

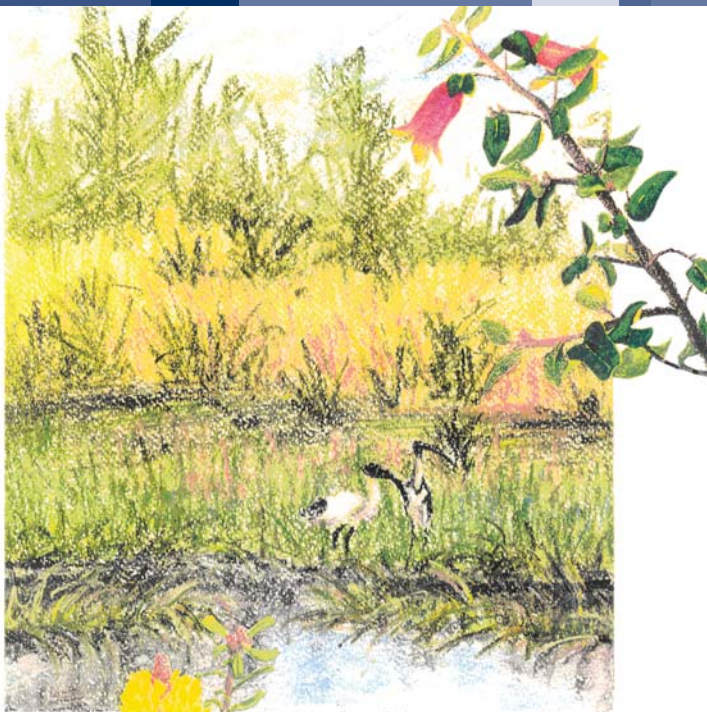


**PORTLAND
ALUMINIUM**

Partnering Stronger Communities

industry - keeping the balance

Portland Aluminium Environmental Education



Helping you protect our environment

industry - keeping the balance



UNIT SUMMARY

This unit of work highlights the need for a balance between the requirements of industry 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 industry working in harmony with nature.
- Focus on the aluminium industry v conservation.
- Understand the basics of the Aluminium Smelting Process.



SPECIALIST MATERIALS

- Portland Aluminium's 'Smelter in the Park' Master Plan
- Portland Aluminium's 'Land Management Plan'
- Do Something (Linking Landcare Unit), Planet Ark
- Can Man Capers Activity Sheets
- It all starts with dirt (Alcoa)

LEARNING OUTCOMES

Relevant outcomes from the Victorian Essential Learning Standards:

SCIENCE: Live and Living – Level 4 – 5

- Explain the various environmental effects of a major change (industry), to living things in the ecosystem.

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.

Activity Sheet 1 (It All Starts with Dirt)

- Activity Sheet 2 (Sustainable Aluminium)
- Activity Sheet 3 (The Tour)
- Suggested Teaching Sequence

TEACHING SEQUENCE OUTLINES

Pre-visit (~2 lessons)

- Research an industry in your locality that caused major change to the environment.
- Research the effects of industry on the environment (habitat loss, pollution etc.)
- Establish students' prior knowledge of the aluminium industry.
- Case Study (The Aluminium Industry – Portland Aluminium's 'Smelter in the park')

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

- View the 'Smelter in the Park' & Making Aluminium Videos (Activity Sheet 1)
- Group discussion about what the Aluminium Industry is doing to address environmental issues. (Activity Sheet 2)
- 'Smelter in the Park' Bus Tour. (Activity Sheet 3)

Post Visit (~2 lessons)

- Decisions, Decisions (Research Activity)
Do Something (Linking Landcare Unit 10), Planet Ark
- Land Degradation and You (Role Play)
'The Changing Environment' Booklet, (Appendix 6), Portland Aluminium

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:

- Shown the 'Smelter in the Park' & 'Making Aluminium' videos
- Given a background talk about Portland Aluminium's 'Smelter in the Park'
- Discussing, discovering and sharing information about industry v conservation issues
- Completing activity sheets relevant to their year level
- Taken on a bus tour around the Smelter Plant and surrounding parklands

MATERIALS

School

- Clipboards, pencils, appropriate clothing & weather protection

Portland Aluminium

- Activity sheets. Tour Guide

BACKGROUND INFORMATION

PORTLAND ALUMINIUM...

Covering 600 hectares and situated to the south of the city, the Portland Aluminium smelter obviously has a huge presence in Portland. The smelter is now one of the most efficient in the world. It currently produces about 350, 000 tonnes of aluminium a year. The aluminium that is produced at the plant is exported, usually through the Port of Portland, mainly to Asian countries. This exporting generates a net export income for Australia of well over \$800 million every year.

SMELTER IN THE PARK...

