

## OCR A Science – Aquatic habitats – West Reservoir

### **B3.4 Life on Earth: Why do some species become extinct, and does it matter? What is the importance of biodiversity?**

#### **Specification Objectives:**

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

- 1 understand that living organisms are dependent on the environment and other species for their survival
- 2 understand that there is competition for resources between different species of animals or plants in the same habitat
- 3 relate changes affecting one species in a food web to the impact on other species that are part of the same food web
- 4 understand that a rapid change in the environment may cause a species to become extinct, for example if:
  - the environmental conditions change
  - a new species that is a competitor, predator or disease organism of that species is introduced
  - another organism in its food web becomes extinct

*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 (25.2%)

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.

**Freshwater Ecology Study****Session 1: Pre-fieldwork activities in the classroom (1 hour)**

Time	Teacher Activity	Student Activity / Differentiation	Resources
<b>Starter</b> (10 min)	<p><b>Heading on board:</b> <i>Why are plants and other animals so important to us; even those we do not eat?</i></p> <p>In pairs students to discuss a food chain and any related vocabulary they know. Several pupils state their food chains to class. Note down any vocabulary on board.</p> <p>On White Board have some pictures of organisms, arrows and key words that can be arranged made into a food chain by pupils. <b>Q:</b> What do these words mean? What does the arrow represent? What can we see from the size of the organisms along this chain – give reasons? (general ideas for now)</p> <p><b>Learning objectives:</b> agree these with the pupil (have on board) and related relevance to the heading on the board and extending KS3 work</p>	<p>Pupil pair work. Pupils state known food chains. <i>Ask from a range of ability pupils.</i> A pupil builds a food chain. Pupils may discuss in pairs first – depending on ability.</p> <p>Listen to pupil objectives. Related to KS3 work</p>	<p>Tables arranged for group work.</p> <p>White Board</p> <p>Interactive board – organism picture, arrows and keywords Objectives on board.</p>
<b>Activity One</b> (15 min)  Presenting New information	<p>Newspaper article – Discusses the large amount of 'biodiversity' that can be seen and studied at a local level.</p> <p>The questions on the sheet can be answered by pupils.</p>	<p>Get article. Read and complete exercise.</p>	<p>Sheet 1: Directed reading – newspaper-style article with questions</p>
<b>Activity Two</b> (20min)  Assessing risks	<p>We are going to complete a study with the aims in mind;</p> <ul style="list-style-type: none"> <li>How can we best study the relationships between the environment and other species of organisms in a water ecosystem?</li> <li>What would occur if the ecosystem changed?</li> </ul> <p>PowerPoint presentation on the site that is to be visited.</p> <p>Using the photos ask the pupils in groups to note down risks that will be likely at the site and what controls they could would put into place to lower the risks.</p> <p>Pupils can present risks as group and add to whole class table on the whiteboard. Consolidate the main risks and what behaviour is expected to decrease the chance of the risk occurring.</p>	<p>Listen</p> <p>Watch</p> <p>Group work complete a table; one column with risks noted and the other with controls put in place.</p> <p>Groups present and add other risks to their tables.</p>	<p>PowerPoint Notes on history of site</p> <p>Sheet 2: Can you spot the risks?</p> <p>Whiteboard.</p>

<b>Activity Three/ Plenary</b>  Review  (10 min)	Using the worksheet review the key words that have been discussed in the starter, the first activity and KS3 work from previous.  These keywords and definitions could be cut up and then used as a starter in lesson three. They should be saved in envelopes with pupil names on.	Complete keywords / definitions. Use textbooks to help.  Cut up and place into envelope.	Sheet 3: Ecology terminology
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### Homework

This could be a research and record homework:

- either to find out more on 3 named aquatic invertebrates (what do they look like, what do they feed on, how do they have their young, what conditions do they prefer to live in? etc)
- or to find out more about the site that is to be visited (where is it, what is the history of the site, what is it special, what can be found there inc. facilities and plant and animal species)

