

Mapping your catchment



Conduct this activity before completing your monitoring or preparing your local Catchment Condition Report.

Key Learning Outcomes

Level 4 Science: Living together

Identify living and non-living things that affect the survival of organisms in an ecosystem.

Level 5 Science: Living together

Explain the effects of various environmental changes on living things in ecosystems.

SOSE: Place and space

Compare natural and human environments and describe factors affecting them.

Maths, Art

Aims

- to develop mapping skills
- to develop understandings about the influence of catchment on your waterway and monitoring site

Materials

graph paper

maps of your local catchment and region

mural and/or model making materials (for Extension activities)

Additional references

A Community Water Quality Monitoring Manual for Victoria, pages 3-6 and 11-12 in Getting Started section.

Waterwatch Victoria Website

<http://www.vic.waterwatch.org.au>

Activity instructions

1. Introduce or revise the catchment concept.

[Refer to pages 3-6 in *A Community Water Quality Monitoring Manual for Victoria*, and Extension activity.]

2. Using a local map(s), prepare a map of the catchment for your monitoring site. Trace your local waterway from your location to its headwaters. Trace where it goes downstream from your location.

[Refer to pages 11-12 in *A Community Water Quality Monitoring Manual for Victoria*.]

3. Ask students to give examples of why it is useful to know about your local catchment for your water quality monitoring activities.

Victoria's river basins and catchments

Explain that the term 'catchment' can be used to cover a local catchment of a group of smaller catchments. They will be working in their local catchment.

Water and land management agencies however often group together smaller catchments to make up larger catchment units for management and planning purposes. For example, Victoria is organised into 10 major Catchment Regions by grouping together several adjoining River Basins.



Extension

1. Create a simple 3D catchment model of a catchment (hills and a central valley). Use a small watering can to simulate rain falling onto the hills. Use coloured water in the watering can to more clearly show that the 'rain' collects in the valley in waterways and wetlands. This also demonstrates that what happens in the catchment influences water quality.
2. Create a large mural(s) of the basic topography of your local catchment and/or your region to pin on the classroom wall.
3. Create a large mural(s) of the basic topography of your local catchment and/or your region to pin on the classroom wall.
4. Identify other waterways/wetlands in your region and add them to your mural (or model). - Where does their water come from?
5. Identify and discuss how your region is similar/different to others (in Victoria/in Aust./other countries in the world).

One plus one plus ...

Key Learning Outcomes**Level 4 Science: Living together**

Identify living and non-living things that affect the survival of organisms in an ecosystem.

Level 5 Science: Living together

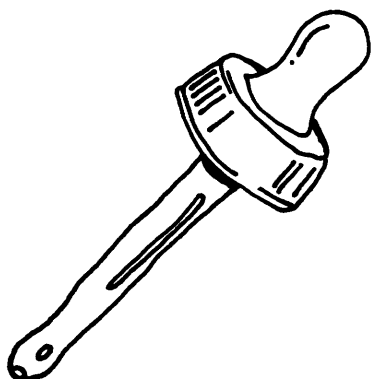
Explain the effects of various environmental changes on living things in ecosystems.

English**Aims**

- to demonstrate that many small insignificant impacts can create a major problem if many people do it.
- to highlight that many small, seemingly insignificant actions taken by many people can together overcome a major problem.

Materials

- 1 glass of tap water
- eye dropper (preferably 2, for speed)
- yellow food colouring

**Activity instructions**

1. Add 1 drop of the food colouring to the glass of water. Ask the students what differences, if any, they notice. *[It should make no visible difference.]*
2. Ask each student, one at a time, to add just 1 drop to the glass. After all the drops have been added (e.g. 30 drops), check how the water looks. *[The food colouring will now have discoloured the water.]*
3. Discuss the results: 1 drop showed no difference, 30 drops showed a very noticeable impact on the water. Somewhere in between 1 to 30 drops, a difference began to be seen.