Looking after the environment is a big priority of Portland Aluminium. The Smelter is known as the "Smelter in the Park", because it sits on about 600 hectares of parkland. The smelter buildings and roads into and around it take up about 100 hectares of this site, with the other 500 hectares made up by parkland, which benefits the whole community.

The parkland around the smelter has areas of relaxation for people; barbecue areas; walking trails; wetland habitats and places where you can learn about and research the environment by using education packages developed for the local schools to use. Landcare groups are invited to use the Smelter's Nursery facilities to propagate plants for their re-vegetation projects. It even has a farm with grazing cows on it!

This park is open to everyone to use. It has been such a success that the "Smelter in the Park" is the only place outside America to have ever won an award from the Wildlife Habitat Enhancement Council.

The parklands around the smelter are home to frogs, mice, ducks, lizards, snakes – even bandicoots and kangaroos. It is also right next to Australia's only mainland colony of gannets. Portland Aluminium is also helping to save a rare flower known as the Spider Orchid. The flower was once widespread through this region, but disappeared over the years. The area around Portland Aluminium is the only known site on which the orchid grows. Portland Aluminium is helping to conduct research into how to preserve the plant.

HOW ALUMINIUM IS MADE...

It all starts with dirt. A type of dirt known as "BAUXITE ORE". When it's loaded on the truck, it looks like little more than a big load of gravel, perhaps for your driveway.

But what happens is this grey dirt, BAUXITE ORE, is ground up and mixed with chemicals known as lime and caustic soda. Have you heard of those materials before? They sound a bit like a fizzy drink, don't they? That's funny, because they are actually very powerful chemicals, which, when mixed with this grey dirt, eventually produce a product that contains fizzy drinks!

The mixture is then pumped into high-pressure containers and heated. A series of complicated chemical reactions then take place, with the end result being a white powder known as alumina. Alumina then goes through another chemical process to become aluminium. This has been happening for well over 100 years and was a process that was invented by Alcoa, which now owns Portland Aluminium.

IT ALL STARTS WITH DIRT...

Activity Sheet 1

This sort of dirt is called bauxite ore. If you were looking at a three-tonne truckload of it and someone asked, "What can you make out of that?" – you would think, "Not much. Maybe the base for a driveway."

White powder, White metal...

Well, from three tonnes of bauxite it's possible to refine about one tonne of alumina – a powdery white oxide of aluminium that looks like talcum powder. It's not easy. The technology is complex and the equipment is massive. From that one tonne of alumina we can smelt half a tonne of aluminium. Smelting aluminium was the invention that launched Alcoa 110 years ago.

Miracles by the tonne...

A tonne of aluminium is enough to make over 60 000 Coke or Pepsi cans. Enough to make the space frames for seven full-size cars. Enough to make 40 000 computer memory discs, capable of storing all the books ever published. And all from a truck load of dirt.

Activity: How many other things can you think of that are made of aluminium?

Look around your classroom

Look around the school.....

Look around at home.....

And fill in the worksheet.

What is made of Aluminium?

In the classroom	Around the school
At home	Other

SUSTAINABLE ALUMINIUM

Activity Sheet 2

'The Aluminium industry leads the way in environmental awareness. The aluminium industry is committed to good environmental steward-ship.'

Complete the following sentences about the aluminium industry's approach to environmental issues using the words below:

- The minimisation of any impact on the _____.
- Research into energy and _____ reduction.
- Responsible, safe disposal or re-use of _____ products.
- Maximising the use of _____ materials.
- Restoration of land to _____, Or to _____ agriculture after mining or other industrial processes.

(Sustainable, Waste, Recycled, Environment, Nature, Emission)

Answer the questions below following the discussion about what the Aluminium Industry is doing to address environmental issues:

- The aluminium industry mines bauxite as a raw material required in the smelting process. How could the mining of bauxite affect the environment?

- What action does the aluminium industry take to reduce the affect on the environment?

- What action does the aluminium industry take to control greenhouse gases resulting from aluminium production?

- What action does the aluminium industry take to minimise energy use as a result of aluminium production?

- What are some other factors affecting the environment that are caused by the presence of an aluminium industry. Explain your answers.

- What waste products would you expect to come from aluminium production?

THE TOUR

Activity Sheet 3

'Smelter in the Park' - What is PA's 'Smelter in the Park' recognised as?

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

'Farm Management' - Why is vermin control part of the Farm Management Plan?

'Kangaroo Management' - What is being done to control kangaroo numbers?

'Farm Forestry' - Besides providing income, why else is the forest useful?

'Parkland for the Smelter' - What are the benefits of bringing the parkland into the plant?

'Water Treatment Pond' - What issues does PA face in regards to Water Management?

'Material Recovery Facility' - What passes through the Material Recovery Facility?

'Baxter House' - What activities are available for the community?

'Nursery' - What are the plants propagated at the Nursery used for?
