Programme 2

Crystal Clear

Unit 2: The Role of Water in our Community

Teaching Point

Water has always played an important part in man's activities, in the past and in the present.

Outcomes: On completion of this unit students should be able to:

- Identify the role played by water in the community in the past.
- Identify settlements influenced by rivers
- Analyse the uses of water in present day economic activities.
- Understand how water is polluted in the local area.

Aonad 2: Ról an Uisce inár bPobal

Pointe Teagaisc

Bhí páirt thábhachtach riamh ag uisce i ngíomhaíochtaí an duine, san am a caitheadh agus san am i láthair.

Torthaí: Tar éis an aonaid seo a fhreagairt ba chóir go mbeadh daltaí ábalta:

- An ról a bhí ag uisce sa phobal sa am ar caitheadh a shainaithint.
- Lonnaíochtaí a raibh tionchair ag aibhneacha orthu a shainaithint.
- Anailís a dhéanamh ar úsáideacha uisce i ngíomhaíochtaí eacnamaíochta an lae inniu.
- Tuiscint a fháil ar conas a dhéantar truailliú ar uisce sa cheantar áitiúil.

Activities

1. Map work

Look at historical sources for evidence of past water uses, water mills, canals, fishing, trade, quays/docks/wharves.
Photocopy the 1st Edition Ordnance Survey Map for the area. Scan the map for evidence of the influence or use of water in the past. If possible compare the 1st Edition with the situation on the 2nd and 3rd Edition. List and describe the activities that you find.

2. Map work

Examine the 1:50,000 OS Sheet for the area to identify settlements influenced by rivers. Look for bridge point and spring-line settlements. Give grid references and describe the situation of each settlement. Try to map the catchment area of each of the rivers.

3. Brainstorming

Get the students to list all the uses of water in the present economic activities. Look at water treatment plants, factories, domestic uses, agriculture, dams and weirs and tourism. Compare these uses with the picture built up from the analysis of the early maps.

4. Individual Work

Using what been seen and learned from the video tape identify and describe the main possible sources of water pollution in the local area. Look at the possible numbers of septic tanks, agricultural sources, industrial sources or domestic sources. Is there domestic sewage treatment in the area? If so is it primary, secondary or tertiary treatment.

5. Investigation Fieldwork

Structure you fieldwork around the following steps!

Step 1: Identify key aims or formulate a hypothesis

Step 2: Identify and get the background material required.

Step 3: Identify the main methods of gathering your information.

Step 4: Identify the main results and draw a conclusion.

Step 5: Identify some achievable actions, which may help the situation.

Step 1: Aims or Hypothesis

To test the hypothesis that
"Rivers are more polluted down river than up river of urban centres"

Aims:

1. Identify four sample sites on a local river, two up river and two down river, of the urban centre.
2. Carry out a visual survey of the riverbanks, riverbed and water samples.
3. Carry out a simple chemical survey of a water sample.
4. Take a kick sample of the riverbed to identify biological indicators of water quality.

Step 2: Preparation and Background Materials

1. Review the "Crystal Clear" Video.
2. Look at the EPA Millennium Report section on water quality, available on the EPA website www.epa.ie, to identify the national and regional situation.
3. Refer to science department for equipment and effective methods of use.
4. Prepare recording sheets and practice basic tests.
5. Identify four safe sites on the river for testing.

Step 3: Methods of Gathering

1. ***Visual Survey.***
   Divide students into groups of four to six. Firstly carry out the visual survey. Each group will look at the riverbank and riverbed for signs of litter, sewage, dumping or algal slime. Each group will then take a water sample in a jar and record any smell, colour or floating slime or silt.
   All these results are to be recorded carefully on the recording sheet for the site.

2. ***Chemical Survey.***
   Using jars each group will take water samples from the river and test Ph, temperature, foam and dissolved oxygen. Foam can be tested by shaking the jar of water for one minute and then timing the length of time it takes the bubbles to disappear. Dissolved oxygen can be measured by the use of drops of methyl blue in a water sample from each site. Take a jar of water back to the class from each site. Carefully label each sample. When you return to school put a few drops of methyl blue in each jar. Then put them in a dark press. The rate of clearing of the blue stain is an indication of the amount of oxygen in the water. A high level of oxygen is a good indication of water quality.
   Use Ph indicator paper to record the Ph and a thermometer to record the water temperature.

3. ***Biological Survey.***
   Place a hand net in the river and kick up a sample of the riverbed upstream of the net. Sand, stones and samples of the river life will land in the net. Empty the contents of the net into a basin and try to identify the samples of river life that you can see. Use your identity chart to check if they are good indicators of water quality. Record all your findings and return the sample to the river.

   Repeat these tests and activities at three other sites along the river making sure that at least two are down river of the urban centre.

Be aware of safety issues when undertaking fieldwork in or near water!

Step 4: Results and Conclusions

Back in the classroom divide the class into their groups and get each to combine their individual results within the group. Each group should then report to the overall class and a consensus result for the class should be established. From these results draw a meaningful conclusion and prove or disprove the hypothesis.
Each individual student should then write up a report on the investigation describing the four steps of the investigation. This should take the form of an A4 type presentation with the results presented as graphs and tables. The use of diagrams and photographs as well as the use of information communication technology (ICT) should be encouraged.

