

AQA A&B Science – Comparing shaded and unshaded grassland – Waterlow Park

Specification links

11.5 What determines which particular species lives and how many of them there are?

Specification Objectives:

Candidates should use their skills, knowledge and understanding of how science works:

- A to suggest how organisms are adapted to the conditions in which they live
- B to suggest the factors for which organisms are competing in a given habitat
- C to suggest reasons for the distribution of animals or plants in a particular habitat.

Their skills, knowledge and understanding of how science works should be set in these substantive contexts:

- 1 To survive, organisms require a supply of materials from their surroundings and from the other living organisms there.
- 2 Plants often compete with each other for light and for water and nutrients from the soil.
- 3 Animals often compete with each other for food, mates and territory.
- 4 Organisms have features (adaptations) which enable them to survive in the conditions in which they normally live.
- 5 Animals and plants may be adapted for survival in the conditions where they normally live e.g. deserts, the Arctic.
- 6 Animals and plants may be adapted to cope with specific features of their environment e.g. thorns, poisons and warning colours to deter predators.

Assessment Objective 3 (AO3): Practical, enquiry and data-handling skills:

- carry out practical tasks safely and skillfully;
- evaluate the methods they use when collecting first-hand and secondary data;
- analyse and interpret qualitative and quantitative data from different sources;
- consider the validity and reliability of data in presenting and justifying conclusions.

Candidates either singly or collaboratively take part in a practical procedure in order to collect primary data. Candidates are assessed on their ability to analyse and evaluate the data collected and the limitations of the techniques used.

Key Activities:

1. Identify tree species using a key
2. Identify four plant species found in a park
3. Sample along a continuous transect for plant presence and percentage frequency
4. Record light intensity, soil pH, humidity, height of vegetation (if changeable)
5. Analysis of data
6. Consider the reliability and validity of the data

Session 1: Pre-fieldwork activities in the classroom (1 hour)**Aim:** To understand the distribution and size of populations of living organisms

Activities	Resources needed
<p>Lesson title – What determines which particular species lives and how many of them there are?</p> <ol style="list-style-type: none"> 1. What do plants need to live? Do plants compete; if so what for? How might plants change in differing conditions? Pupils could discuss these questions in groups recording answers onto poster paper. 2. What has the site been previously used for? What objectives are going to be met there? 3. How could we study if plant species number and frequency change under a tree? (Use Sheet 2) 4. Pupils outline the risk they believe they will met and the precautions that need to take. (Group activity with poster/ or presentations made). 5. Keyword discussion – of vocabulary that is has been met in period. 	<p>Sheet 1: Ecology vocabulary Sense of Place PowerPoint Background information</p> <p>Sheet 2: Sampling</p> <p>Sheet 3: Can you spot the risks</p>

Session 2: Fieldwork (1 hour)

Activities	Resources needed
<ol style="list-style-type: none"> 1. Identify 3 trees using the keys – explain that different trees like different abiotic conditions and also affect what plants can live near it. 2. Introduced to quadrat. Identify 5 plant species – stated on sheet. Estimating plant frequency, bare ground and moss. 3. Laying a transect; (5 m) groups sample along a transect. 4. Recording abiotic condition. Light intensity (all at the same time), vegetation height (does it change? How close can the mower get under the tree? pH of soil. (Higher under tree due to dog urine?) 	<p>Sheet 4: Results sheets Tree key Sheet 4 and plant key. 50m² quadrat Plant key Long tapes Light meter; small ruler; marked containers to collect soil (5 for each gp) Digital camera</p>

Session 3: Post-fieldwork activities in the classroom (1 hour)

Activities	Resources needed
1. A review of the previous activities – what are we studying, what did we do? 2. Soil pH measuring – analysing soil pH. Record in abiotic table 3. Groups consider data (teacher to look previous to lesson). If data is odd/ limited give sample one to analyses. Pupils to discuss what abiotic conditions are changing. This information can be plotted on the y axis against distance from the tree. Spreadsheet can be used here. 4. Use analysis questions to guide interpretation of results 5. Homework – find out about 4 species of plants and how plants in general can be adapted to enable better survival	Digital photos? pH meter Results on Sheet 4 Optional - Excel spreadsheet Sheet 5: Analysis

Session 4: Post-fieldwork activities in the classroom (1 hour)

Activities	Resources needed
1. Use homework information to add to analysis 2. Evaluation – use evaluation questions to consider validity and reliability of data Extension - This could then be applied to water shortages (the wider problem) – how are the plants / parks to cope in the summer	Sheet 5: Evaluation Resources for extensions - http://www.upd8.org.uk/activity/168/send-login.php

Resources needed –

Quadrats (can be made from 50m rulers / garden canes)

Long tapes (can be made from washing lines marked every 50m)

5 small containers for each group to collect soil samples (or just once depending on class) – empty 35mm camera film canisters are very useful for this

Labels

Light meter (optional) (can make a funnel with acetate for pupils to use to estimate through canopy)

Clipboards

Keys – FSC publishes *The Tree Name Trail* and *Playing Field Plants*

See www.field-studies-council.org/publications

Access to computer for analysis (optional)

Access to projector for lab sessions (optional – although more convenient)

Waterlow Park - Site Background Information

Location:

Grid reference: TQ 286 871 Area: 11 ha

Near to Archway and Highgate underground stations.

