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| **YEAR \_\_\_\_ 2023-2024 \_\_\_\_\_ TERM: Spring 1 (Y11)**  **‘An ambitious curriculum that meets the needs of all’**  **Medium Term Planning - Topic: Reproduction & Genetic Engineering** | |
| **Curriculum Intent** | **In addition to working further on objectives from KS3 Human Reproduction, Inheritance, Health & Disease and KS4 Topics 1 Cell Structure & Transport, 5, DNA & Inheritance, 6 Cell Division, 7 Immunology and Disease and 12 Hormones & Homeostasis, pupils will be taught, following National Curriculum guidelines, the following in this topic:**   * the importance of selective breeding of plants and animals in agriculture * the uses of modern biotechnology including gene technology; some of the practical and ethical considerations of modern biotechnology. |
| **Skills/National Curriculum Links** |
| **Spiritual, moral, social, and cultural development** | **SMSC:** Fertilisation, sexual reproduction, ethics of genetic engineering.  **PSHE/British Values:**  Peer review – the role of scientists and policy makers in genetic engineering; *Bio only – antibiotics*  **Skills Builder:** Debate - ethics of genetic engineering |
| **Numeracy** | Calculations required in the topic include crop yield of genetic engineering*, Bio only: area of zones of inhibition (areas of a circle)* |
| **Literacy** | **Vocabulary Tier 2:** sperm, egg, fertilization, sexual, asexual  **Vocabulary Tier 3:** gamete, meiosis, zygote, mitosis, genetic engineering, *Bio only – antibiotic, tissue culture, embryo transplant, adult cell cloning*  **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:  6.1.1.a I can describe features of sexual and asexual reproduction  6.1.2.a I can describe what happens during meiosis  6.1.2.b I can describe what happens at fertilisation  6.2.4.a I can describe what genetic engineering is, including examples, and how it is carried out  6.2.4.b I can explain some benefits, risks and concerns related to genetic engineering  6.2.4.c (Higher) I can explain the process of genetic engineering, to include knowledge of enzymes and vectors  7.5.4.a I can describe and explain some possible biotechnical and agricultural solutions, including genetic modification, to the demands of the growing human population  *GCSE Biology Only*  *1.1.6.a I can describe how bacteria reproduce and the conditions required*  *1.1.6.b I can describe how to prepare an uncontaminated culture*  *1.1.6.c I can calculate cross-sectional areas of colonies or clear areas around colonies using πr², and the number of bacteria in a population after a certain time if given the mean division time*  *6.1.3.a I can explain advantages of sexual and asexual reproduction*  *6.1.3.b I can describe examples of organisms that reproduce both sexually and asexually*  *6.2.5.a I can describe different cloning techniques, to include: tissue culture, cuttings, embryo transplants and adult cell cloning*  *RP 2 I can investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition*  Red denotes interleaving; aspects of knowledge covered previously. |
| **Learning Outcomes (Knowledge)** |
| **Current learning to be developed in the future within:** | Extensively within A Level Biology! |
| **Assessment** | Refer to assessment maps for formative and summative assessment opportunities. |
| **Impact** | Attainment and Progress – Refer to assessment results / data review documentation. |