


Ecosystems – plant adaptations around the world. KS4 RHS Wisley Lesson Plan 2016 National Curriculum: Factors affecting the rate of photosynthesis; some biotic and abiotic factors which affect communities; organisms are interdependent and adapted to their environment. Genetic variation in a population of a species and the process of natural selection leading to evolution			
Learning Objectives	Structure	Plenary	
Objectives: Photosynthesis <ul style="list-style-type: none"> Know the word equation of photosynthesis. Discuss factors limiting the rate of photosynthesis – low temperature, shortage of carbon dioxide, shortage of light. Recall the structure of plant roots. Know that plants use nitrates for producing amino acids and magnesium is needed for chlorophyll production. Know that plants are producers in food chains. Ecosystems <ul style="list-style-type: none"> Make the link between physical conditions in different ecosystems (tropical, arid and alpine) and limiting factors for photosynthesis. 	Introduction <ul style="list-style-type: none"> Welcome and Health & Safety talk (See Risk Assessments). Discuss photosynthesis, word equation and factors affecting rate of photosynthesis. Discuss limiting factors in tropical and arid environments. Role of leaves (water loss from leaves). Role of roots and minerals. Link to the bog and carnivorous plants. Discuss abiotic factors (temperature, humidity, rainfall, soil, mineral availability, exposure to wind) and biotic factors (competition, pests and diseases, pollinators), Activities <ol style="list-style-type: none"> In groups of 5 or 6, sort pictures of plants into those adapted to tropical and arid environments. In feedback need to give reasons for their choice. Students divided into groups of 3. Plants set out. Each group with a 'worksheet 'Plant Adaptations'. Challenge to match the plant with the picture of the habitat on worksheet. (Bog, Tropical rain forest, desert, temperate forest and alpine) Feedback – matched plants and give reasons. What are the relevant biotic and abiotic factors that may affect the plants in each of the ecosystems? Note: may need to adapt activity according to which plants are available. Students to glasshouse with clip boards, Plant Explorer worksheet and pencil. Go to Tropical and Arid regions find at least two plants in each area, make a drawing, write down name and adaptations. Walk up to 	<ul style="list-style-type: none"> Link the environmental factors studied today to photosynthesis. Which environmental factor do you think was rate limiting in each of the habitats studied? Give your reasons why that factor would be rate limiting. Describe with reasons how a plant was adapted to the one of the habitats studied. (if time and depending on the group - discuss genetic variation and natural selection leading to adaptations) 	

<ul style="list-style-type: none"> • Be able to recall some adaptations of plants to tropical, arid and alpine climates. • Genetic variation in a population of a species • Process of natural selection leading to the evolution of plants adapted to different ecosystems – tropical rain forest, arid and alpine <p>Cuttings</p> <ul style="list-style-type: none"> • Know that asexual reproduction produces genetically identical offspring called clones. • Understand that cuttings produce clones • Know that seed production is the result of sexual reproduction and produces variation in the offspring. 	<p>the Alpine houses and find two plants as before.</p> <p>Growing lab Discuss the production of seeds making a link with variation of offspring. Discuss asexual reproduction, clones and offspring being genetically identical. Students take cuttings of plants. Students guess which habitat the plant may thrive in. Students to point out adaptations. Discuss conditions needed for healthy growth. Discuss the care of their plants.</p> <div data-bbox="748 735 1547 1166" data-label="Text"> <p>Key vocabulary: Energy conversion, limiting factors, Nitrate, amino acids, proteins, magnesium, Producers, Tropical and arid climates, shade leaves, climbers, epiphytes, succulents, insectivorous plants, asexual reproduction, clone, genetically identical, sexual reproduction, gametes, variation, adaptation, interdependent, species distribution, biodiversity.</p> </div>	<p>Resources:</p> <p>Picture sort activity – tropical and desert plants</p> <p>Clip boards, pencils Plant Explorer worksheet Plant Adaptations worksheet .</p> <p>Growing Lab – Model flower compost, plastic pots, labels etc, succulent plants for cuttings</p> <p>Demonstration plants: Venus fly trap, sundews, pitcher plants, cacti,</p>
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<p>Assessment questions</p> <ul style="list-style-type: none"> Describe the physical features of each habitat and identify major environmental factors, <i>e.g. light intensity, carbon dioxide availability, temperature range, water availability, humidity.</i> Describe adaptations to life in a variety of habitats. Pick out appropriate adaptations and explain clearly their significance. In a waterlogged habitat, what could be a limiting factor for plant growth? How have insectivorous plants evolved to become adapted to their waterlogged habitat? 	<p>Differentiation:</p> <p>All students can state which factors are needed for photosynthesis. State which may be the most important physical factor in the, tropical and arid environments which would slow the rate of photosynthesis. Be able to give some adaptations of plants to a particular habitat studied. Give a simple explanation of how plants have become adapted by natural selection. Know that cuttings produce clones that will look exactly the same as the parent plant</p> <p>Most students can write a word equation for photosynthesis. Give the key factor in the habitats studied which could reduce the rate of photosynthesis. Link adaptations of plants in the habitats studied to some of the physical factors present. Be able to explain the difference between the way a seed is formed and a cutting is made. Know the difference between sexual and asexual reproduction in plants. Suggest advantages to the farmer or gardener of producing clones. Explain how sexual reproduction leads to variation and how this can enable plants to become adapted by natural selection.</p> <p>Some students can understand the concept of limiting factors for photosynthesis and state the key limiting factor in the environments studied. Pick out appropriate adaptations and explain their significance. Be able to clearly explain using scientific terminology (e.g. gametes) the difference between sexual and asexual reproduction in plants. Explain the significance in terms of genetic inheritance of sexual and asexual reproduction. Suggest advantages and disadvantages of producing plants by cloning. Give a detailed explanation of how sexual reproduction, variation, competition and natural selection can lead to plants becoming adapted to different ecosystems</p>	
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