Year 12 Half Termly 2 Topic sheet for January - March 2020

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| TOPIC: Plant Structure and Function, Biodiversity and Conservation |

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| Theme: To further explore life processes | Level: Year 12 |
| Objectives: To further develop an understanding of the scientific concepts in life processes. | |

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| Focussing Questions | Key Words | |
| 1. **The Cell Wall** 2. know the structure and ultrastructure of plant cells including cell wall, chloroplast, amyloplast, vacuole, tonoplast, plasmodesmata, pits and middle lamella and be able to compare it with animal cells 3. understand the function of the structures listed in (a) 4. **The importance of water and minerals in plants** 5. understand the structure and function of the polysaccharides starch and cellulose, including the role of hydrogen bonds between the β-glucose molecules in the formation of cellulose microfibrils 6. understand how the arrangement of cellulose microfibrils and secondary thickening in plant cell walls contributes to the physical properties of xylem vessels and sclerenchyma fibres in plant fibres that can be exploited by humans 7. know the similarities and differences between the structures of, the position in the stem, and the function of sclerenchyma fibres (support), xylem vessels (support and transport of water and mineral ions) and phloem (translocation of organic solutes). 8. **Plant-based medicines** 9. understand the development of drug testing from historic to contemporary protocols, including William Withering’s digitalis soup, double blind trials, placebo and three-phased testing 10. **Principles of Classification** 11. understand that classification is a means of organising the variety of life based on relationships between organisms using differences and similarities in phenotypes and in genotypes, and is built around the species concept 12. understand the process and importance of critical evaluation of new data by the scientific community leading to new taxonomic groupings, based on molecular evidence, including the three-domain system (Archaea, Bacteria and Eukarya) 13. **Biodiversity and Endemism** 14. know how biodiversity can be measured within a habitat using species richness, and within a species using genetic diversity by calculating the heterozygosity index: number of heterozygotes heterozygosity index = number of individuals in the population 15. understand how biodiversity can be compared in different habitats using the formula to calculate an index of diversity 16. understand the concept of niche and be able to discuss examples of adaptations of organisms to their environment (behavioural, anatomical and physiological) 17. understand how the Hardy-Weinberg equation can be used to see whether a change in allele frequency is occurring in a population over time 18. understand that changes in allele frequency can come about as a result of mutation and natural selection 19. understand that reproductive isolation can lead to accumulation of different genetic information in populations, potentially leading to the formation of new species 20. be able to evaluate the methods used by zoos and seed banks in the conservation of endangered species and their genetic diversity, including scientific research, captive breeding programmes, reintroduction programmes and education 21. know how biodiversity can be measured within a habitat using species richness, and within a species using genetic diversity by calculating the heterozygosity index: number of heterozygotes heterozygosity index = number of individuals in the population 22. understand how biodiversity can be compared in different habitats using the formula to calculate an index of diversity 23. understand the concept of niche and be able to discuss examples of adaptations of organisms to their environment (behavioural, anatomical and physiological) 24. understand how the Hardy-Weinberg equation can be used to see whether a change in allele frequency is occurring in a population over time 25. understand that changes in allele frequency can come about as a result of mutation and natural selection 26. understand that reproductive isolation can lead to accumulation of different genetic information in populations, potentially leading to the formation of new species 27. be able to evaluate the methods used by zoos and seed banks in the conservation of endangered species and their genetic diversity, including scientific research, captive breeding programmes, reintroduction programmes and education | Endemism  Species Richness  Genetic Diversity  Gene Pool  Allele Frequency  l.  Behavioural Adaptations  Anatomical Adaptations  Physiological Adaptations  Taxonomy  Phytogenetics  Natural Selection  Evolution  Middle Lamella  Primary Cell Wall  Secondary Cell Wall  Plasmodesmata  Xylem Vessels  .  Ground Tissue  Vascular Tissue  Support and transport.  Biodiversity Hot Spot  Double Blind Trials  Placebo | **Explaining words**  These are examples of….  There is a relationship between…….  A correlation exists between….  To calculate…..  In order to…..  The equations states….  This is caused by….  However….  …because…  This explains….. |

**Resources: departmental textbooks and worksheets/exam board resources**