Step 5: Action

- Prepare a wall display or poster of the investigation and the key results. Display the project in school, in the local library or local authority office.
- Write a report to the local newspaper reporting on the investigation and highlighting the significant environmental issues.
- Invite speakers from your local authority and local environmental groups to discuss the issues with your class.

Programme 2
Crystal Clear

Look at the videotape once. Look, Listen, Concentrate and Enjoy! 26 minutes approximately. How closely did you look?
Now take a second look. Stop, Start and Rewind the tape to identify clearly what you think Duncan is now telling us about water quality in the Irish environment.
Now complete the following worksheet questions.

Water our Natural Resource

1. What are the main statistics presented in the EPA Millennium Report about our lakes and rivers?

2. Water pollution threatens three different aspects of our life and economy, what are these?

Sea Water

3. What are the effects of dumping raw sewage into the seas around Ireland?

4. Water treatment is seen as the solution to the problem. Describe the three stages of treatment.
   (i) Primary treatment

   (ii) Secondary treatment

Clár 2
Gléghlan

Féach uair amháin ar an bhfístéip . Féach, Éist, Dírigh d'intinn air agus Bain Sult As! Timpeall 26 nóiméad. Cé chomh grinn is a d'fhéach tú?
is féach in athuair. Stop, Tosaigh agus Cuir Siar an téip chun a aithint go soiléir cad a cheapann tusa atá á rá ag Duncan linn faoi chaighdeán an uisce i dtimpeallacht na hÉireann.
Freagair ceisteanna na bileoige oibre seo a leanas:

Uisce ár nAcmhainn Nádúrtha

1. Cad iad na príomhstaitisticí atá i dTuarascáil na Mílaoise EPA faoinár lochanna agus faoinár n-aibhneacha?

2. Tá truailliú uisce ina bhagairt do thrí ghné éagsúil dár saol agus don eacnamaíocht, cad iad?

Uisce Sáile

3. Cad iad na tionchair a bhíonn ag múnlach amh a dumpáil i bhfarraigí thart timpeall na hÉireann?

4. Féachtar ar choireáil uisce mar réiteach ar an bhfadhb. Déan cur síos ar na trí chéim cóireála.
   (i) Cóireáil Phríomhúil

   (ii) Cóireáil Tháinisteach

(iii) Tertiary Treatment

Fresh Water

5. What is industrial wastewater, what does it include, and who monitors wastewater?

6. What did the EPA discover about the water quality of our rivers?

Septic Tanks

7. What are the main problems with septic tanks?

8. What is considered to be the best natural alternative to treating raw sewage?

9. Explain how it works?

(iii) TCóireáil Threasach

Fionnuisce

5. Cad is fuíolluisce tionsclaíoch ann, cad a bhíonn i gceist leis agus cé a dhéanann monatóireacht ar fhuíolluisce?

6. Cad a fuair an EPA amach faoi chaighdeán uisce ár n-aibhneacha?

Dabhcha Séarachais

7. Cad iad na príomhfhadhbanna a bhaineann le dabhcha séarachais?

8. Cad a mheastar a bheith ar an rogha malartach is fearr ar mhúnlach amh a chóireáil?

9. Mínigh conas a oibríonn sé?

10. What are the main nutrients associated with eutrophication or enrichment?

11. What are the visible effects of eutrophication on the rivers and lakes?

12. What is the main solution to eutrophication?

Farms

13. What are the main sources of enrichment, which come from farms?

14. What are the main problems associated with the storage and spread of slurry?

15. How does the REPs scheme attempt to manage enrichment?

10. Cad iad na príomhábhair chothaithe a bhaineann le heotrófú nó saibhriú?

11. Cad iad na tionchair infheicthe a bhaineann le heotrófú ar aibhneacha agus ar lochanna?

12. Cad é an príomhréiteach ar eotrófú?

Farms

13. Cad ia na príomhfhoinsí saibhrithe a thagann ó fheirmeacha?

14. Cad iad na príomhfhadhbanna a bhaineann le stóráil nó scaipeadh sciodair?

15. Conas mar a dhéanann an scéim REPs iarracht bainistiú a dhéanamh ar shaibhriú?

Our Drinking Water – The Public Supply

16. Why is it safe to drink the water from our public water supplies?

17. Outline the four main stages in the treatment of drinking water.

18. What is the cost of treated water?

Our Drinking Water – Private Supplies

19. What percentage of the water from group water schemes is contaminated?

20. What are the main sources of this contamination?

Ár nUisce le hÓl- An Soláthar Poiblí

16. Cén fáth go bhfuil sé sábháilte an t-uisce as ár soláthair phoiblí a ól?

17. Leag amach na ceithre phríomhchéim a bhaineann le cóireáil a dhéanamh ar uisce le hól.

18. Cén costas a bhaineann le huisce cóireáilte?

Ár nUisce le hÓl- Soláthair Phríobháideacha

19. Cén céatadán den uisce ó ghrúpscéimeanna a bhíonn truaillithe?

20. Cad iad príomhfhoinsí an truaillithe seo?