## CHANGES TO THE ENVIRONMENT POST-COLONISATION

<table>
<thead>
<tr>
<th>YEAR</th>
<th>WESTERN AUSTRALIAN CURRICULUM CONNECTIONS</th>
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<tbody>
<tr>
<td></td>
<td>Humanities and Social Sciences The importance of environments to animals and people, and different views on how they can be protected (ACHASSK088)</td>
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<td></td>
<td>Humanities and Social Sciences The nature of contact between Aboriginal and/or Torres Strait Islander Peoples and others (e.g. the Macassans, Europeans) and the impact that these interactions and colonisation had on the environment and people’s lives (e.g. dispossession, dislocation, the loss of lives through conflict, disease, loss of food sources and medicines (ACHASSK086)</td>
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<tr>
<td>Year 4</td>
<td>Humanities and Social Sciences The way people alter the environmental characteristics of Australian places (e.g. vegetation clearance, fencing, urban development, drainage, irrigation, farming, forest plantations, mining) (ACHASSK112)</td>
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<tr>
<td>Year 5</td>
<td>Humanities and Social Sciences Experiences of Australia’s democracy and citizenship, including the status and rights of Aboriginal people and/or Torres Strait Islander Peoples, migrants, women and children (ACHASSK135)</td>
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<td>Year 6</td>
<td>Humanities and Social Sciences The spiritual, cultural and aesthetic value of landscapes and landforms for people, including Aboriginal and Torres Strait Islander Peoples (ACHGK049)</td>
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<td>Year 8</td>
<td>Humanities and Social Sciences Interactions between organisms can be described in terms of food chains and food webs; human activity can affect these interactions (ACSSU112)</td>
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<td>Year 9</td>
<td>Humanities and Social Sciences The challenges to food production, including land and water degradation, shortage of fresh water, competing land uses, and climate change for Australia and the world (ACHGK063)</td>
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### Introduction

Since European colonisation, the Australian environment has changed dramatically. Introduced plants and animals and the use of land for agriculture have caused many of these changes, as has the disruption to Aboriginal fire management practices. These changes have resulted in biodiversity loss and damage to the landscape including soil health.

Many Aboriginal people were also forced off their lands, so were unable to care for their Country. Later, government policies (laws) such as assimilation and the forcible removal of Aboriginal...
children resulted in the disruption of traditional ecological knowledge being passed down to younger generations.

Today, organisations such as the Northern Agricultural Catchments Council encourage the sharing and use of traditional ecological knowledge to better care for the environment.

Terra Nullius

In 1770 Captain Cook claimed the east coast of what would become known as ‘Australia’ for the King of Great Britain. It was not acknowledged that Aboriginal people owned the land under their own system of lore. The land was deemed Terra Nullius (i.e. land belonging to no one).

In the 1992 Mabo decision, the High Court of Australia overturned the idea that the land of Australia was Terra Nullius when the British claimed sovereignty.

Watch The Invasion Story to learn more:
https://www.youtube.com/watch?v=Oj0TNPNpl1c

Activity 1

Students read about the experiences of a Noongar community member and then respond to questions.

In the 1970s and 1980s I grew up in Dandaragan, where my father (Colin Moore) was born and where his mother, my nan, was born (Edith Worrall, circa 1916), where her mother (Clara Worrall, circa 1899) and her father Billy Worrall (circa 1860s) all came from. When dad and I visited nan, sometimes the environment would be discussed – a topic I’d tune into. I remember how nan described the sound snakes would make at night in the bush and how the bush, in the new country (since colonisation), was being cleared for farming. Growing up we never heard these sounds. On the farm my brother and I would jump our motorbikes on the mounds made by what Dad said were ‘boodie’ (a small marsupial), now locally extinct. Much of the destruction to Yued boodja (Country) occurred before I was born, but the effects of colonisation on the environment are still very much an issue today. For example, trees have been removed for agriculture which has made the water table rise on the wetlands. Areas of significance such as Wedge Island are now threatened because of the infestation of introduced plants such as the spiney rush. There are no longer massive flocks of black tailed cockatoo, which once fed on the mari flowers.

My family, like many Aboriginal families, has been affected by the Stolen Generations. My nan and her sister Dori were raised by my great-great grandparents (Billy Worrall and Alice Nettle) because my nan’s mother (my great-grandmother) died two weeks after giving birth to Dori. My nan was forcibly removed and taken to Mogumber Mission, which was devastating for everyone. Whilst my nan was at Mogumber her grandparents died so she never got to see them again. The only thing I think that may have helped was that Mogumber was still her Yued boodja (Country). – Brendan Moore, Yued man.

