Year 11
Subject: Biology
Topic/Unit: Topic 6: Inheritance, Variation, and Evolut
When: Autumn Term (approx. 8 weeks)

Huntington School
Learn and succeed

Overview: Why this? Why now?
This unit explores how biological information is passed between generations and how this process drives the diversity of life on Earth. Having previously studied cell biology and mitosis, students are now prepared to understand the complexities of **meiosis**, **genetic inheritance**, and the molecular structure of **DNA**. This knowledge is fundamental for evaluating modern scientific advancements, such as genetic engineering and cloning, and for understanding the history of life through evolution.

Building on...building to:
This unit builds on prior knowledge of **mitosis**, cell structures (ribosomes and nuclei), and basic digestion (proteins). It provides the essential theoretical foundation for **Topic 7 (Ecology)**, specifically regarding biodiversity, food security, and the role of biotechnology in modern society.

Sequence summary:
- **Reproduction and Genetics:** Comparison of sexual and asexual reproduction, the process of meiosis, and the importance of the **genome** for medicine and tracing human migration.
- **DNA Structure (HT):** The discovery and structure of the **double helix**, nucleotides, and the stages of **protein synthesis**.
- **Inheritance:** Using **Punnett squares** to predict offspring characteristics (genotype and phenotype) and understanding inherited disorders like **cystic fibrosis** and **polydactyly**.
- **Evolution:** Exploring the theories of **Darwin**, **Wallace**, and **Lamarck**, including natural selection and the formation of new species (speciation).
- **The History of Life:** Examining the **fossil record**, causes of **extinction**, and the rise of **antibiotic-resistant bacteria** like MRSA.
- **Human Intervention:** Evaluating the benefits and risks of **selective breeding**, **genetic engineering**, and **cloning** (including adult cell cloning).
- **Classification:** Moving from the traditional Linnaean system to the modern **three-domain system**.

Key Vocabulary: Gamete, genome, allele, homozygous, heterozygous, genotype, phenotype, natural selection, speciation, and nucleotide.

Assessments:
- **Formative:** Regular "Recall Quizzes" at the start of lessons and mini-whiteboard activities to check understanding of cell division.
- **Summative:** End-of-unit test using **Past Exam Questions (PEQs)** and a Dedicated Feedback Task (DFT) comparing evolutionary theories.

Able and interested:
Higher Tier students will complete extended work on **protein synthesis** and the functional effects of **mutations** in coding and non-coding DNA. They will also explore the complexities of **gene therapy**.
Inclusion, Personal Development and Wider Skills: Students will develop **critical thinking** by debating the ethical, social, and economic issues surrounding **embryo screening** and the use of **Genetically Modified (GM) crops**.

Homework and Independent Learning:
Students will complete a task set on the SPARX online platform. The task is based on the current topic but also includes consolidation on previous topics. It will automatically adjust the level of challenge as the student complete the activities. Teachers may also set consolidation and revision activities.