

RED RIDGE CURRICULUM MATERIALS

Key Stage Two

Water Study

Unit 1

This is a **three-day investigation**; however, the materials could be used as separate one-day or half-day activities.

The materials are:

Day 1 Ponds and Streams

Half-day activity on stream mapping – Afon Rhiw

Half-day activity on pond dipping

with follow-up Art work

Day 2 Geography of a River

Half-day activity - investigating water upstream - the birth of a river – Afon Rhiw

Half-day activity - investigating water downstream — a river in old age – River Severn

with follow-up English work

Day 3 The Lyn Clywedog Dam

Whole day visit to Lyn Clywedog Dam, Bryn Tail Lead Mines and to view the reservoir from the scenic trail

With follow-up Drama work

These activities cover: geography, science, mathematics, art, English, drama

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Day 1 Ponds and Streams**Stream Mapping**

Aims For the pupils to make an accurate map representation of the section of the stream.
For the pupils to use simple measuring equipment and techniques.
For the pupils to use their maps to add detail, thus making them look closely in detail at the stretch of stream.

Organisation Whole class activity or two separate groups on different stretches of stream
Each group to organise themselves into scribes, measurers, etc.

Resources Posts to support baseline
Tape/string to establish baseline
Tape measure
Clipboards, paper, pencil
Theodolite or similar to ensure the baseline is straight
Prepared data collection sheets

Time Two hours including follow-up

Method (Use the stream by the Centre – Afon Rhiw)

- 1 Establish baseline - pupils to lay out posts and string in a straight line using theodolite, etc.
- 2 Taking measurements - pupils measure from the baseline to the nearest side of stream, then from the baseline to the other side of the stream. They note the measurements on the data collection sheet.
- 3 Return to the classroom - leave the baseline in case of errors.
- 4 Pupils then use their measurements to draw an accurate map of their stretch of stream. They should use as big a scale as possible, on A3, and may need to return to take some half-metre readings.
- 5 Pupils return to the stream with the maps to admire their work and to dismantle the baseline.
- 6 Discussion about their work and possible extension activities.

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Extension work

Pupils could return to the stream and start to make their maps more detailed with boulders in the stream, etc.

Measure the current flow of that stretch of stream and then use their maps to find conclusions about current and width.

National Curriculum References

Mathematics	U + A	1a, 2b, c, d 3a, b, c
	N	1a, c
	SSM	1a, b, e 3b 4a, b,
	HD	2b
Geography	GS	2a, b 3b, c

Pond Dipping

Aims	For the children to discover that there is a rich variety of life in ponds and streams. For the children to identify and classify animal life. For the children to be aware that ponds and streams support different as well as similar forms of life.	
Organisation	Two groups, one to the pond, one to the stream. Together for the conclusion and collation of results. Pupils work in pairs/threes	
Resources	Fishing nets Large white trays Sample jars Beastie-scoops Pipettes Petri-dishes Identification key Data collection sheets	jam jars - free from kitchen (Ponds and Lakes - Usborne ISBN 086020 452 9 and Nuffield Science Keys - BSO 04111 - Longman)
Time	Three hours - open ended	

Method

- 1 Pupils take the equipment to the sampling area and are shown how to take a kick sample (three sweeps of the net) and then empty the contents of the net into sample jars. This can be done as many or as few times as time and resources will allow.
- 2 Pupils then return to the classroom to examine their samples. Tip the contents of the sample jar into the white tray and look. Each interesting animal can be extracted from the tray and placed on a petri dish and then identified using the key. Pupils then write the details on a sheet. (Group #, animal name, where found). Larger animals put into a tank or bucket of water from original environment.
- 3 Display findings and then give back the sheets to the pupils. Collate the information on a board: Animal

Pond
Stream
Both
Total each column.

- 4 Discussion and conclusions - Why are there different animals in the different habitats? Which animals would you expect to find in the lake? What different animals would you expect to find in the lake and why?
- 5 Samples returned to the pond or stream.

Follow-up work

Art - pictures of the various animals, make their own identification chart using outlines (cut out of black card as silhouette)

National Curriculum References

Science:	PoS	1a, b, c 2d, 4a,
	LP+LT	1b, 4a, 5a, b

Summary of Day 1

- 0900 Introduction to activity (either Mapping or Dipping)
0930 Fieldwork, collecting data
1030 Classwork collating data
1230 Lunch
1400 Introduction to activity
1430 Fieldwork collecting data
1530 Classwork collating data
1800 Dinner
Evening - follow-up work

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Day 2

Geography of a River

Overview

Young streams are rarely straight for any distance, but tend to follow a winding course, determined by the rocks and soil. The water runs swiftly and where there is an outcrop of resistant rock there will be waterfalls. As the streams join together, they form a river.

The river begins to widen the valley by wearing back the sides. This will be done by scouring and steepening the channel sides by the river itself, by rain-wash, soil creep, land-slides, weathering and by general water flow. Streams flow with a screw-like motion, which erode the outside of the curve of a river and deposit soil and debris on the inside. The channel is deepened on the outer side of each bend and the outer bank is worn back and undercut.

By the repetition of this widening process, as bend after bend ingrates downstream, the spurs are gradually cut away and a trough-like valley with a nearly flat floor is developed.

As the river continues to swing from side to side, it undercuts the land around. The river becomes sluggish and easily turned aside by obstructions in the channel floor and by the inflow of tributaries. These bends are called meanders.

The meanders can become very deep loops that gradually form together. If a flood occurs when only a narrow neck of land is left between adjoining loops, the river will take a short cut. The deserted channel is left, forming an 'ox-bow' lake, which soon degenerates into a swamp.