4. Compare this to water quality impacts. If one individual person makes a small impact, it may not have any noticeable effect on the waterway. But if many people in the community do just that one small activity, it can add up to a big impact.

5. Make a class list of small individual impacts that one person can make on waterways

[E.g. throwing rubbish onto streets or directly into waterways; tipping pollutants down the gutter - stormwater is not treated before it flows into waterways].

6. Ask students what happens in each case listed in step 5. What is the physical or chemical effect on the river of one person doing that activity? What is the impact of many people doing that activity?

7. Draw a flow diagram to show the consequences on the waterway of one of the activities listed in step 5.

8. The same principle applies to small individual actions that help look after waterways. Discuss this positive scenario. Ask students for ideas on what individual people can do to help look after our waterways. Develop a class list. The class could refer to this list when developing their action plan for looking after their local wetland or waterway.

[Make the point that often because the damage has become so large, a large effort by many people is first needed to clear up the accumulated problem. For example a group of residents collect the accumulated rubbish from the river then place notices in local letterboxes and newspapers explaining how residents can to look after the river by not putting rubbish down storm drains.]

9. Students write a short essay about an imaginary river that became polluted by many small individual actions. In it they describe how the river was cleaned up and stayed clean.

The platypus



Key Learning Outcomes

Level 4 Science: Living together

Identify living and non-living things that affect the survival of organisms in an ecosystem.

Level 5 Science: Living together

Explain the effects of various environmental changes on living things in ecosystems.

Art

If conducting these activities for Level 5, provide and obtain more detailed information and responses.

Aims

- to understand the living requirements of platypus, and what impacts people are having on its survival.

Materials

Student sheet 20: The platypus.

Platypus section from:

Information sheet 2: Victoria's wetland life.

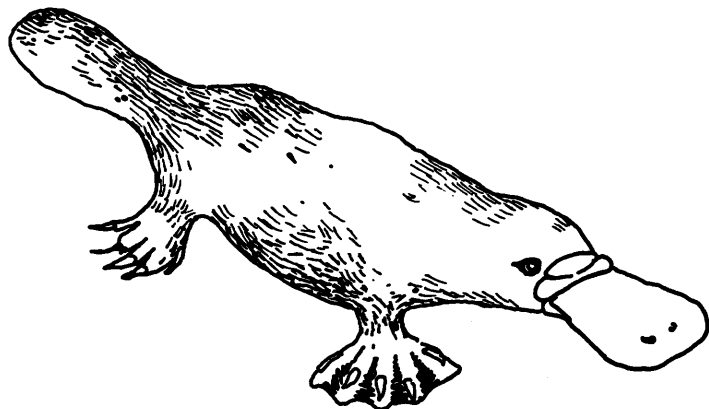
Information sheet 3: Adapted for living in water.

Additional references

The platypus information kit. Australian Platypus Conservancy and Melbourne Water. Fact sheets and platypus survey results.

Advanced preparation

- Duplicate required sheets.



Activity

- Discuss the term 'desnag' so that all students know its meaning.

[A 'snag' is a dead tree or part of a tree that has fallen into a stream and impedes water flow. These 'snags' are natural and provide important habitat for many aquatic animals. 'Desnagging' is the term used when people remove trees from a stream to 'improve' its water flow. All trees and fallen branches in the water, or likely to fall into it, are cleared from the water and river bank so that they will not impede water flow.]

- Review the food and habitat requirements of the platypus (from Information sheets 2 and 3.)

[Their food includes caddis fly and other insect larva, worms, shrimps; platypus shelter in a resting burrow and nest in a much longer and more elaborate nesting burrow in the river bank.]

- Distribute the student sheet. In small groups students discuss possible impacts on the platypus living in a section of creek if:

- a dam is built upstream

[The platypus may not survive because the water will be colder and the river may no longer be deep enough. The change in water temperature and depth may kill the platypus's food supply.]

