

Eco-warriors!

Science, Level 2

The Learning Context:

In this unit students will explore how human actions can have both a positive and negative impact on the natural environment. They take a 'walk and talk' tour in their local community.

During the first stage of the unit students will brainstorm a list of environmental success stories and problems caused by human actions (eg: waste recycling and disposal, forestation and de-forestation, pest control and pesticides, flood control and erosion, clean air enhancements and pollution, etc). They will then select one environmental issue that they wish to study in further depth. Students will gather a range of information about their chosen issue using the internet and library, and by interviewing key people (eg: DOC workers, City Council staff, Greenpeace members, etc).

During the next stage of the unit students will take an active role in becoming 'eco-friendly' citizens as they work together to identify and then rectify a local environmental problem. Students may decide to clean up the local beach, assemble a recycling station at school, plant more trees at the local park, or lobby the local council to install more rubbish bins in the town centre, etc.

Students will then celebrate their achievements and promote an 'eco-friendly' message by sharing their learning and actions with other students in the school, parents and the wider community.

Approximately 10 - 14 lessons

Achievement Objectives:

SCIENCE CURRICULUM: LEVEL 1/2:

Participating and Contributing: Students will Explore and act on issues and questions that link their science learning to their daily living.

As they ...

Planet Earth and Beyond – Interacting Cycles: Describe how natural features are changed and resources affected by natural events and human actions.

Enterprising Attributes:

- Generating, identifying and assessing opportunities
- Using initiative and drive
- Working with others and in teams
- Being fair and responsible
- Planning and organising
- Collecting, organising, and analysing information
- Communicating and receiving ideas and information

Teachers to observe and collect evidence of these enterprising attributes in action.

Resource Requirements:

Journal articles that cover environmental issues, eg:
 The Greenhouse Effect – Just Hot Air? SJ, Pt 3, No 1, 1994
 The Power of Rubbish – Connected 3 1998
 Shifting Sands – SJ, Pt 4, No 2, 1996
 Trees for the Birds – SJ, Pt 2, No 4, 1997
 Compost Heap – SJ, Pt 3, No 1, 1986
 Dead Car Clean Up – SJ, Pt 2, No 2, 2004

- A spokesperson for environmental issues
- Environmental groups, eg: Greenpeace, Forest and Bird Society, WWF, etc
- The local council
- Access to school and community based research facilities, eg: library, computers, etc
- Decision Making Grid
- KWL Chart

Science Learning Outcomes:

Students will be able to:

1. Describe a range of environmental issues that we face in today's world.
2. Identify actions that people can take to rectify/improve the natural world.
3. Participate in an environmental project within the local community taking responsibility for an allocated role.
4. Evaluate the success, or otherwise, of the environmental project.

Teaching and Learning Sequence

NB: Teachers are encouraged to gauge the prior knowledge of their students before implementing each unit so that they can provide personalised and meaningful learning opportunities. The teaching and learning sequence provided in each unit is to be viewed as a guide only. Teachers will need to adapt this sequence to meet the needs of their students, school and community.

The future focus issues of sustainability, citizenship and enterprise can be explored during this unit. The quality of our environment is important to our feeling of well-being. The more we can improve and respect our environment, the more benefits we create for all living things. This is one aspect of sustainability. Sustainability requires people to be responsible citizens, and to be enterprising in their approach to using resources.

The numbered activities listed below are learning steps rather than lessons. Teachers may choose to combine two or three learning steps into one lesson. Alternatively, they may spread one learning step out over several lessons. This will be largely dependent on students' prior knowledge and their subsequent learning needs.

Getting started:

The teacher reads the journal article "Dead Car Clean-Up" (School Journal Pt 2, No 2, 2004) to students. This article describes how students from Punaruku School in Northland have worked with the regional council and other community groups to get rid of dumped cars in their local community. This text can be used as an inspirational tool throughout the unit. The students then do a 'walk and talk' tour of their local environment, places to consider are: schools, parks, beaches, local shops, streets.

The unit and focus for learning is described to the students. Explain that the class will:

- Explore environmental issues and the impact that humans have on the natural world.
- Identify local environmental problems and select one problem to improve or rectify.

