

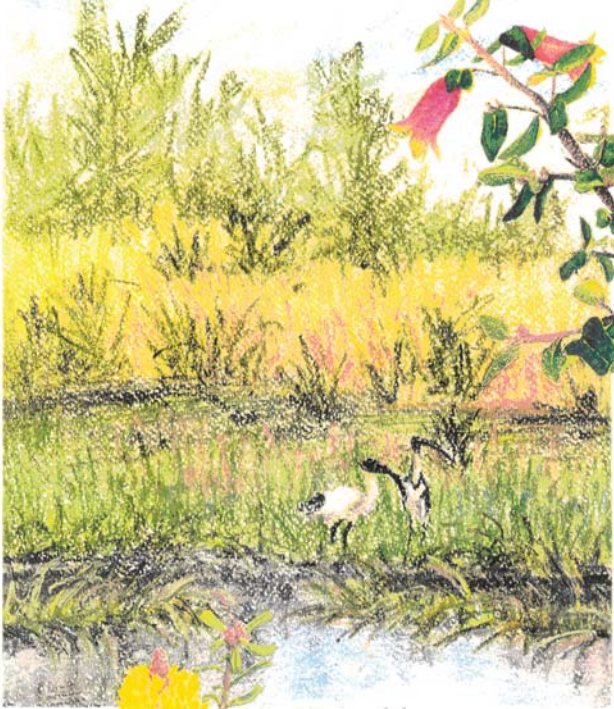


**PORTLAND  
ALUMINIUM**

Partnering Stronger Communities

# the changing environment

Portland Aluminium Environmental Education



the changing environment

Helping you protect our environment



## UNIT SUMMARY

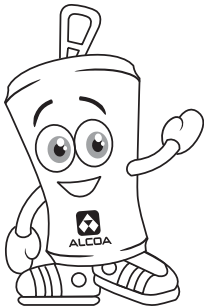
This unit of work highlights the need for a balance between the requirements of farming and its effect on the environment.

This unit places an emphasis on developing students' critical thinking skills through debate, observation, and questioning. This unit can be linked to other units within the 'Environmental Education in the South West Resource Kit'.

## LEARNING OBJECTIVES / FOCUS AREAS

Students will be able to:

- Identify factors that influence the natural balance of an environment.
- Understand the concept of farming working in harmony with nature.
- Understand the diversity of issues concerning natural and human environments.
- Focus on the farming industry v conservation.



## RESOURCES ATTACHED

- Suggested Teaching Sequence
- Activity Sheet 1 (Farming Practices)
- Activity Sheet 2 (My Green Farm Map)
- Activity Sheet 3 (Orienteering Trail)

## SPECIALIST MATERIALS

- 'The Changing Environment' Educational Booklet, Portland Aluminium
- Outdoor Environmental Games, Gould League
- Do Something (Linking Landcare Unit), Planet Ark

## LEARNING OUTCOMES

Relevant outcomes from the Victorian Essential Learning Standards:

SCIENCE: Live and Living – Level 4 – 5

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

SOSE: Place and Space – Level 4 - 5

- Describe responses of different elements to changes in natural systems.
- Focuses on the characteristics of natural and human environments.

## TEACHING SEQUENCE OUTLINES

Pre-visit (~3 lessons) \*Refer to 'The Changing Environment', Educational Booklet\*

- Establish students' prior knowledge of the farming industry.
- Explore issues involving farming v conservation.
- Discuss the environmental problems farming may cause.

The Visit (1/2 Day at Portland Aluminium Wetlands)

- Group discussion about Portland Aluminium's 'Farm in the Park'
- Activity Sheet 1 (Farming Practises)
- Activity Sheet 2 (My Green Farm Map)
- Orienteering Trail around Farm (Follow the clues)

Post Visit (~2 lessons)

- Decisions, Decisions  
Do Something (Linking Landcare Unit Planet Ark)
- Saltville Role Play: Land Degradation and You

Further Study Suggestions:

- Refer to other units represented in the "Environmental Education in the South West Resource Kit".