- pollutants wash into the river

[The platypus may not survive because pollutants kill the platypus itself or kill its food supply]

- the riverbank is cleared of vegetation and the river desnagged

[The platypus may not survive because the water will be warmer, the loss of habitat - fallen trees - in the river may reduce its food supply but most importantly the clearing of vegetation may have increased erosion, causing the river to become more turbid and killing the platypus's food supply.]

- its partially degraded river is improved by planting on the river bank.

[The platypus is more likely to survive because water quality will be improved by decreasing erosion of the river bank].

For each scenario, the groups report what they think may happen to the waterway and the platypus. Compile a class list for each scenario.

- Highlight the positive actions people can take to help platypus survive. This may give the class some ideas for their local action plan.



The platypus

1. Fill in the missing words:

A platypus:

- Eats _____
- Uses its bill to _____
- Shelters in a _____
- Need a _____ burrow to raise its _____

2. On a separate page, draw the following scene:

[A platypus swimming underwater, some of its food, and its burrows.]

3. What might happen to the platypus living in a section of river if:

a) a dam is built upstream

b) pollutants wash into the river

c) the riverbank is cleared of vegetation and the river desnagged

d) its partially degraded river is improved by planting on the river bank.

Monitoring with Waterwatch



Key Learning Outcomes

Level 4 Science: Living together

Identify living and non-living things that affect the survival of organisms in an ecosystem.

SOSE: Resources

Explain factors that affect resource use and development.

Natural & social systems

Describe responses of different elements to change in natural systems.

Level 5 Science: Living together

Explain the effects of various environmental changes on living things in ecosystems.

SOSE: Place and space

Compare natural and human environments and describe factors affecting them.

Health & Physical Education

Aims

- to develop technical skills in measuring water quality and assessing the health of waterways
- to develop skills in interpreting water quality measurements

Materials

Waterwatch equipment kit.

A Water Quality Monitoring Manual for Victoria.

Waterwatch Monitoring Results Book OR

Relevant record pages from the above Manual (Site Description in Getting Started section, pages 22-24; Stream habitat in Habitat section, pages 8-10; Macro-invertebrates in Biological section, pages 22-24; other tests in Physical and Chemical Tests section, page 26).

Advanced preparation

- Familiarise your students with the equipment, waterways and water quality by conducting the activities described in earlier pages of this Kit.

Additional references

Waterwatch Victoria Website
<http://www.vic.waterwatch.org.au>

Activity instructions

- Recap the benefits of monitoring water quality in our waterways: for our lifestyles and all living things.

[Relatively little data has been collected on the state of waterways so we have little information to compare results over time. By collecting data for your local site, you will be establishing records against which comparisons can be made in future to know whether water quality is improving or declining.]

- Identify the catchment area of your monitoring site and trace the source(s) of the water that flows into it. [See Teacher sheet 18, page 91.]
- Monitor your local wetland/waterway as part of the Waterwatch program (use the Waterwatch equipment kit supplied to you and *Water Quality Monitoring Manual*). Conduct the tests as described on the instruction sheets in the equipment kit.
- Record your results in your region's Waterwatch Monitoring Results Book, or the relevant record pages from the Manual.

- Rainfall records should be kept daily.
- Site Description Sheet 1 and Stream Habitat Record Sheet only needs to be completed on the first monitoring day of each year.
- The Macro-invertebrate Record Sheet should be completed at least 2 times a year as part of the seasonal snapshots each autumn and spring.

[If you are able to, take readings each season.]

- The Physical and Chemical Tests should be conducted monthly, along with Site Description Sheet 2. These tests can be conducted more frequently if desired. For example, turbidity tests should be taken after major rain events.
- Soon after completing each test, send your regional Waterwatch Co-ordinator a copy of completed record pages for each test you conducted.
 - Analyse, present and interpret your results.
[See Teacher sheet 22: Interpreting your results.]
 - To develop an understanding of water quality in your catchment, use Waterwatch's Internet site, or contact your local Waterwatch Co-ordinator, to request any other data collected by groups further upstream or downstream of your waterway.