### Session 2: First fieldwork session (1½ hours)

Fieldwork activities	Resources needed
<ul style="list-style-type: none"> <li>• Teacher introduction to West Reservoir and a brief history and overview of the site</li> <li>• Pupils sketch the pond and label the biotic and abiotic features – aim for at least 5 of each</li> <li>• Teacher models use of pond net for sampling</li> <li>• Pupils use pond nets, white trays and identification guides to sample the pond (it is useful for pupils to sample at least two micro-habitats, e.g. surface water, river bottom, among weeds)</li> </ul>	Site background information for teachers Sheet 4: Habitat observations Pond nets, white trays, id guides Sheet 4: Habitat observations Pond nets, white trays, id guides

### Session 3: Classroom review of first fieldwork session (1 hour)

Fieldwork activities	Resources needed
<ul style="list-style-type: none"> <li>• Pupils to finish sharing group data and identifying organisms as necessary</li> <li>• Pupils to use adaptation cards to list adaptations for movement, buoyancy and oxygen supply</li> <li>• Discussion to prepare for fieldwork session 2 - How can we compare the biodiversity in three aquatic areas?</li> </ul>	Sheet 5: Adaptations Sheet 6: Adaptations cards

**Session 4: Second fieldwork session (1 hour)**

Fieldwork activities	Resources needed
<ul style="list-style-type: none"> <li>Teacher to check that pupils remember how to use pond nets for sampling</li> <li>Pupils to collect biotic and abiotic data at three different sites</li> <li>Pupils to share data in groups / class</li> </ul>	Pond nets, white trays, id guides, thermometers, light meters, pH meters or kits, oxygen probes OR dataloggers Sheet 7: Comparing different areas

**Session 5: Classroom review of second fieldwork session (1 hour)**

Fieldwork activities (1 hour)	Resources needed
<ul style="list-style-type: none"> <li>Pupils to use trophic level cards to construct food webs</li> <li>Pupils to use data collected to construct pyramids of numbers for the four trophic levels</li> <li>Pupils to calculate a pollution index for each of the 3 sample sites</li> </ul>	Sheet 8: Trophic level cards Results recorded on Sheet 7 Sheet 9: Assessing pollution

**Post-fieldwork activities**

These activities may be carried out for homework after each of the fieldwork sessions or in the lessons following a 'field day'.

- Analyse data from the three habitats. How could such material be used to answer questions on biodiversity? Graphing techniques?
- A discussion of the usefulness of qualitative and secondary sources.
- Present findings in a report / spoken presentation.
- Consider the validity and reliability of data in presenting and justifying conclusions-
- Consider the conclusion drawn from the investigation from the view point of the developers how could they argue against the findings? Where and how might more data need to be collected?
- Using an up-to-date newspaper article on the decline on biodiversity consider how the report is written and what evidence is given for the importance of biodiversity. Some suggestions...  
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>

## West Reservoir (Hackney) – Site background information

### Location

West Reservoir is best approached from Green Lanes, at the Castle Climbing Centre, 1km south of Manor House station. Grid reference TQ 325874.

### History of site

#### 1. Fresh water for Londoners

The New River is neither 'new' nor is it a 'river'. It is an artificial canal which runs 20 miles from the Lee Navigation to Stoke Newington supplying London with fresh water from Hertfordshire as it has since 1613.

#### 2. From filtration plant to sailing centre

Stoke Newington West Reservoir Centre was a filtration plant which used to purify the water brought to Stoke Newington by the New River. Hackney Council took over the redundant West Reservoir and filtration plant from Thames Water in 1996. Since then the lake and buildings have been converted into a centre for watersports.

#### 3. Saved from irrelevance

When the Thames Water Ring Main opened in 1994 it at first seemed likely to make the New River redundant. The ring main scheme includes pumps, at Stoke Newington to raise water for local distribution. The New River was saved by a combination of: the additional demand for water in the London Docklands; the development of the Artificial Recharge Scheme; and interest from local residents.

#### 4. The Artificial Recharge Scheme

Thames Water's Artificial Recharge Scheme includes boreholes and pumping stations at sites along the New River to Stoke Newington. The pumps transfer treated water into the aquifer lying about 250 feet (76m) below London when there is more water than customers need. At times of drought, water is pumped up from the aquifer and into the New River and then to the Coppermills Water Treatment Works.