## ACTIVITY INFORMATION

During the visit to Portland Aluminium's education centre, students will be:

- Briefed on safety
- Given a background talk about Portland Aluminium's 'Farm in the Park'
- Divided into small groups of 8-10
- Allocated time at 3-4 stations relevant to the Changing Environment Unit
- Discussing, discovering and sharing information about farming v conservation issues
- Completing activity sheets relevant to their year level
- Follow the clues around the 'Farm in the Park' (Orienteering Trail)

## MATERIALS

School

- Clipboards, pencils, appropriate clothing & weather protection

Portland Aluminium

- Guides, Activity sheets. Clues for Orienteering Exercise



## BACKGROUND INFORMATION

### 'Farm in the Park'

The area occupied by Portland Aluminium's 'Farm' was used for grazing prior to purchase. The pasture composition had become degraded. Intractable weeds, such as cape tulip and gorse, were locally abundant. Original wetland complexes had been drained and the first Portland airport occupied part of the site. During the first 10 years of Portland Aluminium ownership, the area was used to support a small herd of mixed breed cattle as part of the requirement to monitor emissions from the smelting operation. No improvements were carried out or long-term management practices instigated until background environmental parameters were established. Once these were established a Master Plan was created that states that the Farm will be used to: "establish demonstration plots associated with agricultural land management. These could be used in field days and would have the advantage of attracting the rural community to the smelter, thus providing the opportunity of spreading management's environmental philosophy."

### AIMS:

- Develop the farm to demonstrate improved land management practices and to provide an opportunity to monitor Smelter emission effects.
- Demonstrate a farm planning process that allows for short term and long term productivity, improved capital value of the farm and protection of local ecosystems. This process incorporated a working document which records farm management decisions and community trends.
- Demonstrate the integration of commercially compatible farming systems through the production of beef and timber.
- Demonstrate management of seasonal wetland areas to sustain wildlife values.
- Create discussion with farmers and farming groups to help implement quality farming practices in south eastern Australia.
- Provide habitat linkages throughout the farm and into the adjacent wildlife area to improve overall wildlife habitat for the 'Smelter in the Park.'

### APPROPRIATE LAND USES:

- Intensive cropping is excluded as regular cultivation could lead to erosion and possible siltation of nearby wetlands.
- Fertiliser and pesticide use will be carefully monitored to minimise risks of contaminating the water-table and wetlands.
- The bulk of the farm will carry a quality perennial pasture base which will support a highly productive herd of beef cattle
- The area will be sub-divided by wildlife corridors, shelterbelts and farm forestry blocks to maximise the productivity potential of the area.
- Exclude cattle grazing from seasonal wetland areas to avoid their disturbance and destruction.
- Use higher sandy loam areas for timber production, shelter and habitat to avoid the denudation impact of overgrazing.
- Steeply sloping areas will be used for wildlife habitat, with the total exclusion of stock to avoid added erosion.

## FARMING PRACTISES...

### Activity Sheet 1

Since the arrival of Europeans in Australia, much of the land has been degraded by poor farming practices. Recently, however, many improvements have been made to farming practises.

COMPLETE THE CHART TO DISPLAY YOUR FINDINGS:

Poor Practice	Environmental Effect	Improved Practice
Overgrazing	-	-
Chemical Overuse	-	-
Land Clearing	-	-
Bare fallowing	-	-
Poor drainage	-	-
Wetland Drainage	-	-

## MY GREEN FARM MAP...

### Activity Sheet 2

The farm in the park is attempting to redress some of the poor farming practices that have occurred in the past. Below is a list of some of the ways these issues associated with land degradation have been addressed:

- Weed and Pest Management
- Establishing Wetlands for Wildlife
- Establishing Wildlife Corridors
- Preserving remnant vegetation
- Providing a balance between domestic and native animals
- Establishing pine and blue gum plantations
- Replanting native vegetation
- Developing a native plant nursery.

Create your own environmentally friendly farm map by including some of the practices above:



## Orienteering Trail

Activity Sheet 3

### SIGN 1 & 2

You are now at signs 1 & 2, which are? "The Smelter in the Park" AND \_\_\_\_\_

- a) Portland Aluminium's 'Smelter in the Park' is recognised as a benchmark in what?

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- b) What does the 'Farm in the Park' demonstrate?

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**\*\*Find the matching clue card in your bag, then proceed to the next sign.\*\***

### SIGN 3

You should now be at sign 3, which is? \_\_\_\_\_

- a) What happens in both February & October? \_\_\_\_\_

- b) Why is this important? \_\_\_\_\_

**\*\*Find the matching clue card in your bag, then proceed to the next sign.\*\***

## SIGN 4

You should now be at sign 4, which is? \_\_\_\_\_

- a) What is a Wetland?

\_\_\_\_\_

- b) Why is it important to preserve wetland environments?

\_\_\_\_\_

- c) List one economic and one environmental benefit.

\_\_\_\_\_

\_\_\_\_\_

**\*\*Find the matching clue card Part A, follow clues to next destination\*\***

How many different species of birds can you see around the wetland habitat?