- What changes to the environment did Brendan’s family experience?
- How have their lives been affected by government policies (laws)?
Activity 2

**European farms in Australia**

When European settlers arrived in Australia they established farms for exporting products such as wool. The First Fleet brought sheep, cows and goats. Unlike Australian animals such as the kangaroo, these animals had hooves that compacted the soil. They trampled and overgrazed fragile native vegetation, which led to soil erosion and degradation.

Europeans cleared the land for farming and removed deep-rooted trees, which led to a change in the water table and climate. Later, artificial fertilisers and chemicals were added to soils to make them more hospitable to foreign crops and grasses. This practice continues today.

**Upper Primary**

**Lower Secondary**

Upper Primary students explore the importance of soil and how erosion impacts on soil. Lower Secondary students use data to examine the health of soil in the Mid and South West region.

**Brainstorm:**

- Why is healthy soil important?

Good soil health is crucial to grow plants for food. Soil also provides plants and other organisms with a home, helps to filter and clean water, and releases gases into the atmosphere to keep our air clean.

**Upper Primary**

**PREPARATION**

- Ask students to bring in a large jar of soil from their backyard.
- Prepare soil on trays for students to examine.
- Provide magnifying glasses.
- Photos of erosion (see page 52-53).
- A tray of soil per group (combine soils that students have brought in).
- Students to collect grass, sticks and other natural materials to create their landscapes.

**LESSON 1**

- What can you see in the soil?

Soils are made up of minerals (from rocks), air, water and organic materials (living or dead animals and plants).

- What does the soil sound like when you rub it between your fingers?
- What does the soil smell like?
- What does the soil feel like?
- Have a look at the different soils in the room. Are they all the same?

**Discussion points:**

- Soil comes from the earth.
- Good quality soils have organic matter and water.
- Different plants grow in different types of soil.
- It is difficult to grow plants in poor quality soils.
LESSON 2
Discussion:

- Have a look at the different photos on pages 52-53. Can you identify the types of erosion as seen in the photos?

Fill a tray with soil. This is your landscape. Do not push down on the soil. Add small hills, grasses and other natural materials such as leaves. Using a paper straw (you can make your own) blow softly and watch what happens to the soil.

This is the same process that occurs with wind erosion, removing the topsoil. This creates problems because topsoil is where many of the nutrients are located and it is where plants grow best. Once topsoil is degraded or eroded away it is very time consuming and expensive to replace. Without good topsoil plants do not grow as well.

Rebuild your landscape, but this time create a barrier using sticks, small stones and other natural materials.

- Blow softly through the barrier. Was the effect different?
- Read ‘Fighting erosion’ to find out how farmers use this strategy.

Fighting Erosion
Planting trees along the boundaries of a property is one technique that farmers use to reduce the effects of wind erosion. You may be keen to push down on your soil, compacting it so that it won't blow away. This is what hoofed animals do when they walk on it repeatedly. Unfortunately, it's difficult for water to sink into compacted soil, which then makes the soil dry and difficult for plants to grow in.
Lower Secondary

PREPARATION

• Display information on local Soil Health on pages 55-59.

LESSON

Discuss:

• How healthy is the soil where you live?
• What issues might be affecting the soil?

In 2013, the Western Australian Department of Primary Industries and Regional Development released a report card on soil in South West Australia: *Resource status and trend summary for the South West*. This includes information on local soil health. Analyse the information (available on pages 55-59) and then answer following questions.

• What are the issues affecting soil health in your region?
• Have a look at the tables on pages 59-60 *Resource status and trend summary for the South West* and find out more about these issues.
• Discuss the image on page 60: *The three primary factors that influence the environmental performance of the land*.
• What does this tell us about the factors that influence soil quality?

GOING FURTHER

We know that different plants grow in a range of soil types, and one of the reasons is because all plants prefer a different level of acidity. One way to find out which plants grow best in your school or home soil is to test the acidity of your soil. There are several ways you can do this:

• Use a pH testing kit available from nurseries and gardening centres.
• Test using the *red cabbage method*, as described by Stephanie Alexander (page 5 in the PDF).


Once you know how acidic your soil is you can work out which plants are best to plant. You can also change the acidity of your soil by adding compost to decrease the acidity. Adding lime to your soil is a technique used by farmers in the Northern Agricultural Region to increase soil acidity.
Local soil health

Maps below provide information about soil health in South West Australia. Images and data have been used with permission from the Department of Primary Industries and Regional Development.

For further information about the report card and soil health can be found on the Department of Primary Industries and Regional Development website (https://agric.wa.gov.au/n/2082).

Resource condition summary for soil acidity.
Resource condition summary for water erosion.

Resource hazard summary for wind erosion for the period 2009–12.
Resource risk summary for risk of expansion of dryland salinity within hydrozones.

