

AQA A&B Science – Aquatic habitats – 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

11.8 How do humans affect their environment? (Only parts of)

Specification Objectives:

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

- A to analyse and interpret scientific data concerning environmental issues
- B to weigh evidence and form balanced judgements about some of the major environmental issues facing society, including the importance of sustainable development
- C to evaluate methods used to collect environmental data and consider their validity and reliability as evidence for environmental change.

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

1. More waste is being produced which, unless properly handled, may pollute:
 - **water with sewage, fertiliser or toxic chemicals**
 - air with smoke and gases such as sulphur dioxide which contribute to acid rain
 - land with toxic chemicals, such as pesticides and herbicides, which may be washed from land into water.
2. Living organisms can be used as indicators of pollution:
 - lichens can be used as air pollution indicators
 - **invertebrate animals can be used as water pollution indicators.**

Improving the quality of life without compromising future generations is known as sustainable development. Planning is needed at local, regional and global levels to manage sustainability.

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. Discussion of sampling and measurement of abiotic factors.
2. Pond dip with identification. Discussion of the adaptations of invertebrates for movement, buoyancy and oxygen supply.
3. Observing population numbers and constructing food chains and webs.
4. Collection of data at biotic and abiotic at 3 different sites.
5. Calculating a pollution index for each site.
6. Discussion on the importance of biodiversity in urban areas.

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

Pre fieldwork activities	Resources needed
<ul style="list-style-type: none"> • Where is Waterlow Park? What objectives are going to be met? • Pupils to compile a glossary of key terms in ecology • Directed reading task for pupils with comprehension questions based on newspaper article • Pupils outline the risks that they observe and the precautions that need to be taken This could be organised as group-work with a plenary based on group posters and/or group presentations 	PowerPoint presentation Site background information for teachers Sheet 1: Ecology terminology Sheet 2: Directed reading Sheet 3: Can you spot the risks? Use PowerPoint presentation photographs

Session 2: Pre-fieldwork activities in the classroom (1 hour)

Pre fieldwork activities	Resources needed
<ul style="list-style-type: none"> • Consider adaptations of differing invertebrate found in an aquatic habitat. Use internet site and worksheets to support learning. • Consider a feeding chain that is found in an aquatic environment. Make a food web with the resource. Copy organism names from food web and label each trophic level and type of eater. • Review using ecological terminology (from previous session) • Homework – to research 2 of the organisms further. 	Sheet 4: Adaptations Sheet 5: Adaptations cards http://www.naturegrid.org.uk/pondexplorer/pondexplorer.html

Session 3: First fieldwork session (30 minutes)

Fieldwork activities	Resources needed
<ul style="list-style-type: none"> • Sample an aquatic area appropriately so that it is fairly completed. • Ask pupils to consider the different abiotic conditions that may be found in the habitats. • To sample two micro habitats of ponds and to collect organisms for identification and discussion of adaptations. • Identify organisms using key and hand lens. Record. 	Site background information for teachers Pond nets, white trays, id guides Sheet 6: Field observations

Session 4: Second fieldwork session (40 minutes)

Fieldwork activities	Resources needed
<ul style="list-style-type: none"> • Discuss method to be used to collect biological evidence to support the need for the ponds within the park. • Sample 2 aquatic habitats so that they can be compared. Identify and record all the invertebrates in the samples. Record abiotic conditions at the sites. 	Site background information for teachers Pond nets, white trays, id guides Sheet 7: Comparing different areas

Post fieldwork lessons in the classroom

Lesson One

- Analysis data from the two habitats; how could such material be used to answer the question on biodiversity? Graphing techniques? Also discussion of qualitative (descriptive information from site visit and secondary sources).
Support resources – Sheet 9: Trophic level cards. Sheet 10: Analysis.

Lesson Two

- Present findings in a report / presentation.
- Consider the validity and reliability of data in presenting and justifying conclusions.
Support resources – Sheet 11: Evaluation
- Consider the conclusion drawn from the investigation from the view point of London Water how could they argue against the findings?
Where and how might more data need to be collected?

Lesson Three

- To use the data and to analysis how clean the ponds. Consider the advantages and limitations of using bio-indicators.
Sheet 8: Assessing pollution

- Article on why suburban biodiversity is important

<http://news.bbc.co.uk/1/hi/magazine/4579333.stm>

How the changes in the food web is pollutants are removed;

<http://www.guardian.co.uk/conservation/story/0,,1677851,00.html>

How changes occur in the food web if mammals are culled

<http://www.guardian.co.uk/conservation/story/0,,1692824,00.html>

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 Pond Dipping / Waterlow Park (Camden)							Date of Assessment: Tuesday 15 th November 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.		Employee	Students	Visiting staff	Public	ALL	Worst Case Outcome X Likelihood / Probability	1	2	3	4	5	1	2	3	4	5	(A x B)
1	Slips, trips and falls – slipping on paths on wet days.	x	x	x			4x3=12				x			x				8
2	Slips, trips and falls – slipping on decking	x	x	x			5x2=10					x	x					5
3	Slips, trips and falls – doing activity Falling into pond	x	x	x			5x3=15					x	x					5
4	Hazardous Substances – Weils disease	x	x	x			5x2=10					x	x					5
5	Manual Handling Carrying equipment	x	x	x			4x2=8				x			x				8
6	Weather – Extreme cold					x	5x2=10					x	x					5
7	Weather – Extreme sun/ hot					x	5X2=10					x	x					5
8	Traffic – crossing road to enter park	x	x	x			5x2=10					x	x					5
9	Strangers		x				5x2=10					x	x					5

10	Getting Lost		x	x			5x3=15				x		x					4
11	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.

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

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 by teacher previous to leaving. Staying in pairs along path. No running. Suitable footwear worn.	No
2	5	Safety talk given by teacher previous to leaving. No running. Suitable footwear worn.	No
3	5	Safety talk given previous to activity. Groups no large than four pupils. Only one pupil allowed dipping at a time. Pupils told to kneel when dipping. Pupils supervised at all times. Mobile phone carried. No running.	No
4	5	All warned of dangers and explanation of symptoms and guidance letter sent to parents. Recommend that gloves are worn/ mirco-tape on wounds. Wash hands at end of session. No eating or drinking during activity.	Gloves /tape needed
5	5	Pupils shown how to use and carry pond nets, trays etc. Pupils supervised at all times.	No
6	5	Pupils to be told to bring appropriate clothing; waterproof and extra layers. Teacher needs to monitor weather conditions. Play warming games if necessary	No
7	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 where appropriate.	No
8	s	Safety talks on walking to site crossing road. Pupils to remain in pairs.	No
9	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
10	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
11	3	Insist that students do not touch any tools/machinery that they see.	No

Assessment carried out by: Melissa Glackin November 2006

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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 –

- 1 first aid guidance leaflet
- 10 waterproof plasters
- 2 triangular calico bandages
- 1 large sterile dressing pad (18x18cm)
- 1 medium sterile dressing pad (12x12cm)
- 2 pairs of vinyl gloves (medium)
- 2 antiseptic wipes (alcohol free)
- 2 safety pins

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.