WASTE
A Teaching Manual

Grade 2 - Litter

www.nre.tas.gov.au
Department of Natural Resources and Environment Tasmania

Tasmanian Government

Citation:
Department of Natural Resources and Environment Tasmania
Environment Heritage and Lands Division

Date:
February 2022, revised version of a publication by EPA Tasmania (2019) Waste – A Teaching Manual Grade 2 Litter

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ISBN: 978-1-74380-051-5

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An important facet of using resources sustainably is managing waste. One subset of waste is litter, which is essentially any material that has been left where it is not meant to be. Commonly littered items include drink containers, cigarette butts and take-away food packaging. Litter can also include abandoned vehicles and household rubbish dumped on the roadside or in the bush.

Litter is a very visible sign of pollution. It is unsightly and can cause harm to people, wildlife and our waterways. It can harbour pest animals and facilitate the spread of germs and disease. Litter is wasteful and costly to clean up. Litter also affects the way tourists view our State.

Many of the materials that are casually or accidentally thrown away last in the environment for a long time. For example, an aluminium can takes approximately 80-200 years to break down and a plastic drink bottle is thought to take 450 years to break down. In the marine environment, plastic litter can have a devastating effect on wildlife.

Litter prevention, education, collection and enforcement costs the community, state and local government millions of dollars every year in Australia.

Litter has many other costs that are significant but hard to quantify in dollar terms. Examples include the social and environmental costs of degraded environments, injured wildlife, and impacts on liveability such as reduced amenity of public space and community safety.

The Tasmanian Government is tackling the litter problem head on, introducing a number of initiatives to reduce our littering rates. The Government has a litter reporting system, where people 'dob in a litterer' using the existing litter laws. These laws will also be strengthened to increase penalties for illegal dumping.

Citizens can also report dumped rubbish at www.rubbish.epa.tas.gov.au and the land owner will organise to have it cleaned up.

Keep Australia Beautiful receives $45,000 per annum from the Tasmanian Government to host the Sustainable Communities - Tidy Towns award and the Sustainable Schools Grant Program.

About this Resource

Waste – A Teaching Manual provides a sequence of pedagogically aligned, hands-on waste-related teaching units for primary school teachers. The units outline activities that can be used to develop awareness in students about waste in Tasmania while meeting requirements of the Australian Curriculum in various subject areas, including the cross curricular priority of sustainability. Through the activities students explore how wastes are derived, how students can act to reduce, re-use and recycle wastes and the connection between their individual actions and broader environment impacts.

Through the *Waste – A Teaching Manual* series, each year level is provided with a particular waste issue to tackle, both in an academic and a practical sense, in an attempt to deliver a comprehensive picture over an eight year journey from K-6. To complement this, this package includes reference to resources to assist in the development of a Waste Action Plan, at http://rethinkwaste.com.au/at-school/schools-program. This is to ensure that by its very infrastructure and procedures, the school reinforces the children's learnings. During the school year, every participating class should have the opportunity to suggest modifications or improvements to the Plan, to improve waste management throughout the whole school.

In the early years there is a strong focus on nature play and establishing a lifelong appreciation of the environment. This is a great springboard into investigating litter in Grade 2. Students begin to make connections between their consumption and the impacts this has on the environment. In Grade 3 students investigate paper consumption and the affect this has on forests and the animals which use forest habitat. In Grades 4 and 5, students take on a new challenge, to look at plastic and food wastes respectively. Then in Grade 6, there is a "wrap up", providing a snapshot of where these wastes fit into the 'bigger picture' of wastes in contemporary Australia, and a consolidation of the need to address waste and sustainability issues. The embedded philosophy of reduce, re-use and recycle should stand the children in good stead for the future, at home, at work and in the community.

The activities within the unit encourage students to deploy their prior knowledge and literacies as a setting for their subsequent academic and hands-on experiences. Most lessons are 45 minutes in duration.

Students at Grade 2 level can meet many aspects of the National Curriculum via an investigation into litter. In this module they will be asked to observe and count litter, sort into type, observe changes over time to a location such as a park that they know, alternatively, in the school grounds. They will discover how the litter got there, for example, via wind or storm-water, and their role in reducing litter. They can also think about what they can do when by a river or at the beach in order to prevent litter from entering the water. They can be challenged to bring little or no packaging to school. Children will learn about how long it takes for litter to break down, and that some litter can be ingested by marine animals, or these animals become entangled in it. Then they can 'get visual' – make marine animals from litter or develop a poster or calendar to discourage littering.

An added overlay to assist the learning process where the activity relates to the science curriculum, and enable measurable outcomes is by following the 5E model: Engage, Explore, Explain, Elaborate and Evaluate. Students experience common activities, build on prior knowledge and experience to construct meaning and continually assess their understanding of a concept. This helps teachers evaluate students' understanding.

