

Our future:

Past and future study

Strand

Time, Continuity and Change
Place and Space
Systems, Resources and Power

Core learning outcomes

*Time,
Continuity
and Change*

TCC 3.3 Students use knowledge of people's contributions in Australia's past to cooperatively develop visions of preferred futures.

TCC 3.4 Students organise information about the causes and effects of specific historical events.

*Place and
Space*

PS 3.5 Students describe the values underlying personal and other people's actions regarding familiar places.

*Systems,
Resources
and Power*

SRP 3.1 Students make inferences about interactions between people and natural cycles, including the water cycle.

Purpose and overview

This module focuses on the impact introduced species have had on Australian environments and the actions that can be taken to develop a preferred future for the environment.

Students become aware of the positive and negative effects of intervention in various environments through a study of the human intervention that resulted in the introduction of the non-native *Bufo marinus* or cane toad into Australian ecosystems.

Students investigate people's contributions to environmental issues and use this knowledge to cooperatively develop visions of preferred futures. They consider principles within documents such as the Earth Charter and determine how individuals and groups can contribute to achieving these principles for a sustainable global society.

Students conduct local community surveys and analyse the data. They consider how their own actions and those of others value the needs of the animal and plant species that are vital to sustainable ecosystems.

Note: This module provides an overview of activities within each phase, rather than in-depth descriptions of activities as found in other modules at this level.



Phases	Activities	Core learning outcomes	Assessment opportunities
<p>1. Investigate: Introduction of non-native species</p>	<p>Students explore the causes and effects of a specific historical event and make inferences about interactions between people and natural cycles.</p>	<p>TCC 3.4 SRP 3.1</p>	<p>Responses that explain the effects introduced species have had and might continue to have on natural cycles may provide evidence of students' demonstrations of SRP 3.1.</p> <p>Contributions to discussions about the causes and effects of the introduction of non-native plants and animals to Australia may provide evidence of students' demonstrations of TCC 3.4.</p> <p>Contributions to discussions about the population game and inferences about the interactions between people and natural cycles may provide evidence of students' demonstrations of SRP 3.1.</p> <p>Responses that identify the causes and effects of interactions between people and natural cycles may provide evidence of students' demonstrations of SRP 3.1.</p>
<p>2. Respond: Contributions</p>	<p>Students share ideas and understandings about the contributions of individuals and/or groups from Australia's past to develop preferred futures for the environment.</p>	<p>TCC 3.3</p>	<p>Discussions and responses about people's contributions in Australia's past may provide evidence of students' demonstrations of TCC 3.3.</p> <p>Retrieval charts that identify types of contributions and the individuals who made them may provide evidence of students' demonstrations of TCC 3.3.</p> <p>Investigations of contributions made to Australian medicine, sport, environment and community may provide evidence of students' demonstrations of TCC 3.3.</p> <p>Sharing, ranking and justifying priorities for the future of the Earth may provide evidence of students' demonstrations of TCC 3.3.</p>
<p>3. Develop ideas, take action: Our future</p>	<p>Students identify and share values that influence their own and others' actions in relation to familiar places.</p>	<p>PS 3.5</p>	<p>Discussions and responses about the values that underlie people's actions may provide evidence of students' demonstrations of PS 3.5</p> <p>Presentations of the values that underlie people's actions may provide evidence of demonstrations of PS 3.5.</p>

Assessment

The assessment opportunities outlined are examples of how to assess students' demonstrations of the identified learning outcomes. As often as possible, negotiate assessment with students and support a variety of ways of demonstrating the learning outcomes. Reflect with students on evidence gathered when making judgments about their demonstrations of learning outcomes. Some students may require more time and/or other contexts in which to demonstrate these learning outcomes. Other modules may provide such time and/or contexts and the 'Levels 1 to 6 module learning outcomes maps' in the *Years 1 to 10 Studies of Society and Environment Sourcebook Guidelines* can be used to identify these modules.

Assessing learning outcomes at different levels

Activities in this module are designed primarily for students working towards demonstrations of Level 3 learning outcomes. Assessment opportunities may need to be modified or created to enable students to demonstrate core learning outcomes before or after this level.

