SB9 Ecosystems and Material Cycles

SB9a Ecosystems

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|  | State what is meant by the ecological terms community, population and habitat. |  |  |  |
|  | Give examples of an ecosystem, a community, a population and a habitat. |  |  |  |
|  | Describe the organisation of the components of an ecosystem (including populations, communities, habitats and abiotic factors). |  |  |  |
|  | Describe how the interdependence of organisms in an ecosystem allows their survival. |  |  |  |
|  | Explain how to estimate population size, including the use of quadrats. |  |  |  |

SB9b Energy transfer

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|  | Describe the energy transfers that occur between trophic levels. |  |  |  |
|  | Explain how energy is transferred at each trophic level, including making some energy less useful. |  |  |  |
|  | Explain how energy transfers limit the length of a food chain. |  |  |  |
|  | Explain how energy transfers determine the shape of pyramids of biomass. |  |  |  |
|  | Calculate the efficiency of energy transfer between trophic levels. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L9.jpg | Calculate the percentage of biomass transferred between trophic levels. |  |  |  |

SB9c Abiotic factors and communities

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L3.jpg | Give examples of abiotic factors. |  |  |  |
|  | Explain how communities are affected by abiotic factors (temperature, light, water, pollutants). |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Explain how to investigate the effect of abiotic factors on the distribution of organisms using belt transects. |  |  |  |

SB9d Biotic factors and communities

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|  | Give examples of biotic factors. |  |  |  |
|  | Describe how competition can affect communities. |  |  |  |
|  | Describe how predation can affect communities. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Explain how predator–prey cycles affect communities. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L9.jpg | Explain how the structure of a community can affect biodiversity. |  |  |  |

SB9e Assessing pollution

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|  | **H** Name some indicator species and what they indicate. |  |  |  |
|  | **H** Explain why indicator species are evidence for a particular level of air or water pollution. |  |  |  |
|  | **H** Describe the advantages of using indicator species as evidence for the level of pollution. |  |  |  |
|  | **H** Describe the disadvantages of using indicator species as evidence for the level of pollution. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L9.jpg | **H** Evaluate the use of indicator species for assessing the level of pollution. |  |  |  |

SB9f Parasitism and mutualism

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Define the term ‘parasitism’. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Define the term ‘mutualism’. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Describe how parasites are dependent on their hosts. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Describe how hosts are harmed by parasites. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Identify parasites and mutualists in examples. |  |  |  |
|  | Explain how mutualists benefit from their relationship. |  |  |  |

SB9g Biodiversity and humans

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|  | Define the term eutrophication. |  |  |  |
|  | Describe examples of the introduction of non-indigenous species. |  |  |  |
|  | Describe the advantages of fish farming. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Explain how fish farming can affect ecosystems and biodiversity. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Explain how the introduction of species can affect ecosystems and biodiversity. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Explain how eutrophication can affect ecosystems and biodiversity. |  |  |  |

SB9h Preserving biodiversity

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|  | Define the term conservation. |  |  |  |
|  | Explain what is meant by reforestation. |  |  |  |
|  | Give examples of animal conservation. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Explain how animal conservation can benefit biodiversity. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Explain how reforestation can benefit biodiversity. |  |  |  |

SB9i Food security

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|  | Define the term ‘food security’. |  |  |  |
|  | Describe the effect of increasing human population on food security. |  |  |  |
|  | Describe the effect of new pests and pathogens on food security. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Describe the effect of animal farming and consumption on food security. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Describe the effect of human-induced environmental change on food security. |  |  |  |
|  | Describe the effect of sustainability issues [production of biofuels, cost of agriculture] on food security. |  |  |  |

SB9j The water cycle

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|  | Give examples of materials that cycle through ecosystems. |  |  |  |
|  | Describe the processes by which water cycles through abiotic parts of an ecosystem. |  |  |  |
|  | Describe the processes by which water cycles through living organisms. |  |  |  |
|  | Describe how drinking water is produced where water is plentiful. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Explain how drinking water can be produced by desalination in areas of drought. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Explain why water is important to living organisms. |  |  |  |

SB9k The carbon cycle

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|  | Give examples of decomposers. |  |  |  |
|  | Define the term *decomposer*. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Describe the carbon cycle. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Identify the key processes in the carbon cycle. |  |  |  |
|  | Explain how carbon is cycled through the biotic and abiotic components of an ecosystem. |  |  |  |
|  | Explain the importance of the carbon cycle (in balancing photosynthesis and respiration, and removal of wastes by decomposition). |  |  |  |

SB9l The nitrogen cycle

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|  | Describe how plants use nitrates. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Describe the different roles of bacteria in the nitrogen cycle. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Explain how fertilisers increase the nitrate content of the soil. |  |  |  |
|  | Explain why bacteria are important for soil fertility. |  |  |  |
|  | Explain how crop rotation can increase the nitrogen content of the soil. |  |  |  |

SB9m Rates of decomposition

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|  | Describe ways that food is preserved. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Explain why food is preserved in different ways [reducing temperature, water content and oxygen availability]. |  |  |  |
|  | Describe how compost is made. |  |  |  |
| D:\WD\Live Job\2016\Sep-16\regcsesciencewordformattingsb3sc13sp4andsp5\Required_Input\Required_Input\TTPP progression steps icons\Progression_icon_L7.jpg | Explain how the rate of decomposition in composting can be increased. |  |  |  |
|  | Calculate the rate of decay in food and compost. |  |  |  |