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| **YEAR \_\_\_\_ 2023-2024\_\_\_\_\_ TERM: Spring 1**  **‘An ambitious curriculum that meets the needs of all’**  **Medium Term Planning - Topic: DNA & Inheritance** | |
| **Curriculum Intent** | **In addition to working further on objectives from KS3 Variation, Human Reproduction, Inheritance and KS4 Topic 1 Cell Structure & Transport, pupils will be taught, following National Curriculum guidelines, the following in this topic:**   * the characteristics of a living organism are influenced by its genome and its interaction with the environment * the genome as the entire genetic material of an organism * how the genome, and its interaction with the environment, influence the development of the phenotype of an organism * the potential impact of genomics on medicine * most phenotypic features being the result of multiple, rather than single, genes * single gene inheritance and single gene crosses with dominant and recessive phenotypes * sex determination in humans |
| **Skills/National Curriculum Links** |
| **Spiritual, moral, social, and cultural development** | **SMSC:** Sexual reproduction, inheritance of genetic diseases,  **PSHE/British Values:**  Sexual reproduction  **Skills Builder:** Debate, ethics of genetic screening |
| **Numeracy** | Calculations in this topic include the ratio of phenotypes and genotypes in genetic crosses. |
| **Literacy** | **Vocabulary Tier 2:** sperm, egg, embryo, characteristic, Bio only: complementary,  **Vocabulary Tier 3:** Chromosome, DNA, gene, allele, genome, dominant, recessive, homozygous, heterozygous, genotype, phenotype, polydactyly, Bio only: nucleotide, base  **Reading:** Students are given opportunity to develop their skills in specified tasks that develop disciplinary literacy. Throughout the GCSE Biology and Combined Science course they develop their understanding of the requirements of exam questions and the key terminology in questions. In addition, they read practical methodology and translate this to actions in laboratory tasks.  **Writing:** Students construct answers independently and through class teaching. Their answers range from single word answers to the planning and writing of 6-mark “extended writing” tasks that require linking of multiple concepts from a topic. These often develop students’ ability to construct written evaluations of contrasting situations, where the use of comparative connectives are required.  **Oracy:** Students are regularly given the opportunity to practice their scientific vocabulary in class discussion, through choral response and in giving instruction to others during practical activities. |
| **Becoming future ready** | **Careers/Employability:** Opportunity for development of communication, teamwork, and manual dexterity in the completion of practical activities (Required Practicals in testing for carbohydrates, proteins and lipids and measuring the effect of pH on amylase activity) |
| **Adaptation** | Throughout this topic, quality first teaching will provide differentiation:  **By product:** Assessments have opportunities for students to achieve all grades, with structured questions and opportunities for development of extended writing for all abilities.  **By resource:** Booklets are differentiated as appropriate, with ‘foundation’ booklets produced in conjunction with class teachers for students who would benefit from additional scaffolding of resources in order to achieve their potential.  **By Intervention**: by providing different levels of supervision and support, including the specific deployment of teaching assistants within lessons.  **By Progressive Questioning:** exploring pupils’ understanding through interactive dialogue.  **By Grouping:** according to prior attainment, gender, social preference.  **By Task:**Pupils should be involved in the identification of targets which are meaningful to them and in the selection of an appropriate task from the given range.  **By Offering Optional Activities:** In class or as homework, to extend learning.  This QFT/SEND provision will be explicit within the lesson-by-lesson schemes of work. |
| **QFT/SEND Provision** |
| **Implementation**  **Curriculum Delivery** | To be able to:  6.1.4.a I can describe the structure of DNA and its role in storing genetic information inside the cell  6.1.4.b I can explain the term 'genome' and the importance of the human genome  6.1.6.a I can describe how characteristics are controlled by one or more genes, including examples  6.1.6.b I can explain important genetic terms: gamete, chromosome, gene, allele, dominant, recessive, homozygous, heterozygous, genotype and phenotype  6.1.6.c I can understand and use Punnett square diagrams, genetic crosses and family trees  6.1.6.d (HT) I can construct a Punnett square diagram to predict the outcome of a monohybrid cross  6.1.7.a I can describe cystic fibrosis and polydactyly as examples of inherited disorders  6.1.7.b I can evaluate social, economic and ethical issues concerning embryo screening when given appropriate information  6.1.8.a I can describe how the chromosomes are arranged as 23 pairs in body cells, including the function of the sex chromosomes  6.1.8.b I can explain how sex is determined and carry out a genetic cross to show sex inheritance  *6.1.5.a (Biology only) I can describe the structure of DNA, including knowledge of nucleotide units*  *6.1.5.b (HT Biology only) I can explain complementary base pairing in DNA*  *6.1.5.c (Biology only) I can explain the relationship between DNA bases, amino acids and proteins*  *6.1.5.d (HT Biology only) I can describe how proteins are synthesised on ribosomes, including protein folding and its importance for protein function*  *6.1.5.e (HT Biology only) I can explain what mutations are, and the possible effects of mutations*  *6.1.5.f (HT Biology only) I can explain what non-coding parts of DNA are, and why they are important*  Red denotes interleaving; aspects of knowledge covered previously. |
| **Learning Outcomes (Knowledge)** |
| **Current learning to be developed in the future within:** | Topic 6 (cell division), Topic 12 (Reproduction & Genetic Engineering) |
| **Assessment** | Refer to assessment maps for formative and summative assessment opportunities. |
| **Impact** | Attainment and Progress – Refer to assessment results / data review documentation. |