Using this module

There are three stages to this inquiry: investigating, responding, and developing ideas and taking action. The module has been designed so that other issues relevant to the local area or student needs and interests may replace the content focus. The following historical environmental issues may be useful:

- the Snowy Mountains hydro-electric scheme
- the development of recycling technology (glass, paper, aluminium, methane)
- the establishment of Earth Sanctuaries (Dr Walmsley)
- the introduction of water extraction caps to major waterways such as the Murray–Darling and the non-introduction of this policy to the Condamine–Balonne River in Queensland
- the passing of legislation to create Australia's first National Park
- the research into and development of anti-venoms
- the introduction of feral species such as salvinia, buffalo, rabbit, prickly acacia, common myna, carp, pig and fire ant
- the introduction of Australian species overseas such as the possum (New Zealand) or tea trees (Florida everglades)
- the establishment of the Kingfisher Centre (refer to *Living Planet*, Issue 3, March 2001).

Background information

Terminology

In this module students may have opportunities to become familiar with and use the following terminology:

balance	eradication	predator
benefit	financial	preservation
community	habitat	prey
conservation	introduced	survey
contribution	native	threatened
destruction	negative	values
ecosystem	non-native	volunteer
endangered	positive	vulnerable

School authority policies

Be aware of and observe school authority policies that may be relevant to this module, particularly those relating to school visitor permits, fieldwork and sunsafety.

Equity considerations

Activities take place in a supportive environment. They provide opportunities for students to increase their understanding and appreciation of equity through valuing diversity and challenging inequities. Activities encourage students to:

- value and respect others' ideas and contributions to discussions and activities
- understand, appreciate and value contributions from a range of local community members and groups.

Some students with disabilities may need assistance with some activities. Advice should be sought from their support teachers.

It is important that these equity considerations inform decision making about teaching strategies, classroom organisation and assessment.

Links

Studies of Society and Environment

This module is one of a suite of modules for Levels 1 to 6. See the Queensland School Curriculum Council website at www.qscc.qld.edu.au for more information.

This module has conceptual and process links to the following modules:

- Level 1: *Lean, green cleaning machine: Caring for the environment*
- Level 2: *Eco-consumerism: Conserving the environment*
- Level 3: *Environments past and present: Management of Australian environments*
- Level 4: *Changing places: Changing global environments.*

Other key learning areas

Activities may offer opportunities for planning across key learning areas. However, it is important that the integrity of the key concepts, organising ideas and processes within key learning areas is maintained.

Possible links to *Science*:

- SS 3.3 Students make predictions about the immediate impact of some applications of science on their community and environment, and consider possible pollution and public health effects.
- LL 3.1 Students draw conclusions about the relationship between features of living things and the environments in which they live.
- LL 3.2 Students present information which illustrates stages in different types of life cycles (including metamorphosis) of familiar living things.
- LL 3.3 Students describe some interactions (including feeding relationships) between living things and between living and non-living parts of the environment.

Links may also be made to Life and Living and Science and Society Level 4 outcomes.

Evaluation of a unit of work

After completion of units of work developed from this module, collect information and make judgments about:

- teaching strategies and activities used to progress student learning towards demonstrations of core learning outcomes
- opportunities provided to gather evidence about students' demonstrations of core learning outcomes
- future learning opportunities for students who have not yet demonstrated the core learning outcomes and to challenge and extend those students who have already demonstrated the core learning outcomes
- the extent to which activities matched needs of particular groups of students and reflected equity considerations
- the appropriateness of time allocations for particular activities
- the appropriateness of resources used.

Information from this evaluation process can be used to plan subsequent units of work so that they build on, and support, student learning. The evaluated units of work may also be adapted prior to their reuse. For further information, refer to the 'Curriculum evaluation' section in the sourcebook guidelines.

Activities

Phase 1 — Investigate: Introduction of non-native species

Core learning outcome emphasis: TCC 3.4, SRP 3.1

Students explore the causes and effects of a specific historical event and make inferences about interactions between people and natural cycles.

