



Science Department Biology Curriculum and Assessment Map

| | Half-Term 1 and 2 | Half Term 3 and 4 | Half Term 5 | Half Term 6 |
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| Year 9 | Ecology | Our World | Cells and Microscopy | Cell Division |
| Fundamental Knowledge | <ol style="list-style-type: none"> 1. State that the individuals in a population are likely to vary from one another genetically. 2. Distinguish between continuous and discontinuous variation. 3. Identify and give examples of inherited variation and explain how its caused. 4. Identify the physical environmental factors that make up the environment in a habitat and describe how these factors can vary, both on a daily basis and seasonally. 5. Describe the adaptations of a range of organisms to their habitats. 6. Explain how particular adaptations increase the chances of survival, while others can limit an organism's distribution and abundance 7. Describe physical and behavioural adaptations of organisms to daily and seasonal | <ol style="list-style-type: none"> 1. Describe the processes involved in the carbon cycle 2. Describe what biodiversity is, why it is important, and how human activities affect it 3. Describe the impact of human population growth and increased living standards on resource use and waste production 4. Explain how pollution can occur, and the impacts of pollution 5. Describe how humans reduce the amount of land available for other animals and plants 6. Explain the consequences of peat bog destruction 7. Describe what deforestation is and why it has occurred in tropical areas 8. Explain the consequences of deforestation | <ol style="list-style-type: none"> 1. Use the terms 'eukaryotic' and 'prokaryotic' to describe types of cells 2. Describe the features of bacterial (prokaryotic) cells 3. Demonstrate an understanding of the scale and size of cells and be able to make order of magnitude calculations, including standard form 4. Recall the structures found in animal and plant (eukaryotic) cells including algal cells 5. Use estimations and explain when they should be used to judge the relative size or area of sub-cellular structures 6. Required practical: use a light microscope to observe, draw and label a selection of plant and animal cells 7. Describe the functions of the structures in animal and plant (eukaryotic) cells | <ol style="list-style-type: none"> 1. Identify where chromosomes are found and describe what a chromosome is. 2. Identify the reasons why cells divide by mitosis. 3. Describe the stages of the cell cycle, including mitosis. 4. Recognise and describe situations where mitosis is occurring, including interpretation of the stages shown in microscope images and diagrams. 5. Describe the differences between differentiation in plant and animal cells. |

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| | <p>changes, including deciduous and evergreen trees, nocturnal organisms, hibernation and migration.</p> <p>8. Identify and give examples of environmental variation.</p> <p>9. Describe the causes of environmental variation (differences in the environment, acquired characteristics).</p> <p>10. State the resources that organisms need from their habitats and ecosystems.</p> <p>11. Explain why organisms are in competition in a given habitat.</p> <p>12. Use a food web to identify food sources for different animals and give reasons for identifying organisms as: carnivores, consumers, herbivores, omnivores, predators, prey, producers.</p> <p>13. Explain the gains and losses of energy from living organisms.</p> <p>14. Interpret and compare models of energy transfer in food chains (pyramids of number, biomass).</p> <p>15. Explain why preserving biodiversity is important (useful products, organism interactions, enriches our lives, disaster recovery).</p> <p>16. Explain how biodiversity can be preserved using gene banks, seed banks, tissue banks, cryopreservation and pollen banks.</p> <p>17. Explain how natural selection determines the survival of certain variations of adaptations within a population, and how this can lead to evolution.</p> <p>18. Explain how evidence from fossils supports Darwin's theory.</p> | <p>9. Describe how the composition of the atmosphere is changing, and the impact of this on global warming</p> <p>10. Describe some biological consequences of global warming</p> <p>11. Describe both positive and negative human interactions in an ecosystem and explain their impact on biodiversity</p> <p>12. Describe programmes that aim to reduce the negative effects of humans on ecosystems and biodiversity</p> | <p>8. Describe what a specialised cell is, including examples for plants and animals</p> <p>9. Describe what differentiation is, including differences between animals and plants</p> <p>10. Define the terms magnification and resolution</p> <p>11. Compare electron and light microscopes in terms of their magnification and resolution</p> <p>12. Carry out calculations involving magnification using the formula: magnification = size of image/ size of real object - including standard form</p> | <p>6. Define the term 'stem cell' and describe where they are found in animals and plants.</p> <p>7. Describe how stem cells could be used to help treat some medical conditions.</p> <p>8. State what therapeutic cloning is and why this is important in stem cell treatments.</p> <p>9. Evaluate risks and benefits, as well as the social and ethical issues concerning the use of stem cells from embryos in medical research and treatments.</p> |
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| | 19. Explain how changes in an ecosystem can lead to endangerment and extinction. 20. Suggest methods of conservation that can be used to ensure the survival of organisms and habitats. | | | |
| Learning Checkpoint Tasks | <ol style="list-style-type: none"> 1. Competition and adaptations 2. Feeding Relationships | <ol style="list-style-type: none"> 1. Materials Cycling and biodiversity 2. Deforestation and Global Warming | <ol style="list-style-type: none"> 1. Cell Structure 2. Specialised Cells 3. Microscopy and Magnification | <ol style="list-style-type: none"> 1. DNA and the Cell Cycle 2. Cell division and stem cells |
| Common Assessment Task | Year 9: Common Assessment 1 | Year 9: Common Assessment 2 | | |
| Mock Exam (if applicable) | | | | |
| Interleaved Knowledge | <p>Previously at KS2/3 students will have learnt:</p> <ul style="list-style-type: none"> • How animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. • That most living things live in habitats to which they are suited • How different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. <p>In studying organisms in their environments, students should recall the effects of abiotic and biotic factors on populations. They should link this with the importance of temperature and pH on the action of enzymes in the topic <i>Organisation and the digestive system</i>.</p> | <p>In studying cells, students should recall the work done in year 7 on animal and plant cells, including the functions of cell organelles. Students should also recall parts of the microscope and making a specimen slide.</p> | <p>Along with cell division, students will study cell differentiation, and students should be able to make connections between cell differentiation and the specialised cells and adaptations they studied in <i>Chapter B1 Cell structure and transport</i>.</p> | |

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| | <p>In studying animals in cold climates students should make the link to surface area to volume ratio in their work on diffusion in the topic <i>Cells and organisation</i>.</p> | | |
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