Aims For the children to understand where the water in a river comes from;
To reinforce geographical vocabulary: source, tributary, mouth, channel, and erosion;
To understand the relationship between a map and the land it represents;
To understand how rivers, erode, transport and deposit materials producing landscape features.

Organisation Whole groups or divided into two, swapping activities after lunch

Resources Photocopies of Pathfinder 887 showing Afon Rhiw
Map of River Severn
Coloured Crayons
Clip-board
Stop-watches
Tape measures
Oranges or something bright to place in water
Children will need waterproofs/walking shoes, etc.

Time This is a whole day investigation.

Method

- 1 In the classroom the pupils are given the copies of the OS map. They are then asked to identify Afon Rhiw and colour it in up to the courses.
- 2 Pupils are then asked to identify the feeder streams and shade them in a different colour.
- 3 Discussion about the river, where it comes from, its width at certain points.
- 4 Pupils then taken on a walk upstream with their maps to look at the stream. During the walk the pupils will be shown the contours surrounding it and asked to reason their importance on the size of the stream.
- 5 Depending upon the force of the river the children could look at the current to see where the river flows the fastest. A suitable section of stream could be found where the children could draw a plan of part of the river and plot on the plan the fastest and slowest currents. The children could then take a 10-metre section of the river and time an object flowing along it. They should then be encouraged to detect patterns and discover if currents can cross over.
- 6 After lunch, the children travel in the min-bus to River Severn to look at a river in old age. A good site is on the B4381 road to Lower Leighton from Welshpool.

Park on the B4381 where the road crosses the River Severn. Take the footpath south towards the White House.
- 7 Examine the meanders with the children. Explain: -

The development of a river valley depends on the original surface slopes, on the climate and the rock. This is a river in old age and meanders can be clearly seen. Show the children a map of the river and the meanders that are forming an 'ox-bow' to the north of the road.
- 8 Walk along by the river and examine how the river is undercutting on the outside bends and depositing gravels/soil on the inside bends.
- 9 Ask the children to look at the current to see where the river flows the fastest. A suitable section of the river could be found where the children could draw a plan of part of the river and plot on the plan the fastest and slowest current.
- 10 The children could then take a 10-metre section of the river and time an object flowing along it.

They should then be encouraged to detect patterns and discover if the current cross over.
- 11 Return to mini-bus and the Centre.

Follow-up work

A worksheet, cloze exercise, based on the work they have done in the session.

Summary of Day 2

0900	Introduction and overview of the day/dividing into two groups
0915	Preliminary classroom activity

0945 Preparation for departure
1000 Leave for walk
1200 Return to classroom for debrief and discussion
1300 Lunch
1400 Preliminary classroom activity
1415 Leave for ride to River Severn
1645 Return to classroom for debrief and discussion
1800 Dinner
Evening - follow-up work



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Day 3 Lyn Clywedog Dam

This is a day spent looking at the purpose and operation of Llyn Clywedog Dam and will explore the effects that the building of a dam could have on a community.

am: Visit Llyn Clywedog Dam

Location 4 miles NW of Llanidloes of B4518 (signposted scenic routes)

Σ Follow self-guided gorge trail which unfolds the civil engineering feats of building the dam, constructed to control the headwaters of the River Severn. It will take you to the now abandoned Bryn Tail Lead Mine.

Σ At Bryn Tail Lead Mine, the children can see the remnants of the Mid-Wales nineteenth century lead mining industry. The site looks at extraction to ore crushing.

pm: Σ After lunch, take the Llyn Clywedog Scenic Trail to see the best features of the reservoir. Start at Ystradhynod Farm car park (½ mile from the dam, near the sailing club). It is a 3-mile walk.

Σ Return to centre.

Role-play exercise — Dam Centre

Aim: For the pupils to explore and reinforce the Human Geography aspect of the day through role-play.

Time: 2 hours: open-ended.

Method:

Each pupil is given a role-play card and spends a few minutes studying and thinking about the role. Then they are asked to find another person and talk with them in character. Then the pairs are asked to join with another pair - heads in. This will help the pupils to establish their role.

Roles:

1 Village Vicar, Shopkeeper, Publican, Lowland Farmer, Two Foresters, Teacher, Farmer's Wife, A Retired Couple

2 Two Townies, Building Contractor, Lorry Driver, Unemployed Person, Two People from another Village, Forest Ranger.

Children then told about the proposal to build a dam in their valley - told it would create jobs, tourist facilities and that it may involve re-location and compensation.

Then the children will be asked to form small groups of three or four (this may need to be stage-managed to keep opposing forces apart!) and discuss the proposal - encouraged to look at advantages and disadvantages. Depending on how this is going the children could change groups once or twice.

Teacher/supervisors to circulate and help.

The children are then called to a public meeting - chair could be a pupil, or a teacher depending on circumstances. During the meeting the pupils will be asked for their contribution. Order must be kept but allowance made for heated discussion. The conclusion could be a vote.

Follow-up

Creative writing write about your feelings/or the pros and cons of dam building.
Art a before and after picture of the dam area
design a poster to advertise the area as a tourist facility

National Curriculum References

Geography 1a, b, d
2a, c
3a
5a, c, d
10a b

Summary of Day 3

0900	Centre	Introduction and overview of the day
1000	Llyn Clywedog	
1230	Lunch	
1330	Scenic Trail	
1600	Centre	Debrief on afternoon's trip
1700	Free time/dinner	
1900	Role-play exercise	
2100	End of activities	

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