Expected learning outcomes

After completing the Grade 2 litter unit students are expected to have learnt the following:

- **Where litter comes from**
- **How litter can affect biodiversity and water quality**
- **How litter is everyone's responsibility**
- **How people can reduce litter**
- **Ways that the school can reduce littering**

Curricular links at a glance

The activities covered in the unit have been mapped to various subjects in the Australian Curriculum for Year 2 and, in the most part, concurrently meet the sustainability cross curriculum priority. Extension activities are also included where teachers want to go beyond the 7 lesson unit. Each extension has corresponding Australian Curriculum code reference numbers.

Learning Area in Australian Curriculum			**Lesson no. = (L) and Extension no. = (E)**
SCIENCE			
Science Understanding	Biological Sciences	Living things grow, change and have offspring similar to themselves (ASCCU030)	L2,5,6,7 L7-E1, L7-E2
Science as a Human Endeavour	Nature and development of science	Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE034)	L1,3,4,7 L1-E1, L1-E3
	Use and Influence of Science	People use science in their everyday lives, including when caring for their environment and living things (ACSHE035)	L1,4,5,7 L1-E2, L4-E1
Science Inquiry Skills	Questioning and predicting	Pose and respond to questions, and make predictions about familiar objects and events (ACSIS037)	L3,4,7 L1-E2
		Use informal measurements to collect and record observations (ACSIS039)	L3
MATHS			
Stats and probability	Data representation and interpretation	Create displays of data using lists, tables and picture graphs and interpret them (ACMSP050)	L1,3 L1-E1
Numbers and Algebra	Number and Place Value	Group, partition and rearrange collections up to 1000 in hundreds, tens and ones to facilitate more efficient counting (ACMNA028)	L7
ENGLISH			
Literature	Creating Literature	Create short imaginative, informative and persuasive texts using knowledge of texts and language, selecting elements appropriate to audience (ACELY1671)	L2, 4 L1-E2, L1-E3, L7-E1, L7-E2
THE ARTS			
Visual Arts	Use and experiment with different materials, techniques, technologies and processes to make artworks (ACAVAM107)		L2,4 L1-E3, L1-E4, L7-E1, L7-E2
	Create and display artworks to communicate ideas to an audience (ACAVAM108)		L2,4 L1-E3, L1-E4, L7-E1, L7-E2

Learning Area in Australian Curriculum continued			Lesson no. = (L) and Extension no. = (E)
DESIGN AND TECHNOLOGIES			
Processes and Production Skills	Explore needs or opportunities for designing, and the technologies needed to realise designed solutions (ACTDE005)		L7-E3
	Generate, develop and record design ideas through describing, drawing and modelling (ACTDEP006)		L7-E3
SUSTAINABILITY			
Systems	OI.1	The biosphere is a dynamic system providing conditions that sustain life on Earth.	L4,5,6,7 L7-E2
	OI.2	All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival.	L2,4,5,6,7 L1-E2, L1-E3, L7-E2
	OI.3	Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems.	L4,5,6,7 L1-E2, L1-E3
World Views	OI.4	World views that recognise the dependence of living things on healthy ecosystems, and value diversity and social justice are essential for achieving sustainability.	L1,4,5,6,7
	OI.5	World views are formed by experiences at personal, local, national and global levels, and are linked to individual and community actions for sustainability.	L5,6,7
Futures	OI.6	The sustainability of ecological, social and economic systems is achieved through informed individual and community action that values local and global equity and fairness across generations into the future.	L2,3,5,6,7 L1-E1, L7-E1, L7-E2, L7-E3
	OI.7	Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.	L1,2,3,4,5,6,7 L1-E1, L1-E 2, L1-E3, L7-E1, L7-E2, L7-E3
	OI.8	Designing action for sustainability requires an evaluation of past practices, the assessment of scientific and technological developments, and balanced judgments based on projected future economic, social and environmental impacts.	L1,3,5,6,7 L7-E1, L7-E2, L7-E3
	OI.9	Sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments.	L1,2,3,4,5,6,7 L1-E2, L1-E3, L7-E1, L7-E2

LESSONS

LESSON 1
Litter audit

Children participate in a litter audit, which is simply a count of litter from a particular area, such as a creek, public area, beach or reserve, or the school grounds. Children observe and count the types of litter in that area and consider how the litter came to be in that place. They learn to read a simple graph of litter types and relative quantities. They also learn what recycling is, and what is recyclable. Then they can report back to the reserve manager or school and make recommendations for remedying the litter situation.

