Learning Journey – Year 11 – B6 Inheritance, Variation, and Evolution CS

What have I done previously in my learning journey?	
Previously….	Structure and Function of Living Organisms - Cells and Organisation • The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts Genetics and Evolution - Inheritance, Chromosomes, DNA and Genes • 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…	You will learn more about inheritance, variation, and evolution. This will include learning about: • 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 • Define genome, chromosome, gene and DNA. • Describe the structure of DNA. • Discuss the importance of studying the human genome.		☐ Scientific Methods ☐ Practical ☐ Number skills ☐ Application ☐ Communication
B6.02 Reproduction • Describe the difference between sexual and asexual reproduction. • Explain the difference between mitosis and meiosis.		☐ Scientific Methods ☐ Practical ☐ Number skills ☐ Application ☐ Communication
B6.03 Mitosis V Meiosis • Describe the difference between sexual and asexual reproduction. • Explain the difference between mitosis and meiosis.		☐ Scientific Methods ☐ Practical ☐ Number skills ☐ Application
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.		☐ Scientific Methods ☐ Practical ☐ Number skills ☐ Application ☐ Communication
B6.05 Embryo Screening and Family Trees • Describe what embryo screening is and used for • Discuss ideas and opinions about the economic, social and ethical issues concerning embryo screening.		☐ Scientific Methods ☐ Practical ☐ Number skills ☐ Application ☐ Communication
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.		☐ Scientific Methods ☐ Practical ☐ Number skills ☐ Application ☐ Communication
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.		☐ Scientific Methods ☐ Practical ☐ Number skills ☐ Application ☐ Communication
B6.08 Genetic Engineering • Define the term genetic engineering. • Explain advantages and disadvantages of genetic engineering. • Evaluate the use of genetic engineering.		☐ Scientific Methods ☐ Practical ☐ Number skills ☐ Application ☐ Communication

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.

	☐ Scientific Methods ☐ Practical ☐ Number skills ☐ Application ☐ Communication

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.

	☐ Scientific Methods ☐ Practical ☐ Number skills ☐ Application ☐ Communication

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.

	☐ Scientific Methods ☐ Practical ☐ Number skills ☐ Application ☐ Communication

B6.12 Classification
- • Use the binomial system.
- • Explain why the classification system has changed.
- • Interpret evolutionary trees.

	☐ Scientific Methods ☐ Practical ☐ Number skills ☐ Application ☐ Communication

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	Punnet square	Inherited	Genetic	Variation	Fossils	Antibiotic resistance	Mutation	Nucleic acid

Future Learning	Biodiversity • 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. Genetics and Evolution • 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.