Links	Activities	Assessment opportunities
<i>Resource 1</i>	<ul style="list-style-type: none"> Provide different groups of students with pictures, photographs or names of a range of plants and animals (see Resource 1). Ask students to sort pictures, photographs or names into two groups — those that they think are native to Australia and those that are non-native. Provide assistance to recognise plants and animals as needed. Ask students to sort pictures, photographs or names again according to new categories — those that they think might be pests and those that are not. Discuss students' responses. Encourage students to think about how the non-native plants and animals arrived in Australia. Develop a list of possible causes of introduction — for example, smuggled, arrived in a container of fruit, arrived in ballast water, introduced by another animal (parasites), introduced in banned products (food, timber products, shells), brought in for scientific purposes or were released into the environment (exotic fish in local waterways). This activity could form the basis for a further investigation into how non-native species were introduced. Discuss the possible effects that the introduction of non-native plants and animals could have on ecosystems. Assist students to understand how introduced species affect ecosystems by playing the population game (described below). Explain that ecosystems contain prey and predators. A number of natural cycles occur within the ecosystem, which ensure a natural balance between prey and predators. To play the game, mark out a 30 cm circle. Place ten marbles inside the circle to represent the population of a species in an ecosystem. Explain that there are four possible events: birth, being killed by a predator, accidental death and death by disease. Choose one student to represent each event. Each student places or removes a marble at the following rate: <ul style="list-style-type: none"> birth — add a new marble every three seconds being killed by a predator — remove a marble every five seconds death by disease — remove a marble every ten seconds accidental death — remove a marble every 30 seconds. 	<p>Responses that explain the effects introduced species have had and might continue to have on natural cycles may provide evidence of students' demonstrations of SRP 3.1.</p> <p>Contributions to discussions about the causes and effects of the introduction of non-native plants and animals to Australia may provide evidence of students' demonstrations of TCC 3.4.</p> <p>Contributions to discussions about the population game and inferences about the interactions between people and natural cycles may provide evidence of students' demonstrations of SRP 3.1.</p> <p>Responses that identify the causes and effects of interactions between people and natural cycles may provide evidence of students' demonstrations of SRP 3.1.</p>

This table is continued on the next page ...

Links	Activities	Assessment opportunities
	<p>Ask questions such as:</p> <ul style="list-style-type: none"> – How had the size of the population changed at the end of five minutes? – What would happen if there were no predators in the ecosystem? – How could you change the outcome of the game? – How do the actions of humans impact on or affect predators and prey in ecosystems? <ul style="list-style-type: none"> • Explain that students are going to investigate the introduction of the cane toad into Queensland. Assist them to develop concept webs showing what they know about the cane toad — for example, its diet, predators and habitat. Use the concept webs to assist students to develop a KWL chart for the cane toad. Use this chart as the basis for the investigation. • Provide some background information about the sugar industry in Queensland and the introduction of the cane toad by Reginald Mungomery in 1936 or assist students to conduct their own research. • Pose this problem to students: 'Imagine that you are a Queensland Scientific Officer who has the responsibility for approving or declining an application from Reginald Mungomery to bring the cane toad into Queensland to control the cane beetle'. Assist students to investigate the issues and to collect information that they could use in two responses to the problem: one approving the application and one rejecting it. Each response should outline the possible causes (reasons for the decision) and effects of the decision. • Assist students to organise and summarise their findings about the introduction of the cane toad by developing cause–effect timelines for this historical event. 	

Teaching considerations

The video *Cane Toads — An Unnatural History* is a useful resource. See 'Support materials and references'.

Phase 2 — Respond: Contributions

Core learning outcome emphasis: TCC 3.3

Students share ideas and understandings about the contributions of individuals and/or groups from Australia's past to develop preferred futures for the environment.

Links	Activities	Assessment opportunities
	<ul style="list-style-type: none"> • Ask students what they think 'making a contribution' might mean. Encourage them to consider what forms contributions might take — for example, volunteering time, giving money, inventing products, donating goods/services. Ask students to think of situations in which they have made contributions. • Brainstorm and list groups or individuals in the past who have made contributions to Australian medicine, sport, the environment and community. Make sure the list includes males and females and people from diverse cultural backgrounds. • Using retrieval charts to record information assist students to locate, share and discuss information about the contributions made by the people they have listed and to explore the impact of these contributions. You may wish to focus on contributions to the environment. • Ask students whether their investigations indicated that the individual or group contributions had been recognised (for example, contributions may have been published or contributions may have been recognised by the individual receiving an award). Explore which groups were and were not recognised or valued. Discuss why this situation may occur and consider the values that underlie such recognition. Consider what value others may place on contributions. • Assist students to develop criteria for evaluating contributions — for example, to be valuable or worthwhile, a contribution should: <ul style="list-style-type: none"> – have positive benefits – be considered valuable or worthwhile by many – not be done for the sole purpose of benefiting the individual/group undertaking it. • Discuss the Earth Charter. Assist small groups of students to use the categories within the Earth Charter to develop a list of individuals and groups that they feel contribute to the principles of the Charter. • Assist students to use their criteria and the Charter to discuss and reconsider the contribution individuals or groups have made to the environment. Include discussion of Reginald Mungomery's contribution. • Ask students to consider how their personal actions or contributions and those of local and national communities might contribute to the principles of a sustainable global society as listed in the Earth Charter. • Model how to use a ranking process to identify the top ten priorities within the Earth Charter. Assist small groups of students to discuss and develop a top ten list. Invite students to share their priority lists with the class. Encourage students to justify their identified 'priorities'. Develop a class top ten. • Use the priority list and justification of priorities to discuss students' visions for the future of the environment. Discuss how contributions of individuals or groups may have contributed to this vision. 	<p>Discussions and responses about people's contributions in Australia's past may provide evidence of students' demonstrations of TCC 3.3.</p> <p>Retrieval charts that identify types of contributions and the individuals who made them may provide evidence of students' demonstrations of TCC 3.3.</p> <p>Investigations of contributions made to Australian medicine, sport, environment and community may provide evidence of students' demonstrations of TCC 3.3.</p> <p>Sharing, ranking and justifying priorities for the future of the Earth may provide evidence of students' demonstrations of TCC 3.3.</p>

This table is continued on the next page ...

