Learning Tracker: Topic 4 – Biodiversity and Natural Resources

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| **SPECIFICATION POINTS** | **R** | **Y** | **G** |
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| 4.1 Know that over time the variety of life has become extensive but is now being threatened by human activity. |  |  |  |
| 4.2 i) Understand the terms biodiversity and endemism. ii) Know how biodiversity can be measured within a habitat using species richness and within a species using genetic diversity by calculating the heterozygosity index (H):iii) Understand how biodiversity can be compared in different habitats using a formula to calculate an index of diversity (D): |  |  |  |
| 4.3 Understand the concept of niche and be able to discuss examples of adaptation of organisms to their environment (behavioural, physiological and anatomical). |  |  |  |
| 4.4 Understand how natural selection can lead to adaptation and evolution. |  |  |  |
| 4.5 i) Understand how the Hardy-Weinberg equation can be used to see whether a change in allele frequency is occurring in a population over time. ii) Understand that reproductive isolation can lead to accumulation of different genetic information in populations, potentially leading to the formation of new species |  |  |  |
| 4.6 i) 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. ii) Understand the process and importance of critical evaluation of new data by the scientific community, which leads to new taxonomic groupings, including the three domains of life based on molecular phylogeny, which are Bacteria, Archaea, Eukaryota. |  |  |  |
| 4.7 Know the ultrastructure of plant cells (cell walls, chloroplasts, amyloplasts, vacuole, tonoplast, plasmodesmata, pits and middle lamella) and be able to compare it with animal cells. |  |  |  |
| 4.8 Be able to recognise the organelles in 4.7 from electron microscope (EM) images. |  |  |  |
| 4.9 Understand the structure and function of the polysaccharides starch and cellulose, including the role of hydrogen bonds between β-glucose molecules in the formation of cellulose microfibrils. |  |  |  |
| 4.10 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. |  |  |  |
| CORE PRACTICAL 6: Identify sclerenchyma fibres, phloem sieve tubes and xylem vessels and their location within stems through a light microscope. |  |  |  |
| 4.11 Know the similarities and differences between the structures, position in the stem and function of sclerenchyma fibres (support), xylem vessels (support and transport of water and mineral ions) and phloem (translocation of organic solutes). |  |  |  |
| 4.12 Understand the importance of water and inorganic ions (nitrate, calcium ions and magnesium ions) to plants. |  |  |  |
| CORE PRACTICAL 7: Investigate plant mineral deficiencies |  |  |  |
| CORE PRACTICAL 8: Determine the tensile strength of plant fibres. |  |  |  |
| 4.13 Understand the development of drug testing from historic to contemporary protocols, including William Withering’s digitalis soup, double blind trials, placebo, three-phased testing. |  |  |  |
| 4.14 Understand the conditions required for bacterial growth |  |  |  |
| CORE PRACTICAL 9: Investigate the antimicrobial properties of plants, including aseptic techniques for the safe handling of bacteria. |  |  |  |
| 4.15 Understand how the uses of plant fibres and starch may contribute to sustainability, including plant-based products to replace oil-based plastics. |  |  |  |
| 4.16 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. |  |  |  |

**How can I improve?**

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**Revision Actions taken**

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