\_\_\_\_\_

**\*\*Find matching clue card Part B, follow clues to next sign\*\***

## SIGN 5

You should now be at sign 5, which is? \_\_\_\_\_

- a) Why is it important to control the number of kangaroos on the property?

\_\_\_\_\_

\_\_\_\_\_

**\*\*Find the matching clue card in your bag, then proceed to the next sign\*\***

## SIGN 6

You should now be at sign 6, which is? \_\_\_\_\_

- a) Besides boosting income in down times, what else is the forest useful for?

\_\_\_\_\_  
\_\_\_\_\_

- a) Look around you; can you see more farm forestry?

What plant species has been used? \_\_\_\_\_

**\*\*Find the matching clue card in your bag, then proceed to the next sign\*\***

## SIGN 7

You should now be at sign 7, which is? \_\_\_\_\_

- a) List three benefits a farm plantation provides?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**\*\*Find the matching clue card in your bag, then proceed to the next sign\*\***

## SIGN 8

You should now be at sign 8, which is? \_\_\_\_\_

- a) Why do you think there is a need for areas like the animal enclosure?  
\_\_\_\_\_  
\_\_\_\_\_
- b) What do you think would happen to the animals if there was no vermin control program in place?  
\_\_\_\_\_  
\_\_\_\_\_

**\*\*Find the matching clue card in your bag, then proceed to the next sign\*\***

## SIGN 9

You should now be at sign 9, which is? \_\_\_\_\_

- a) Why has the arboretum been developed by the nursery at Portland Aluminium?  
\_\_\_\_\_  
\_\_\_\_\_
- b) What else is the area use for?  
\_\_\_\_\_

**\*Well done you made it.... Hope you learnt something about environmentally friendly farming?\***

## Orienteering Trail Answers

Sign 1 - 'Smelter in the Park'

- a) Industrial and Environmental Harmony

Sign 2 - 'Farm in the Park'

- a) Practical conservation of land resources by integrating conservation, with a beef cattle / forestry enterprise.

Sign 3 - Farm Management

- a) fox & rabbit control
- b) To protect the native wildlife that live on the farm.

Sign 4 - Wetland Wonders

- a) A depression in the land covered by water for varying periods of time.
- b) Refuge for birds, animals, erosion control, native grasses, attracts beneficial insects, lowers nutrient levels and improves the ecological balance on the farm

Sign 5 - Kangaroo Management

- a) The strain on the land would be too great. Kangaroos would eat themselves out. No feed for domestic stock. Increased risk of road accidents.

Sign 6 - Farm Forestry

- a) Shelter, habitat for native birds & animals, helps reduce green-house gases and salinity problems, improves eco-logical balance in the area.

Sign 7 - Farm Plantation

- a) Helps prevent soil erosion and salinity, links habitats for wildlife, provides shelter for livestock.

Sign 8 - Enclosure

- a) Feral animal numbers are out of control threatening small native birds and animals. A safe haven is required for them to breed and increase their population numbers.
- b) The animals would be eliminated by the vermin

Sign 9 - Arboretum

- a) To display the many species of coastal heathland plants which occur in the local area.
- b) Environmental Education for School Children

## The Saltville Roleplay

Reference: Victorian Association for Environmental Education & Preuss, P. & Duke, G., Investigating Australian Ecosystems, Cambridge University Press, Melbourne, pp73-74..

### Role-play: [Land degradation and you](#)

Since 80% of Australians live in towns and cities, many of us feel unaffected by land degradation; it's just a problem for farmers. But is it? In this activity you may discover some of the far-reaching effects of land degradation. All you need is a good imagination while considering the following scenario.

### Scenario

Saltville is a small town of 500 people within an intensive agricultural area. It has a small primary school, a general store and pub.

About 40 kilometres from Saltville is Closetown, with a population of 9500 people. Closetown has many shops, factories and other businesses. Closetown services many other small towns like Saltville within the region.

The crops growing in the area include grapes and other fruits, which are processed and sold to people in major cities some distance away.

The removal of trees in the Saltville area, together with excessive irrigation, has resulted in a rise in the natural water table. Consequently, some properties are experiencing excessive salinity; orchard trees are dying and crops are failing. Low-lying properties are most effected, with few farmers facing bankruptcy following successive years of crop failure.

### Characters

Now consider the following imaginary characters.