Links	Activities	Assessment opportunities
	<ul style="list-style-type: none"> • Pose the question ‘How would you contribute to the eradication or control of the cane toad?’. Ask students to develop a response to the question. In developing their response they should consider and apply appropriate aspects of the criteria they developed earlier and principles of the Earth Charter. Encourage students to consider the possible causes and effects of their proposed actions. Assist students to use concept maps or cause–effect charts to present their solutions. 	

Phase 3 — Develop ideas, take action: Our future

Core learning outcome emphasis: PS 3.5

Students identify and share values that influence their own and others’ actions in relation to familiar places.

Links	Activities	Assessment opportunities
	<ul style="list-style-type: none"> • Present students with the following scenario: ‘You have been chosen as student representatives on an environmental committee. Scientists have developed the technology for an intensive breeding program for two endangered species — but there is only enough funding for research to continue into saving one species. The choice is between a sugar glider and a snake. The committee’s task is to decide which species will be saved and to justify the decision’. As a class, conduct a secret ballot to establish which species to save. Discuss the outcome of the ballot and encourage students to explain why people may be more likely to want to help certain animals — for example, sugar gliders appear cute, cuddly and harmless, while snakes appear cold and scaly and can be dangerous. Ensure students appreciate that despite appearances, many species need assistance and are integral components of their ecosystem. Discuss how diversity of both plant and animal species is vital to the survival of sustainable ecosystems. • Assist students to investigate what introduced species (plant/animal) are present in their local area and what native species might be vulnerable, threatened or endangered within their local area. Discuss any causal links between those species that are introduced and those that might be vulnerable — for example, myna birds often chase out local birds and cane toads can impact on local frog numbers. Where possible, access local expertise to assist students in this investigation. • Using the information gathered about local animal or plant species, assist students to design a process to collect information, opinions, feelings and data from within the local community. This might range from working within the school to gathering data from outside the school. Students may choose to investigate: <ul style="list-style-type: none"> – people’s attitudes towards and knowledge of local animal or plant species – which vulnerable/threatened species the community thinks is most in need of assistance – how community members believe the problem of introduced plants and animals may be solved or approached – why certain species are valued more than others – actions that people take or could take to eradicate pests or assist wildlife and vegetation. 	<p>Discussions and responses about the values that underlie people’s actions may provide evidence of students’ demonstrations of PS 3.5.</p> <p>Presentations of the values that underlie people’s actions may provide evidence of demonstrations of PS 3.5.</p>

This table is continued on the next page ...

Links	Activities	Assessment opportunities
	<ul style="list-style-type: none"> • Ask students to present their findings in a format of their choice, such as a documentary, video, photo essay, electronic presentation, roleplay or scientific report. Their reports should focus on providing information about local species and the values that underlie people's opinions, feelings and actions. Reports may be presented to other classes, parents/carers and/or community groups. • As an additional activity, students might investigate the actions of a local group such as wildlife carers or rescuers, Landcare, Waterwatch, Toad Busters or a local preservation society. Encourage students to focus on why individuals participate in such groups, what they hope to achieve and the values that underlie their actions. 	

Teaching considerations:

- Refer to *Threatened Species and Threatened Ecological Communities* at www.ea.gov.au/biodiversity/threatened or the Queensland Museum for information about local species.

Aussies one and all?**Resource 1**

sparrow rabbit fox cactus

common myna dingo camel brown hare

house mouse pig mosquito fish cane toad

prickly acacia water hyacinth buffel grass

mimosa bush salvinia donkey brumby

fire ant brushtail possum tea tree

kookaburra blue-tongue lizard wombat

albatross bridled nail-tail wallaby bilby

lorikeet powerful owl red-back spider

eucalypt wattle wedge-tailed eagle lantana

Support materials and references

Allen, A-L. 1997, *Australian Issues Collection: Endangered Species*, McGraw Hill, Roseville, NSW.