Meets **Maths ACMSP050** Create displays of data using lists, tables and picture graphs and interpret them

Science ACSHE034 Science involves observing, asking questions about, and describing changes in, objects and events

Science ACSHE035 People use science in their everyday lives, including when caring for their environment and living things

Sustainability OI.4, OI.7, OI.8, OI.9 People use science in their everyday lives, including when caring for their environment and living things

Photo: Simon de Salis

You will need

- small rubbish bags e.g. used plastic shopping bags, one for a group of 2-3 children
- sturdy footwear, sunhats, water bottles for each child
- first aid kit if required by the school for outings
- tarpaulin

(Also, you could provide gloves or tongs if you are worried that the students may hurt themselves).

You will need to decide whether the children can walk or bus to a nearby creek, public area, beach or reserve and pick up litter there within a nominated boundary, and nominate that boundary. Alternatively, they can do a school litter audit, collecting litter from the school grounds, or nominated area of the school grounds. This could be undertaken on Clean Up Australia Day (Schools), which is in March every year.

Encourage children to avoid anything sharp, such as glass or rusty metal – to let the teacher know. (If syringes are found, they are to be left and the Local Council could be informed of their location).

Encourage the students to avoid damaging animal homes/habitats and plants in the audit area. Do not collect litter from beaches between October and March, due to nesting birds.

Method

ENGAGE

List the things the children enjoy about going on bushwalks/ playing in their local reserve, or their favourite part of the school grounds – whichever is the chosen place for the litter audit. Ask the students what would be involved with looking after that place. Have they ever seen anyone caring for that place (e.g. *school, individuals, the local Council, Parks and Wildlife*)? What sort of things did the people do in order to care for the place?

What is litter? If the managers of the place picked up litter, why did they pick up litter? (e.g. *so that people could still respect and enjoy the place, so there aren't sharp things around, so that animals were not eating it, so it did not wash into the sea or get blown on the wind into the sea or creek*).

EXPLORE

A litter audit can be undertaken to see how much litter is in the particular area/school grounds. Collect the litter from inside the nominated boundaries or inside the boundary of the school, or a defined area of the school yard. Allow 15-20 minutes.

This could be undertaken in conjunction with Clean Up Australia Day in March, or Clean Up Schools Day.
See www.cleanupaustraliaday.org.au/resources

LESSON 1
Litter audit
continued

Bring the litter back to the classroom or outdoor area, and spread the litter on a tarpaulin. As a class, loosely group the litter into similar categories, then use the following form to count the litter, in each of the categories.

Audit sheet template on page 11.

Graph the categories and quantities on the board, using a bar graph. Take a photo of the graph, for future reference (for Lesson 1 Extension 1).

EXPLAIN

Review the different types of litter found. Develop theories as to why some materials are more plentiful than others (e.g. *due to different decomposition rates, popular types of packaging*). Consider how the litter got there (e.g. *careless people, overfilled bins, birds, wind, overturned bins, via storm-water)*. Examine how the litter might affect a person's enjoyment of the site. How much rubbish collected could be reduced, re-used or recycled? Who knows what those words mean – Reduce, Re-use and Recycle? (e.g. *use less, use again, make it into the same thing and use it again such as plastic bottles, aluminium cans*). Was the site clean after the collection? If so, how did it make you feel about the site after the collection? How can we prevent the same amount of litter in the future? Could it have been **our** litter?

ELABORATE

Ask the children what they know about natural cycles. If litter falls on the ground, does it decompose back into the earth? (e.g. *depends on the litter, but most litter won't decompose*). What happens when an animal thinks that the litter is food? (e.g. *it may fill its stomach with litter instead of food, it may be slower therefore easier prey for predators, it may choke on the litter*). How may the litter affect the water quality? (e.g. *it may cause extra nutrients in the water*). Could it block drains? (*Yes*)

EVALUATE

Dry the litter, if necessary, for storage, to be used in Extension activities and/or Lesson 2. Do not include vegetative material.

Make recommendations as a class, regarding how litter could be reduced in the area. (e.g. *the reserve/park/school may need more litter bins, an education campaign, and/or alternate locations for existing bins. People may need to be more careful not to let litter fall off boats or when packing their trailers*). Write a letter to the land manager or if you did a litter count/audit in the school grounds, report back to the school and suggest some changes to the school grounds on order to reduce litter. Contribute to the School Waste Management Plan. Maybe write an article for the school magazine.

Discuss the sources/types of litter found and if the litter audit was at school, whether this could be related to the school canteen. Investigate whether the canteen needs to sell this food item which contributes to litter. It may be over-packaged? Maybe the school canteen could become a 'green canteen'? Contact the school environment team/committee (if there is one) to facilitate discussions with the school and canteen operators to work towards less providing food with less packaging. The Tasmanian Government's School Food Matters Program may be helpful. See www.schoolfoodmatters.org

Note to Teachers

Do not use litter clean-ups as a disciplinary measure at school. This sends a poor message to students and could develop negative attitudes towards caring for their environment. Also, other students may get the sense that it is OK to litter, as someone else will clean up afterwards.