If results are available, graph them or compile tables and a map to show water quality results along the length of the river. Discuss possible reasons for the changes in water quality readings at different sites along the river.

Extension

Compare your data with other Waterwatch data in other regions of Victoria, Australia or the world. What is the condition of these waterways? What are people doing to look after their waterway?



Interpreting your results

Key Learning Outcomes

Level 4 Science: Living together

Identify living and non-living things that affect the survival of organisms in an ecosystem.

SOSE: Resources

Explain factors that affect resource use and development.

Natural & social systems

Describe responses of different elements to change in natural systems.

Level 5 Science: Living together

Explain the effects of various environmental changes on living things in ecosystems.

SOSE: Place and space

Compare natural and human environments and describe factors affecting them.

Maths; Technology, Health & Physical Education

Aims

- to develop skills in interpreting the results of water quality measurements

Materials

Your Waterwatch monitoring results.

Student sheet 22: Water quality results summary.

Water quality ratings for your region, OR

Water quality guideline pages from *A Water Quality Monitoring Manual for Victoria* (Stream habitat in Habitat section, page 6; Macro-invertebrates in Biological section, pages 23; Physical and Chemical Tests, page 25).

Advanced preparation

- Contact your regional Waterwatch Co-ordinator to check if local water quality guidelines have been developed. If not, use the Statewide guideline pages listed above in *A Water Quality Monitoring Manual for Victoria*.
- Duplicate required numbers of Student sheet 22 and relevant water quality ratings sheets.
- Discuss the class's results with your regional Waterwatch Co-ordinator. Are there any unusual results? What do the measurements indicate about water quality? Any suggestions about probable cause(s) of any poor water quality values at your site?

Additional references

Results to Action section of *A Water Quality Monitoring Manual for Victoria*.

Waterwatch Victoria Website
<http://www.vic.waterwatch.org.au>

Activity instructions

- Organise students into small groups as for their field work and distribute Student sheet 22 and copies of water quality ratings sheets.

[Students should be in the same group each time so they can collate their group's data over the year.]

- Students summarise their results onto Student sheet 22 and determine the water quality rating for each test the class conducted.

- Discuss these results as a class, in particular any that score a Poor or Degraded water quality rating.

[High turbidity, nutrient or salinity levels or low or excessively high oxygen readings will score Poor or Degraded ratings.]

- Review the daily rainfall readings to date and the site details from Site description Sheet 2. Are there any clues from this that may help to explain the water quality ratings at the time of your tests.

[E.g. turbidity may be high because of a recent heavy rainfall. Was there any visual evidence at the site of the cause of the pollution such as a drain upstream or dumped rubbish.]

- One factor at a time, brainstorm a list of reasons why that particular water quality factor may be Poor or Degraded at your site.

[See pages 1-8, Interpreting your Results section in A Water Quality Monitoring Manual for Victoria, and Student information sheets 4-7 in this kit for ideas.]

- Discuss each idea from the brainstorm list. Does it match all the evidence? Refine the list of possible causes.

- Have any factors changed much over time? Compare the class results over time by plotting them on a graph or compiling them in a table. Has that particular factor increased or decreased over time? If so, ask students to suggest what might be some reasons for the change in the reading? Could it be a natural change with the season?

[E.g. temperature increase of the water in summer, decrease in water flow in summer.]

If it is not likely to be a natural change, ask students to suggest possible reasons for the increase/decrease in the reading.

- Students complete Student sheet 22.

- If results are available from other groups, plot them onto a graph or compile them in a table to show sites along the length of the river. Suggest possible reasons for the changes in water quality readings at different sites along the river.



Water quality results summary



Complete one of these sheets each time you conduct tests at your monitoring site.