### RISK ASSESSMENT PRO FORMA 2006

Activity/Situation Pond Dipping / West Reservoir (Hackney)										Date of Assessment: Thursday 6 <sup>th</sup> 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.		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)
								Inconvenience	Minor Injury	Injury / Illness	Major Injury	Fatality / Multiple	Unlikely	Rarely	Infrequently	Sometimes	Often	
1	Slips – walking to site. Unsuitable footwear	x	x	x			4x2=12				4		1					4
2	Slips – walking on footbridge, slippery surface	x	x	x			3x2=6			3			1					3
3	Trips– uneven surfaces, changes in levels and bridges	x	x	x			4x2=10				4		1					4
4	Cuts – broken glass or sharp objects at sites	x	x	x			5x3=15					5		2				10
5	Falls – doing activity Falling into reed bed	x	x	x			4x3=12				4			2				8
6	Falls – doing activity Falling into New River	x	x	x			4x3=12				4			2				8
7	Falls – doing activity Falling into reservoir	x	x	x			5x3=15					5		2				10

8	Hazardous Substances – Weils disease	x	x	x			5x2=10					5	1					5	
9	Hazardous Substances – Faeces	x	x	x			5x3=15					5		2					10
10	Manual Handling Carrying equipment	x	x	x			4x2=8				4			2					8
11	Weather – Extreme cold					x	5x2=10					5	1						5
12	Weather – Extreme sun/ hot					x	5X2=10					5	1						5
13	Traffic – Car parks					x	5x2=10					5	1						5
14	Strangers		x				5x2=10					5	1						5
15	Getting Lost		x	x			5x3=15				4		1						4
16	Gardeners machinery – tools on path or adjacent to path	x	x	x			4 x 2 = 8				3			1					3

No	Risk Rating	THESE CONTROL MEASURES ARE TO BE IN PLACE. LEADING TEACHER TO ENSURE ACCOMPANYING STAFF AND ADULTS ARE CLEARLY BRIEFED, <b>BEFORE</b> THE START OF THE ACTIVITY REGARDING THEIR SUPERVISORY ROLE + ACTION TO TAKE IF ANY PROBLEMS OCCUR	Is additional action req'd <b>Yes / No</b>
1	4	Safety talk given previous to leaving. Staying in pairs along path. No running. Suitable footwear worn.	No
2	3	Safety talk given previous to leaving. Pupils can hold railing on footbridge. No running	No
3	4	Safety talk given previous to leaving. Pupils to walk in pairs or single file where suitable.	No
4	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.	Gloves
5	8	Safety talk given previous to activity. Groups no larger than four pupils. Only one pupil allowed dipping at a time. Float on a rope carried (by group leader). Pupils supervised at all times. Mobile phone carried. No running.	Float on rope needed
6	8	Safety talk given previous to activity. <b>An area cleared of vegetation along bank should be used.</b> Be aware that logs are in the river and groups should not dip where nets could get caught. Groups no large than four pupils. Only one pupil allowed to dip at a time. Float on a rope carried (by group leader). Pupils supervised at all times. Mobile phone carried. No running.	Float on rope needed
7	10	Safety talk given previous to activity. Dipping should not occur on pontoon as too unstable. Dipping from banks of reservoir. Groups no larger than four pupils. Only one pupil allowed dipping at a time. Float on a rope carried (by group leader). Pupils supervised at all times. Mobile phone carried. No running.	Float on rope needed
8	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 needed
9	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. If site has to be used then and hazard a large obstruction then should be removed by wearing clothes by teacher and disposed of into appropriate bins.	Gloves needed
10	8	Pupils shown how to use and carry pond nets, trays etc. Pupils supervised at all times.	No

11	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
12	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
13	5	Safety talks on walking to site and through car parks. Pupils to remain in pairs.	No
14	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
15	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
16	3	<b>Insist</b> that students do not touch any tools/machinery that they see.	No

**Assessment carried out by:** Melissa Glackin and Andrew Turney (FSC) April 2006

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** – Lucy Harrigan (07734 599730)

**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.