Situated next door to Highgate Cemetery, Waterlow Park has been described as one of the most beautiful parks in London, and is Camden borough's flagship park. Its rich variety of parkland trees and the somewhat unusually sloped profile of the terrain add a welcome element of surprise.

History:

Waterlow Park was officially opened to the public in November 1891 in a blaze of publicity. It was Sir Sydney Waterlow's gift of his Highgate estate, in his words, to be 'a garden for the garden-less'. Sydney Waterlow had created the estate only 30 years earlier, in the 1860s through the acquisition of properties next to his own. Owing to these origins the park does seem to have more in common with the grounds of a country estate than a typical municipal park. One key feature is Sir Sydney Waterlow statue which was erected in 1900. It is made of bronze and finds Sir Sydney holding the key to the park in one hand and his umbrella, which he was well known to carry, and hat in the other.

In 2005 a large programme of works, supported by the Heritage Lottery Fund, was completed which restored and revitalized the park.

Geology and Wildlife:

One key habitat present is a number of spring-fed ponds, combined with an area of wet grassland where some uncommon grasses can be found. Among the wide range of specimen trees are some fine copper beeches, maidenhair trees and Indian bean trees, as well as native species including oak, ash and crack-willow. Most of the park is rigorously mown, but two areas of longer grass near the northern end is mown less frequently, due presumably to its continually damp state. Here the grasses foxtail, meadow barley, timothy and floating sweet-grass occur, with creeping and meadow buttercups, hairy sedge and common sorrel. Interestingly path-side weeds including the closely related species, gallant-soldier and shaggy soldier are seen and are thought to have escaped originally from Kew Gardens (both are native to tropical America).

Birds resident include coots, moorhens, Canada geese, tufted ducks and mallards. Wrens, blue tits, nuthatches, goldcrests, blackbirds, dunnocks, kestrels and greenfinches have all been recorded. Mammals seen included foxes and grey squirrels.

Information sourced from:

Cooper, P. (2005) Waterlow Park. A mini guide. Friends of Waterlow Park

Waite, M., Keech, D. & Game, M. (1993) Nature Conservation in Camden. London: London Ecology Unit

RISK ASSESSMENT PRO FORMA 2006

Activity/Situation Plant study at Waterlow Park								Date of Assessment: Friday 28 th April 2006											
HAZARDS IDENTIFIED Grouped by Outcomes		PERSONS AT RISK FROM EXPOSURE TO HAZARD					RISK RATING WITHOUT CONTROLS IN PLACE	WITH CONTROLS IN PLACE										RISK RATING WITH CONTROLS IN PLACE	
								A					B						
								WORST CASE OUTCOME					LIKELIHOOD /PROBABILITY						
NO.							Worst Case Outcome X Likelihood / Probability	1	2	3	4	5	1	2	3	4	5	(A x B)	
1	Slips, trips and falls – walking to site Temporary traffic furniture						2x3=12		2					2					4
2	Slips – wet leaves, moss & ice on tarmac						4x3=12			3				2					6
3	Hazardous Substances – Soil Borne diseases						5x2=10					5	1						5
4	Hazardous Substances – Fungi						4X2=10				4		1						4
5	Hazardous Substances – Glass, litter, faeces, syringes						5x4=20					5		2					10
6	Harmful plants						5x3=15					5	1						5
7	Manual Handling - Carrying equipment						4x2=8				4			2					8
8	Weather – Extreme cold						5x2=10					5	1						5

9	Weather – Extreme sun/ hot					x	5X2=10					5	1					5
10	Weather – High wind Tree branches/ dead wood					x	5x2=10					5	1					5
11	Traffic – Vehicles/ Car parks					x	5x3=15					5	1					5
12	Strangers		x				5x2=10					5	1					5
13	Getting Lost		x	x			5x3=15				4		1					4
14	Gardeners machinery – tools on path or adjacent to path	x	x	x			4 x 2 = 8				3		1					3

This pro forma does not replace school policy risk assessments. This can be used for guidance only. Site must be visited and assessed by teacher leading activity.