Name: _____

Monitoring site: _____

Date: _____

1. Water quality results

Parameter	Reading	Rating
Stream habitat		
Macro-invertebrates		
Conductivity		
pH		
Turbidity		
Dissolved Oxygen		
Phosphorus		

a) Briefly describe any recent weather conditions that may have influence your results (e.g. heavy rainfalls).

b) Briefly describe any other features that may have influenced your results.

2. **Summary.** Tick the relevant result for each test you conducted.

	Excellent	Good	Fair	Poor	Degraded
Stream habitat					
Macro-invertebrates					
Conductivity					
pH					
Turbidity					
Dissolved oxygen					
Phosphorus					

b) Write a sentence or two to summarise water quality and stream side habitat at your monitoring site at this time. (List any factors which score a Poor or Degraded



Introduced impacts



Key Learning Outcomes

Level 4 Science: Biodiversity, change and continuity

Identify current endangered species and examine strategies to conserve them.

SOSE: Natural & social systems

Describe responses of different elements (including people) to change in natural systems.

Level 5 Science: Living together

Explain the effects of various environmental changes on living things in ecosystems.

SOSE: Time, continuity and change

Explain people's motives and actions from various perspectives.

SOSE: Place and space

Evaluate individual and group views on issues related to management of environments.

Arts, English

Activity instructions

1. Identify some native plants and animals of waterways, and some introduced species that live in or around waterways or wetlands. Draw these as a poster of river life, with one side of the river showing native plants and animals, and the other side showing introduced plants and animals.
2. Suggest some reasons why there are introduced plants and animals in Victoria. Have all Victoria's pest plants and animals come from overseas? How do overseas plants and animals get into Australia.
3. Describe how Willows can affect waterways. What impacts might they have on the waterway and life in it? Make a list of ways people can help to reduce the problems caused by Willows.
4. Describe how Carp can affect waterways. What impacts might they have on water quality, water plants, native fish and other river life?
5. Draw two flow diagrams; one to show a natural waterway and another to show what might happen to a waterway if carp are introduced into it. Show what affects this may have on the native plants and animals and water quality.
6. Brainstorm a list of ways anglers can help to reduce the problems caused by Carp.
7. Discuss whether people's attitudes about Willows and Carp has changed since these pests were introduced to the country? Discuss why people might wanted to introduce new plants or animals into Australia? Discuss what the farmer who introduced Carp into Victoria in 1961 might have done if he knew in advance what impact Carp would have.
8. Identify what State and local environmental agencies and land managers are doing about Carp, Willows and Blackberries and waterway protection in your area.
[Contact your local regional office of the Department of Natural Resources and Environment and your local Council office].
9. Students write an essay comparing River Red Gums and Willows and their effects on a river and aquatic life.

Aims

- to investigate the impact of introduced plants and animals on waterways and wetland species.

Materials

Information sheet 2: Victoria's wetland life (pages on Carp, Willow, Blackberry, and River Red Gum).

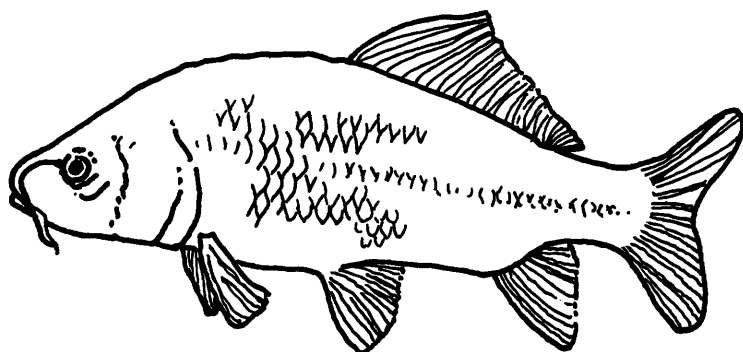
Advanced preparation

Duplicate required numbers of the Information pages.