The class creates a timeline for the unit with key dates for critical actions. This process will make the teaching sequence of the unit explicit to the students.

LINKS TO BES Best Evidence Synthesis

- 5. Quality teachers allow students to solve problems and link learning to real life experiences.
- 2. Quality teachers facilitate active learning in the classroom.

Researching:

1. The teacher and students complete a brainstorm to record students' prior knowledge on environmental problems. Encourage students to consider environmental problems in New Zealand and the wider world. Prompt questions could include: Are there any environmental problems in our local community? What causes harm to our oceans, lakes and rivers? Why do some animals become endangered? Why do environmental groups like Greenpeace exist? What environmental problems do countries with a high population face? Etc. (Learning Outcomes 1 and 2)
2. Students decide which areas they would like to do a 'walk and talk' tour. Students consider what 'aspects' they might want to look and talk about on their tour. Allow time for more than one visit as students will want to consider a range before deciding which one is for them to tackle. Students are introduced to the new language they may use on this tour. Students plan their tour on a map and undertake the trip.

- 3. Quality teachers recognise and build on students' prior knowledge.
- 6. Quality teachers plan a range of activities that engage students, enabling them to complete the learning process, so what is learned is remembered.

| | |
|--|--|
| <p>3. Invite a spokesperson for environmental issues to come to the class to talk about environmental problems in further depth. The spokesperson could be a member of Greenpeace, a local Green Party MP, a council employee, etc. Ask the spokesperson to focus on a range of current environmental problems students have observed on their 'walk and talk' tour and explain what has caused the problems and what is being done to improve the situation. (LOs 1 and 2) Collecting, organising and analysing information Ecological sustainability</p> <p>4. Re-visit the brainstorm that was created in Step 1 and add any further knowledge about environmental problems to the list using the information shared by the spokesperson. (LOs 1 and 2) Communicating and receiving ideas and information</p> <p>5. Students select an environmental issue that they wish to explore in further depth. Students use a KWL Chart - What I know; What I want to learn; What I have learned - to help direct the research process. (LOs 1 and 2) Community and participation</p> <p>6. Students gather information about their selected environmental issue using a range of resources. Students may choose to work independently on this research project or in groups. Students should explore the following questions in their research –</p> <ul style="list-style-type: none"> • Is the environmental issue considered to be a problem by all people or are there opposing views? • Why is the problem occurring? • What is being done to remedy it? • What further action is needed? <p>Research pathways could include: making contact with an environmental group (or several groups) to ask questions about their work, researching opposing views, using the internet, library books, newspapers and magazines to gain information, etc. NB: There are many environmental groups within New Zealand and the wider world. 2 useful directory websites for these groups include: www.greenpages.org.nz and www.eco.org.nz (LOs 1 and 2) Collecting, organising and analysing information</p> <p>7. Students collate their research and plan a presentation to share their acquired information with their classmates. The presentation could take the form of a speech, a power-point presentation, a role-play, etc. (LOs 1 and 2) Collecting, organising and analysing information</p> <p>8. Students share their presentations with the class. (LOs 1 and 2) Communicating and receiving ideas and information</p> <p>9. Students revisit their KWL chart and complete the 3rd column (what we have learned) to document their learning.</p> <p>Planning and Taking Action:</p> <p>10. Students brainstorm a list of environmental problems that are occurring in their own community with the intention of choosing one problem to improve or rectify. They could use their own knowledge and the expertise of a council employee or environment guardian to compile this list. Problems might include: a polluted river, a muddy park, litter at the beach or in the town centre, damaged community gardens, etc. Students then identify ways that each environmental problem could be solved or improved. (Learning Outcomes 2 and 3) Generating, identifying and assessing opportunities</p> | <p>8. Quality teachers develop all students' information skills; ensuring students have ready access to resources to support the learning.</p> <p>5. Quality teachers allow students sufficient opportunity for practice and application.</p> <p>10. Quality teachers involve students in the process of setting specific learning goals.</p> |
|--|--|