No	Risk Rating	THESE CONTROL MEASURES ARE TO BE IN PLACE. LEADING TEACHER TO ENSURE ACCOMPANYING STAFF AND ADULTS ARE CLEARLY BRIEFED, BEFORE THE START OF THE ACTIVITY REGARDING THEIR SUPERVISORY ROLE + ACTION TO TAKE IF ANY PROBLEMS OCCUR	Is additional action req'd? Yes / No
1	8	Safety talk given previous to leaving; walk single lane if obstacle on footpath. Staying in pairs along path. No running. Suitable footwear worn.	No
2	6	Verbal warning to students to walk & not run. Ensure an adult always positioned at front & back to maintain sensible pace. Pay particular attention if students are wearing inappropriate footwear. Ensure bags/coats are carried properly.	No
3	5	Safety talk given and symptoms told to pupils. All are to wash hands at end of session. Pupils told not to touch faces or put fingers near mouths.	No
4	4	Safety talk given. All pupils told not to eat any fungi seen, or berries etc.	No
5	10	Site to be used to be surveyed by group leader prior to lesson. Items should be removed using gloves or activity re-sited. In safety talk pupils must be told that they must not touch any item found and to be careful when on site. Pupils told not to put fingers in mouth or to eat. All to wash hands after. Pupils to report any item found to adult. Adult should remove item using gloves or ask pupils to move. Faeces should be removed by wearing clothes and disposal clothes, at school.	No
6	5	Safety talk given on not eating berries etc. and being aware of nettles. Show nettles to pupils when on site.	No
7	8	Pupils shown how to use and carry long tapes, etc. Pupils supervised at all times.	No
8	5	Pupils to be told to bring appropriate clothing; waterproof and extra layers. Teacher to monitor weather conditions. Play warming games if necessary	No
9	5	Pupils to be told to bring sun cream, sun hats and bottled water. Teacher needs to monitor weather conditions. Shade should be sort to work in where appropriate.	No
10	5	Pupils to be made aware of risk. Teacher to monitor weather conditions and change locations as appropriate.	No
11	5	Safety talks on walking to site. Pupils to remain in pairs; walk single lane if obstacle on footpath.	No

12	5	Tell pupils to be aware of others using park in safety talk.	No
13	5	Pupils to be advised that the park is a public space. Told not to talk to strangers and to stay with partner/ group. Report any incidents to members of staff.	No
14	4	Safety talk: group told to stay together. Pupils told to stay still if lost. Pupils and assistants to be told approx. length of activity. Mobile to be carried by lead teacher.	No
15	3	Insist that students do not touch any tools/machinery that they see.	No

Assessment carried out by: Melissa Glackin (FSC) April 2006

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Site Contact – Ben Genovese (Nature conservation and events/ education officer) 020 7974 8817

Teachers/ group leaders before taking a group should:

1. Re-read school own 'off-site' policy
2. Carry a mobile that has reception at the site
3. Carry telephone numbers for the school office where pupil details are stored
4. Carry a basic first aid kit
5. Check the adult: pupil ratio is correct
6. Carry an up-to-date register

First Aid kits should contain –

- | | |
|--|---|
| <ul style="list-style-type: none"> ▪ 1 first aid guidance leaflet ▪ 10 waterproof plasters ▪ 2 triangular calico bandages ▪ 1 large sterile dressing pad (18x18cm) | <ul style="list-style-type: none"> ▪ 1 medium sterile dressing pad (12x12cm) ▪ 2 pairs of vinyl gloves (medium) ▪ 2 antiseptic wipes (alcohol free) ▪ 2 safety pins |
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KEY TO ASSESSMENT FORM 2006

PEOPLE AT RISK

KEY	DESCRIPTION
EMPLOYEE	EMPLOYEES INCLUDING VOLUNTEERS
STUDENTS	<u>ALL</u> students working with FSC
VISITING STAFF	All teachers / lecturers / adult helpers with groups
PUBLIC	When the general public have access to the area being Risk Assessed
ALL	All persons who are exposed to the hazard

SEVERITY OF OUTCOME

KEY	DESCRIPTION	GUIDANCE
1	Slight inconvenience	Verbal reassurance given, able to continue with activity
2	Minor injury	Requires First Aid, may be able to continue with activity
3	Injury / Illness	Medical attention required, unable to continue with the activity
4	Major Injury	As defined by RIDDOR, hospitalisation required, use of emergency services
5	Fatality, Multiple Injury	As defined by RIDDOR, injury may lead to a disability

LIKELIHOOD / PROBABILITY OF INJURY TAKING PLACE

KEY	DESCRIPTION	GUIDANCE ON DEFINITIONS
1	Highly unlikely to occur	
2	May occur	Rarely
3	Does occur	Not frequently
4	Occurs	From time to time
5	Likely to occur	Often

NOTE

When the final risk rating score is 8 or 9 everyone must be made aware of the hazards and the activity should be modified to lower the risk. If the score is 10 or higher the activity must cease .

The information given on the definitions can only be used as guidance and should not be referred to as the definitive version.