Additional references

Feral Peril. Gould League of Victoria

Willow Removal Program Fact Sheet. Waterways and Drainage Group. Melbourne Water.



Local action to improve stream habitat



Key Learning Outcomes

Level 4 Science: Living together

Identify living and non-living things that affect the survival of organisms in an ecosystem.

SOSE: Natural & social systems

Describe responses of different elements (including people) to change in natural systems.

Level 5 Science: Living together

Explain the effects of various environmental changes on living things in ecosystems

Place and space

Compare natural and human environments and describe factors affecting them.

Evaluate individual and group views on issues related to management of environments.

Health & Physical Education; Arts, English

Aims

- to identify some achievable local actions that the class can undertake to help look after the waterway/wetland they are monitoring
- to develop an action plan to achieve this
- to successfully complete the action plan

Materials

Completed Student sheet 22: Interpreting your results

Blackline master 7A or 7B: Spot the differences, whichever is most appropriate for your site.

Additional resources

A Community Water Quality Monitoring Manual for Victoria, pages 1-4 Habitat Survey section.

Riparian Management Sheets 1-6. Available from Land & Water Resources Research & Development Corporation. GPO Box 2182, Canberra, ACT, 2601.

Local Waterwatch Catchment Co-ordinator for details about local groups and projects.

NRE for details about your local Landcare groups.

Your region's Catchment Management Authority.

Advanced preparation

- As part of your stream habitat monitoring students should conduct a streamside habitat survey (see *A Community Water Quality Monitoring Manual for Victoria*). In particular, students can draw a cross-section of your waterway to illustrate what the streamside habitat is like. If you know the names of plants, label them on the sketch (e.g. River Red Gum). Refer to reference list for plant identification books.
- Contact your local Waterwatch Catchment Co-ordinator, NRE and Catchment Management Authority for details about relevant local groups and projects. You may be able to assist an existing river improvement project, or obtain recommendations on priority water improvement projects in your area.
- Make an overhead of Blackline master 7A or 7B if required

Activity instructions

- Soon after commencing monitoring of your site's Stream Habitat, identify its Stream Habitat rating.
- Refer to your monitoring results (completed Student sheet 22). Do any of your physical and chemical test results indicate high levels of nutrient or turbidity, or problems with temperature or dissolved oxygen levels? If so, improving stream habitat may help reduce these problems.
- Predict what might happen to your monitoring site if no action is taken.

[E.g. *stream habitat will deteriorate and this will decrease water quality and the amount of wildlife both at the site and downstream. The site will become less appealing for people to visit.*]

- Use Blackline master 7A or 7B as a stimulus (as an overhead, or students use their copy from this earlier activity). As a class, brainstorm a list of ideas on how to improve stream habitat at your site.

[E.g.

- replanting bare or eroding stream banks and verges with native plants*
- helping the few remaining River Red Gums to regenerate*
- removing Willows and other weeds*
- making signs informing visitors how to care for the site*]

- Write these ideas as a list on the board.

[Take all ideas at this stage; they will be reviewed and priorities later].



Local action to improve stream habitat cont.