| | |
|---|--|
| <p>11. Students use a Decision Making Grid (*) to help to decide which environmental problem they would like to work on. Criteria for the Decision Making Grid could include: the time it would take to solve/improve the problem; the cost of required resources; necessary manpower; the need for expert assistance, the number of people who would benefit from the improved situation, etc. (LO 3) Generating, identifying and assessing opportunities</p> <p>12. Students decide which environmental problem to work on and list success criteria to describe what the space will look like when the work has been done, eg: if the students have decided to clean up litter at the local beach the success criteria could include: no rubbish on the sand or in the sand dunes, new rubbish bins at the edge of the sand-dunes, rubbish signs encouraging people to stop littering, etc. (LO 3) Excellence</p> <p>13. The teacher and students list all the different jobs that will need to be allocated so that the environmental project can be carried out. Jobs could include requesting parent help, seeking funding, asking for assistance from environmental groups, purchasing resources, taking photographs, gaining expert advice, etc. Students and teacher will also need to prepare a timeline which timetables tasks and encourages time efficiency. (LO 3) Planning and organising, Working with others and in teams Excellence</p> <p>14. Jobs are allocated to students and the project is put into action. (LO 3) Being fair and responsible, Working with others and in teams, Using initiative and drive</p> | <p>2. Quality teachers encourage learners to work as a community.</p> |
| <p>Sharing and Evaluating:</p> <p>15. Students make a digital slideshow (using photographs) to show their project in action and to promote an 'eco-friendly' message. This slideshow can be shown to other students in the school, parents and the wider community. Students may also wish to write a newspaper article about their work and request that it is published in the local newspaper. Communicating and receiving ideas and information Excellence</p> <p>16. Students use the "success criteria" that they drew up at step 11 to evaluate the project. Students identify the strengths of the project and areas for improvement. (Learning Outcome 4)</p> <p>Reflective Questions:</p> <p>Exploring new knowledge and skills</p> <ul style="list-style-type: none"> • In what ways have people enhanced our environment? • In what ways have people harmed the environment? • What are people doing to try to help the environment? • How has science and technology helped to improve our environment? • What action still needs to take place to improve our natural world? • What are the crucial steps you need to take to carry out environmental action? • Can we draw these steps in a flow diagram? • How well did we carry out our responsibilities when working together to improve/rectify an environmental problem? • What do we need to continue to do to ensure the ongoing success of our environmental work? • How do we feel about our actions? • Would we do anything differently next time? • Do we have any further ideas for environmental improvement in our community? | <p>10. Quality teachers engage students in goal orientated assessment and utilize assessment to improve learning.</p> |

| | |
|---|--|
| <p>Exploring what it is to be innovative and enterprising</p> <ul style="list-style-type: none"> • What step/s were you doing when you used each of the Enterprising Attributes? Break each attribute into its separate words and refine your answers. • How could you improve on using the Enterprising Attribute/s for next time? • Can you transfer this learning to your other topics? <p>Exploring further future focus issues</p> <ul style="list-style-type: none"> • Who is responsibility for the care of our environment? • Who should pay the cost of caring for our environment? • Why do our enterprising ideas and our positive actions bring benefits to ecological sustainability? | |
| <p>Possible Assessment Activities (Teacher):</p> <p>Learning Outcomes 1 and 2: Students could list, illustrate or describe a range of environmental problems that exist in today's world and explain how these problems are being rectified or improved.</p> <p>Learning Outcome 3: The teacher could evaluate how well each student participates in the environmental project and how they carry out their allocated role/responsibility.</p> <p>Science Exemplar: (available on-line at http://www.tki.org.nz/r/assessment/exemplars/sci/living) <u>We'll Give You Trees – Level 3:</u> This exemplar measures student achievement in adopting and communicating environmental values. A similar task could be given to students who have completed this unit. However, teachers would need to alter the progress indicators to allow them to fit level 2 of the curriculum.</p> | |

Decision Grid

| Criteria | | | | | | |
|----------|--|--|--|--|--|--|
| Choices | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Total | | | | | | |

KWL Chart

| What I know | What I want to know | What I have learnt |
|--------------------|----------------------------|---------------------------|
| | | |

