allow study and alteration of gene function in order to better understand organism function and to design new industrial and medical processes.
In careers	Careers in genetic engineering and biotechnology have helped us to develop new drugs and predict inherited disorders. This research helps us to assess medical risks and develop new technology.