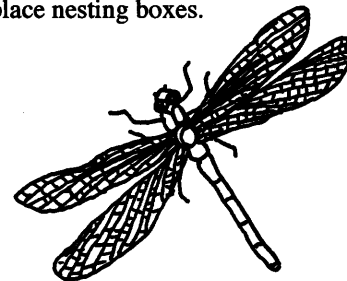
6. After the brainstorm list is compiled, discuss each idea on the list. One idea at a time, identify the separate steps involved in implementing that idea.
[E.g. *fencing the river bank to prevent livestock from trampling and eating the seedlings*]
Put a tick beside the steps that the class can do.
7. Find out what other groups in your area are doing or could do to help look after your waterway or wetland. Perhaps the class could assist an existing project or group? Or you may be able to get another group to work with you on your chosen project.
8. Review the list and circle each idea for habitat improvement that would be practical for the class to undertake.
9. Choose one of the circled habitat improvement ideas to develop a step by step plan of action with the class. Set achievable goals and timeline.
10. Organise the first step of your action plan.
11. Implement the first step of your action plan.
12. Monitor your action plan. You may need to adjust your initial project plan.
13. Celebrate your successes!
14. Take photographs during the project. Write 'newsletter' or 'newspaper' articles.
15. Prepare posters, murals, photographic displays or write essays to describe how the site has changed over time and what effects this has had/is having on life in and around your waterway or wetland.
16. Interview people who live near or use the site to hear what their views are on the changes to the site.
17. Contact a local newspaper to invite them to write a story about your stream habitat improvement project and your water quality monitoring project.

Ideas for improving poor or degraded streamside habitat

Refer to pages 16 - 18, From Results to Action section, *A Water Quality Monitoring Manual for Victoria*.

Here are some additional ideas for school and student action.

- Find out what can your class do to help the survival of some of the threatened plants and animals that rely on local wetlands or waterways? (See threatened species list in Information sheet 2: Victoria's wetland life.) You may be able to plant native species they require, fence off areas, or place nesting boxes.
- Replant bare or eroding stream banks and verges with native plants
- Help any remaining River Red Gums to regenerate by:
 - fencing off some areas from livestock
 - reducing rabbit numbers
- Remove willows and other riverside weeds
 - obtain assistance with identifying weeds from local experts
- Remove hard rubbish such as plastics, paper, cans, bottles, car bodies etc from the site and the river
- Make signs to inform visitors how to care for the site
- Make displays about the river to place in local shopping areas or notice boards
- Writing articles for local newsletters about the value of your local river and its plant and animal life. Include ways people can help to care for the site
- Arranging for the local newspaper to cover the class's water monitoring project



Some of these activities are best carried out by assisting existing adult groups and their community projects. Contact your local Waterwatch Co-ordinator for suggestions on which existing projects or groups would be suitable to team up with for your local stream habitat improvement project.

Local action to improve water quality



Key Learning Outcomes

Level 4 Science: Living together

Identify living and non-living things that affect the survival of organisms in an ecosystem.

SOSE: Resources

Explain factors that affect resource use and development.

Natural & social systems

Describe responses of different elements (including people) to change in natural systems.

Level 5 Science: Living together

Explain the effects of various environmental changes on living things in ecosystems.

SOSE: Place and space

Compare natural and human environments and describe factors affecting them.

Evaluate individual and group views on issues related to management of environments.

Health & Physical Education; Arts, English

Aims

- to identify some achievable local actions that the class can undertake to help look after the waterway/wetland they are monitoring
- to develop an action plan to achieve this
- to successfully complete the action plan

Materials

Completed Student sheet 22: Interpreting your results.

Blackline master 7A or 7B: Spot the differences, whichever is most appropriate for your site.

Additional resources

Your Waterwatch Catchment Co-ordinator.

Regional office of the Department of Natural Resources and Environment (NRE) and/or your Catchment Management Authority (CMA).

Advanced preparation

Contact NRE and your local Waterwatch Catchment Co-ordinator for details about relevant local groups and projects that relate to maintaining or improving water quality at your monitoring site.

Activity instructions

- After monitoring the physical and chemical condition of your site use the completed Student sheet 22 to identify if the site has a Fair, Poor or Degraded water quality rating. Identify whether this is because of high turbidity, nutrient or salinity levels or low oxygen levels.
- Predict what might happen to your site if no action is taken.

[E.g. water quality will decline further; aquatic animals could die; the death of aquatic plants could lead to erosion of the river bed and loss of aquatic animals; increased nutrient levels could lead to algal blooms; fishing could be reduced; swimming or other water contact sports could be prevented for health reasons; the site will become less appealing for people to visit.]