Ms.Sally Tee:	A Saltville farmer facing bankruptcy due to successive years of crop failure.
Ms.Jenny Store:	Proprietor of the Saltville General Store
Mr.John Walker:	Saltville publican
Mrs. Chalky:	Teacher at Saltville Primary School
Mick (the picker)	Fruit Picker
Mr. Ian Murray Okeigh (I.M. OK for short)	Saltville farmer upstream of Sally Tee, with no sign of salinity on his property.
Ms. Poly Tishan:	State Member of Parliament in the Saltville electorate

Winifred Pickup:	Manager of the Closetown winery, which buys grapes from Sally Tee.
Ms. Fruity:	Manager of Closetown fruit co-operative, which transports and sells fruit to the city market.
Mrs. Packer:	Worker at the Closetown fruit co-operative.
Mack:	Owner-driver of a truck who contracts for the Closetown fruit co-operative.
Adam Count (A. Count for short)	Manager of the Closetown bank.
Terry Shirt (T.Shirt for short)	Salesperson in a closetown clothing store
Mrs. Goodfellow:	Manager of a city supermarket
Mr. Con Summer (Consumer)	City shopper
Mr. Ploughman:	City-based tractor manufacturer.
Mr. Porter:	Exporter of Australian wines
Sue Anything:	Worker at a city-based clothing manufacturer, Clothall Pty. Ltd, which provides clothing to T. Shirt's shop.
Demetrius Craticus: (Demecrat for short)	Federal minister for Social Security.

## QUESTIONS

1. Write a brief account of how each of these characters is affected, either directly or indirectly, by salinity in the Saltville area.
2. As a class, discuss the implications of salinity for each character. Was any character unaffected? Who was the most affected? Who was the least affected?
3. What could happen to the town of Saltville if more farms are badly affected by salt?
4. What could happen to Closetown as more nearby areas are affected by salt?
5. What could happen to a small community unaffected by salinity if many other communities that relied on Closetown become badly affected?
6. How could salinity in country areas affect people in cities?
7. What effect could land degradation have on the Australian economy?
8. How might an increase in land degradation affect your lifestyle?

## GLOSSARY

<b>Agroforestry:</b>	The beneficial effects of trees on agricultural systems. Tree planting may address a number of the land use issues, eg. soil conditions.
<b>Arboretum:</b>	Plant library. Display of plant varieties.
<b>Biodiversity:</b>	The variety of plants, animals and micro-organisms on earth. Local extinction reduces the biodiversity of an area.
<b>Community:</b>	A group of animals and plants that live and interact in a given area, eg. a wetland community.
<b>Conservation:</b>	People managing & protecting the environment, ecosystems & habitat.
<b>Environment:</b>	Everything external to an organism. The physiological & biological factors in which an organism interacts.
<b>Environmental weeds:</b>	Plants that invade vegetation outside their normal ecological range, often replacing the original indigenous vegetation.
<b>Environmental weed invasion:</b>	When weeds invade bushland at the expense of the indigenous plants.
<b>Exotic:</b>	A species that naturally occurs on other continents.
<b>Feral animal (vermin):</b>	Reference to animals from other countries that have been allowed to go wild in places they do not belong.
<b>Habitat:</b>	The area in which an organism lives that contains all the resources it needs to survive, food, water, space, light, shelter, mates, etc.
<b>Heathland:</b>	Open flat waste tract of land covered with shrubs.
<b>Indigenous:</b>	Species that naturally occurs in a given local area, eg. mallee.
<b>Land degradation:</b>	Reduce fertility and usefulness of land by poor management or practises.
<b>Land use issues:</b>	Salinity of dry land; pest plant invasion; pest animal proliferation; soil ; coastal dune erosion; soil acidification; soil structure decline; induced waterlogging; water quality deterioration; reduced diversity of flora and fauna (land degradation)
<b>Native:</b>	A species that naturally occurs in any area of Australia.
<b>Pests:</b>	Any exotic species, accidentally or deliberately introduced, which is of threat to native species; or a native species which has reached very large numbers in response to environmental change.
<b>Plantation:</b>	Belt of varied vegetation types. Can also be called, shelterbelt, wildlife corridor, windbreak.
<b>Remnant Vegetation:</b>	Area of vegetation that has remained undisturbed or unchanged.
<b>Species:</b>	A group of individuals having some common characteristics or qualities. The members of the group can breed and produce fertile young.
<b>Weeds:</b>	Unwanted pest plants in gardens, farms and natural environments.
<b>Wetlands:</b>	Also named swamp, bog, marsh, fen, lake, pond, billabong, coastal lagoon, estuary. They have arrange of water depths and are not necessarily always wet. Also known as feral animals.
<b>Vermin:</b>	