



| What have I done previously in my learning journey? | | |
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| Previously.... | <p><u>Structure and Function of Living Organisms - Cells and Organisation</u></p> <ul style="list-style-type: none"> The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts <p><u>Genetics and Evolution - Inheritance, Chromosomes, DNA and Genes</u></p> <ul style="list-style-type: none"> Heredity as the process by which genetic information is transmitted from one generation to the next A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. Differences between species The variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation . The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction . The importance of maintaining biodiversity and the use of gene banks to preserve hereditary material. | |
| In this topic... | <p>You will learn more about inheritance, variation, and evolution. This will include learning about:</p> <ul style="list-style-type: none"> Selective breeding and genetic engineering Evolution and how species have evolved over time. The modern classification system and how new species are classified. How to predict the outcome of a genetic cross diagram and Punnet Square diagram. | |
| We will develop our learning by studying the following each lesson: | | RAG |
| | | Skills in Science checklist |
| B6.01 DNA | <ul style="list-style-type: none"> Define the term 'clone' Describe sexual reproduction in animals and plants Explain why sexual reproduction produces variation in the offspring but asexual reproduction does not | <input type="checkbox"/> Scientific Methods <input type="checkbox"/> Practical <input type="checkbox"/> Number skills <input type="checkbox"/> Application <input type="checkbox"/> Communication |
| B6.02 Reproduction | <ul style="list-style-type: none"> Describe the difference between sexual and asexual reproduction. Explain the difference between mitosis and meiosis. | <input type="checkbox"/> Scientific Methods <input type="checkbox"/> Practical <input type="checkbox"/> Number skills <input type="checkbox"/> Application <input type="checkbox"/> Communication |
| B6.03 Mitosis V Meiosis | <ul style="list-style-type: none"> Describe the difference between sexual and asexual reproduction. Explain the difference between mitosis and meiosis. | <input type="checkbox"/> Scientific Methods <input type="checkbox"/> Practical <input type="checkbox"/> Number skills <input type="checkbox"/> Application |
| B6.04 Sex determination and genetic diagrams | <ul style="list-style-type: none"> Define and use the terms: gametes, genotype, phenotype, dominant recessive, homozygous and heterozygous. Complete a Punnett square to show the outcomes of genetic crosses. | <input type="checkbox"/> Scientific Methods <input type="checkbox"/> Practical <input type="checkbox"/> Number skills <input type="checkbox"/> Application <input type="checkbox"/> Communication |
| B6.05 Embryo Screening and Family Trees | <ul style="list-style-type: none"> Describe what embryo screening is and used for Discuss ideas and opinions about the economic, social and ethical issues concerning embryo screening. | <input type="checkbox"/> Scientific Methods <input type="checkbox"/> Practical <input type="checkbox"/> Number skills <input type="checkbox"/> Application <input type="checkbox"/> Communication |
| B6.06 Variation | <ul style="list-style-type: none"> 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. | <input type="checkbox"/> Scientific Methods <input type="checkbox"/> Practical <input type="checkbox"/> Number skills <input type="checkbox"/> Application <input type="checkbox"/> Communication |
| B6.07 Selective Breeding | <ul style="list-style-type: none"> 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. | <input type="checkbox"/> Scientific Methods <input type="checkbox"/> Practical <input type="checkbox"/> Number skills <input type="checkbox"/> Application <input type="checkbox"/> Communication |
| B6.08 Genetic Engineering | <ul style="list-style-type: none"> Define the term genetic engineering. Explain advantages and disadvantages of genetic engineering. Evaluate the use of genetic engineering. | <input type="checkbox"/> Scientific Methods <input type="checkbox"/> Practical <input type="checkbox"/> Number skills <input type="checkbox"/> Application <input type="checkbox"/> Communication |



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| <p>B6.09 Evolution</p> <ul style="list-style-type: none"> ● 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. | | <input type="checkbox"/> Scientific Methods <input type="checkbox"/> Practical <input type="checkbox"/> Number skills <input type="checkbox"/> Application <input type="checkbox"/> Communication |
| <p>B6.10 Fossils</p> <ul style="list-style-type: none"> ● 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. | | <input type="checkbox"/> Scientific Methods <input type="checkbox"/> Practical <input type="checkbox"/> Number skills <input type="checkbox"/> Application <input type="checkbox"/> Communication |
| <p>B6.11 Antibiotic Resistance</p> <ul style="list-style-type: none"> ● State why bacteria evolve rapidly. ● Explain how antibiotic resistance develops by natural selection. ● Discuss how we can reduce the development of antibiotic-resistant strains. | | <input type="checkbox"/> Scientific Methods <input type="checkbox"/> Practical <input type="checkbox"/> Number skills <input type="checkbox"/> Application <input type="checkbox"/> Communication |
| <p>B6.12 Classification</p> <ul style="list-style-type: none"> ● Use the binomial system. ● Explain why the classification system has changed. ● Interpret evolutionary trees. | | <input type="checkbox"/> Scientific Methods <input type="checkbox"/> Practical <input type="checkbox"/> Number skills <input type="checkbox"/> Application <input type="checkbox"/> Communication |

Key Vocabulary

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|---------------|---------------|--------------|----------------|--------------------|---------------------|-----------------------|----------------------|--------------|
| DNA | Gene | Chromosome | Evolution | Selective breeding | Genetic engineering | Nucleotide | Base | Phosphate |
| Complimentary | Homozygous | heterozygous | Classification | Meiosis | Mitosis | Sexual reproduction | Asexual reproduction | Phenotype |
| Genotype | Punnet square | Inherited | Genetic | Variation | Fossils | Antibiotic resistance | Mutation | Nucleic acid |

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| <p>Future Learning</p> | <p><u>Biodiversity</u></p> <ul style="list-style-type: none"> ● 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. <p><u>Genetics and Evolution</u></p> <ul style="list-style-type: none"> ● 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. |
| <p>In careers</p> | <p>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.</p> |