Beder, S. 1989, *Toxic Fish and Sewer Surfing: How Deceit and Collusion Are Destroying Our Great Beaches*, Allen & Unwin, St Leonards, NSW.

Durrell, L. 1986, *State of the Ark*, Bodley Head, London.

Fountain, S. 1995, *Education for Development*, Hodder & Stoughton, London.

Leigh, J., Boden, R. & Briggs, J. 1984, *Extinct and Endangered Plants of Australia*, Macmillan of Australia, South Melbourne.

Low, T. 1999, *Feral Future*, Viking, Ringwood, Vic.

Ovington, D. 1990, *Endangered Species of Australia* (chart), Standard, Rozelle, NSW.

Pollock, S. 1993, *The Atlas of Endangered Animals*, Belitha Press, London.

Pyers, G., Dahlenburg, J. & Gott, R. 1995, *Deadly Invasions: Introduced Species in Australia*, Cardigan Street Publishers, Carlton, Vic.

Periodicals

Nature Australia 'Cane toad versus native frog', Winter 2000, pp. 32–41, Australian Museum, Sydney.

Kits (including audiovisual)

Weedbuster Activity Kit, 1996, Department of Natural Resources Queensland, Brisbane.

Videos

Film Australia can be contacted at www.filmaust.com.au

Film Australia 1987 *Cane Toads — An Unnatural History*.

In one of the most bizarre biological blunders of all time, the cane toad was introduced into Australia to save the nation's cane crops from devastation. This humorous film takes a close look at these pests, now in plague proportions, and at how different people have responded to living among them.

Websites

(All websites listed were accessed in June 2002.)

Department of Natural Resources and Mines. www.nrm.qld.gov.au/resourcenet/education/
Includes information about issues such as Landcare, Pasture Watch and Waterwatch. Teaching modules include a Levels 3 and 4 module on biodiversity.

Earth Charter. www.earthcharter.org

Provides access to the Earth Charter, a declaration of the fundamental principles for building a just, sustainable and peaceful global society in the 21st century.

Environmental Contacts. www.env.qld.gov.au/environment/school/contacts/

Supplies contact details for organisations that may be able to provide information about topics such as endangered species, marine life, national parks and native plants and animals.

Environmental Protection Agency. www.epa.qld.gov.au/environment/part/cyberrangers/

Provides information about issues such as sustainability, biodiversity and environmental guidelines. Students may also access an environmental club called Cyber Rangers.

Griffith University EcoHotline. www.gu.edu.au/centre/ecohotline/

Provides information about environmental topics and contact details for various environmental organisations and agencies. The teachers' page includes innovative classroom lesson plans on how to teach a wide range of environmental issues and information on school programs that can involve the whole school in a variety of active learning experiences.

Threatened Species and Threatened Ecological Communities:

www.ea.gov.au/biodiversity/threatened/

A page on the Environment Australia website that provides detailed information on endangered species' flora and fauna programs.

This sourcebook module should be read in conjunction with the following Queensland School Curriculum Council materials:

Years 1 to 10 Studies of Society and Environment Syllabus

Years 1 to 10 Studies of Society and Environment Sourcebook Guidelines

Studies of Society and Environment Initial In-service Materials

ISBN 0 7345 2279 7

© The State of Queensland (The Office of the Queensland School Curriculum Council) June 2002

Queensland schools are permitted to make multiple copies of this sourcebook module without infringing copyright provided the number of copies does not exceed the amount reasonably required for teaching purposes in any one school. Copying for any other purposes except for purposes permitted by the *Australian Copyright Act 1968* is prohibited.

Every reasonable effort has been made to obtain permission to use copyright material in all sourcebook modules. We would be pleased to hear from any copyright holder who has been omitted.

The State of Queensland and the Queensland School Curriculum Council make no statements, representations, or warranties about the accuracy, quality, adequacy or completeness of, and users should not rely on, any information contained in this module.

The State of Queensland and the Queensland School Curriculum Council disclaim all responsibility and liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs whatsoever (including consequential loss) users might incur to person or property as a result of use of the information or the information being inaccurate, inadequate, or incomplete.

In July 2002, the Queensland School Curriculum Council amalgamated with the Queensland Board of Senior Secondary School Studies and the Tertiary Entrance Procedures Authority to form the Queensland Studies Authority. All inquiries regarding this module should be directed to:

Queensland Studies Authority, PO Box 307, Spring Hill, Q 4004, Australia
Ground Floor, 295 Ann Street, Brisbane

Telephone: (07) 3864 0299

Facsimile: (07) 3221 2553

Website: www.qsa.qld.edu.au

Email: inquiries@qsa.qld.edu.au