Water repellence hazard. The classes represent the proportions of the soil-landscape map units with high water repellence hazard.
Resource condition summary by shire.

Resource hazard summary for soil compaction.
Resource status and trend summary for South West Australia.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Summary</th>
<th>Condition</th>
<th>Trend</th>
<th>Confidence in Condition</th>
<th>Confidence in Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil acidity</td>
<td>Severe and widespread and a major risk to production due to insufficient use of agricultural lime. In most areas, condition of the soil profile is declining.</td>
<td>Poor</td>
<td>Deteriorating</td>
<td>Adequate high-quality evidence and high level of consensus</td>
<td>Adequate high-quality evidence and high level of consensus</td>
</tr>
<tr>
<td>Water repellence</td>
<td>Widespread and often severe on sandy soils and can be a major limitation to production under current land management systems.</td>
<td>Poor</td>
<td>Deteriorating</td>
<td>Limited evidence or limited consensus</td>
<td>Limited evidence or limited consensus</td>
</tr>
<tr>
<td>Nutrient status (P)</td>
<td>In most areas, more phosphorus (P) than is required to optimise production is stored in many agricultural soils.</td>
<td>Excess</td>
<td>Stable</td>
<td>Limited evidence or limited consensus</td>
<td>Limited evidence or limited consensus</td>
</tr>
</tbody>
</table>

Resource condition summary for acidification of inland waterways by hydrozone.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Summary</th>
<th>Hazard/ Risk</th>
<th>Trend</th>
<th>Confidence in Condition</th>
<th>Confidence in Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind erosion</td>
<td>Despite several below average growing seasons, the risk is largely managed through maintaining ground cover. Vigilance is required however, because after an exceptionally dry year, this issue may be significant.</td>
<td>Low</td>
<td>Variable</td>
<td>Limited evidence or limited consensus</td>
<td>Limited evidence or limited consensus</td>
</tr>
<tr>
<td>Water erosion</td>
<td>The risk is largely managed through current land management, although actual levels are mostly unknown.</td>
<td>Low</td>
<td>Stable</td>
<td>Limited evidence or limited consensus</td>
<td>Limited evidence or limited consensus</td>
</tr>
<tr>
<td>Soil compaction</td>
<td>Widespread issue but exact severity and trend is unknown.</td>
<td>High</td>
<td>Unclear</td>
<td>Limited evidence or limited consensus</td>
<td>Evidence and consensus too low to make an assessment</td>
</tr>
<tr>
<td>Dryland salinity</td>
<td>Widespread risk with variable spatial and temporal impact. Future extent threatens agricultural land, water resource and biodiversity assets. Containing and adapting to salinity is feasible, though recovery is viable in only a few areas.</td>
<td>Moderate</td>
<td>Deteriorating</td>
<td></td>
<td>Limited evidence or limited consensus</td>
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The three primary factors that influence the environmental performance of the land.
Discuss the three primary factors that influence the environmental performance of the land as shown on page 60.

1. **Climate** – how much rain falls, and when. When do the strong winds blow? What are the trends in climate change?
2. **Land characteristics** – the characteristics of our soils and landscapes that make up our diverse environment.
3. **Land management** – what we grow or graze and how we manage it. What land practices do we use in association with the different land uses?

**Activity 3**

Students watch and discuss a video on traditional fire management being used today.

**Upper Primary**

Watch the *Korrelocking Fire Project*.
[https://www.youtube.com/watch?v=uYAkATN12ww](https://www.youtube.com/watch?v=uYAkATN12ww)

- Why did the Noongar people want to use fire on their Country?
- How did Kevan learn about traditional fire practices?
- What knowledge did Kevan share about using fire? For example, the difference between hot and cool fires?
- What were the results of using Noongar knowledge of fire practices?
- What is the benefit of engaging with Aboriginal people when it comes to caring for the environment?

**REFLECT**

- How might the Australian environment have been different if early explorers had chosen to learn from Aboriginal people?
- What can we do now to protect the environment?
- What will you do? Promise to make one change.

**Review your KWL chart.**

- What did you learn?
- What did you most enjoy learning about?
- What questions do you have now?
- How might you be able to find the answers?

**Additional resources**

- Video: Yued Elder shares issues of human impact on Wedge Island.
  [https://www.youtube.com/watch?v=fZB6VgwGIFo](https://www.youtube.com/watch?v=fZB6VgwGIFo)
- Website: Noongar information about the Stolen Generations.
- Video, audio and text: *National apology to the Stolen Generations*.
- Movie education resource: Rabbit Proof Fence education resource about the Stolen Generations in Western Australia.
- Website: AIATSIS First encounters and frontier conflict.