- Using Blackline master 7A or 7B as a stimulus, brainstorm with the class a list of ideas on how to improve water quality at your site. [e.g.
 - reducing the amount of nutrients that get into the water
 - reducing the amount of sediment that gets into the waterway
 - removing rubbish in the river.]
 - Write these ideas as a list on the board. [Take all ideas at this stage; they will be reviewed and prioritised later].
 - After the brainstorm list is compiled, discuss each idea on the list. One idea at a time, identify the separate steps involved in implementing that idea. [e.g.
 - fencing the river bank to prevent livestock from walking in the river
 - not putting the wrong things down the drain at school and home (too much detergents, fertilisers, paints etc.)
 - not wasting water; understanding stormwater and not putting the wrong things into waterways (rubbish, from gardens and streets).]
- Put a tick beside the steps that the class or individuals can do.
- Find out what other groups in your area are doing or could do to help look after water quality in your waterway or wetland. Perhaps the class could assist and an existing project or group or you may be able to get another group to work with you on your chosen project.



Local action to improve water quality

7. Review the list and circle each idea for water quality improvement that would be practical for the class (and individuals at home) to undertake.
8. Choose one of the circled water quality improvement ideas to develop a step by step plan of action with the class. Set achievable goals and timeline.
9. Organise the first step of your action plan.
10. Implement the first step of your action plan.
11. Monitor your action plan. You may need to adjust your initial project plan.
12. Have students report on their individual actions.
13. Celebrate your successes along the way!
14. Take photographs during the project. Write 'newsletter' or 'newspaper' articles. Prepare posters, murals, photographic displays or write essays to describe how the site has changed over time and what effects this has had/is having on life in and around your waterway or wetland.
15. Interview people who live near or use the site to hear what their views are on the changes to the site. Try to interview a range of user groups (e.g. anglers, walkers, rowers.)
16. Contact a local newspaper to invite them to write a story about your stream habitat improvement project and your water quality monitoring project.
17. Discuss how the class's actions may affect the use and development of the site in the future. How might this future scenario be different if no action was taken?
18. Invite other groups or water management agencies to tell you about their water quality or river improvement project. Identify what ways their actions are helping to improve water quality or river habitat, and the consequences for people in the area.

Ideas for improving and maintaining water quality

Refer to pages 16 - 18, From Results to Action section, *A Water Quality Monitoring Manual for Victoria*.

Here are some additional ideas for school and student action. Heavy work is best conducted with a local adult group.

- Help prevent toxins, sediment and excess nutrients from entering your monitoring site and waterway by:
 - planting around it to trap nutrients and toxins before they enter the wetland or waterway (by planting natives you also enhance habitat)
 - fencing it from livestock
 - building a ramp or steps between the top and bottom of a bank at places where river access is needed.
- Inform visitors to the site (via signs, displays, newspaper articles etc) of ways to reduce their recreational impacts.

Everyone can help by:

- taking their rubbish, especially plastics, home with them.

Anglers can also help by:-

- not leaving behind any fishing tackle, especially plastic ones, and disposing of dead fish (particularly carp) at home and not leaving them on the river bank.

Boaters can help by:-

- not producing wakes within 150 m of the shore line and reducing speed near riverbanks
- using on-shore toilet facilities where possible, or discharging boat sewage into open water deeper than 6 metres.

- Inform people of ways that everyone at home can help water quality by:
 - using phosphate free detergents and washing powders
 - pour cooking fats into a container and put into the rubbish rather than tipping down the sink
 - using pesticides and herbicides safely and sparingly
 - disposing of unwanted chemicals safely and not pouring them down the drain
 - reducing your household's use of fertilisers.

Some of these activities are best carried out by assisting existing adult groups and their community projects. Contact your local Waterwatch Co-ordinator for suggestions on which existing projects or groups would be suitable to team up with for your local water quality improvement project.