References

Clean Up Australia (Undated) Clean Up Resources – Clean Up Event and Educational Resources, viewed 16 February 2022, www.cleanupaustraliaday.org.au/resources

Keep South Australia Beautiful and The Wrigley Company (undated) Litter Less - A Resource for Teachers and Students Years 6-9, Keep South Australia Beautiful, South Australia.

Tasmanian Government (undated) Tasmanian School Food Matter Program, viewed 16 February 2022, www.schoolfoodmatters.org

LESSON 1
Litter audit
continued

Audit sheet templates

TYPE OF LITTER	QUANTITY (NUMBER OF ITEMS)
Organic Recyclables	
Food (uneaten)	
Food scraps	
Other	
TOTAL ORGANIC RECYCLABLES	
Non-Organic Recyclables	
Plastic containers	
Milk and juice cartons	
Aluminium cans	
Steel cans	
Paper and cardboard	
Glass	
Other	
TOTAL NON-ORGANIC RECYCLABLES	
Non-recyclables	
Plastic bags and cling wrap	
Food packaging (e.g. muesli bars, chip packets)	
Contaminated paper	
Discarded chewing gum	
Other non-recyclables	
Total Non-Recyclables	
Re-usables (e.g. ziplock bags)	
Other	
TOTAL	

NOTES

TYPE OF LITTER	QUANTITY (NUMBER OF ITEMS)
Organic Recyclables	
Food (uneaten)	
Food scraps	
Other	
TOTAL ORGANIC RECYCLABLES	
Non-Organic Recyclables	
Plastic containers	
Milk and juice cartons	
Aluminium cans	
Steel cans	
Paper and cardboard	
Glass	
Other	
TOTAL NON-ORGANIC RECYCLABLES	
Non-recyclables	
Plastic bags and cling wrap	
Food packaging (e.g. muesli bars, chip packets)	
Contaminated paper	
Discarded chewing gum	
Other non-recyclables	
Total Non-Recyclables	
Re-usables (e.g. ziplock bags)	
Other	
TOTAL	

NOTES

LESSON 1 *EXTENSION 1*

Revisit the litter audit

Students return to the same site as the litter audit (from Lesson 1) and compare the amount of litter with what was found previously. Then they discuss how the litter got there and how the problem could be remedied.

Meets **ACMSP050** Create displays of data using lists, tables and picture graphs and interpret them

Sustainability OI.6, OI.7 In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.

Photo EPA Tasmania

Method

Go back a month later to the same site as the litter audit (from Lesson 1), and see if the litter problem is the same. Pick up the litter at the site – bring the newly collected litter back to the classroom and count the number of items in the categories established in Lesson 1. Graph those on the board, and compare with the first litter collection. (See stored photo of graph from Lesson 1). Show the students how to interpret the graph. Ask the children if they think that because they did the first collection, this meant that there was less to collect this time. Discuss how the litter got there and how the problem could be remedied.

LESSON 1 *EXTENSION 2*

Write a story about litter

The students write a short written piece about the items that they found on their litter collection, and how those items came to be in that place.

Meets **Science ACSIS037** Pose and respond to questions, and make predictions about familiar objects and events

English **ACELY1671** Create short imaginative, informative and persuasive texts using knowledge of texts and language, selecting elements appropriate to audience

Sustainability OI.2, OI.3, OI.7, OI.9 In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.

Photo courtesy of Rethink Waste Tasmania

Method

Ask the children to write a short written piece about the items that they found on their litter collection, and how those items came to be in that place. For example, write about the journey of a plastic bag from a household to the sea, via wind and stormwater.

The mockumentary "The Majestic Plastic Bag" may inspire the children www.youtube.com/watch?v=GLgh9h2ePYw

Reference

HealtheBay (2010) The Majestic Plastic Bag – A Mockumentary, www.youtube.com/watch?v=GLgh9h2ePYw, viewed 16 February 2022.

LESSON 1 *EXTENSION 3*
Litter Collage

A display of the litter found in the school playground or neighbouring areas is made. These items are given interpretive labels, including a theory about how the litter got there and what impact it could have.

Meets **Science ACSHE034** Science involves observing, asking questions about, and describing changes in, objects and events

Arts ACAVAM107 Use and experiment with different materials, techniques, technologies and processes to make artworks

Arts ACAVAM108 Create and display artworks to communicate ideas to an audience

English ACELY1671 Create short texts to explore, record and report ideas and events using familiar words and beginning writing knowledge

Photo EPA Tasmania

You will need

- Large pin-board e.g. 1.5 metres squared
- Litter from litter cleanup/s
- Pins
- Soft toys e.g. seals, octopus, turtles

Method

On the large pin-board, with the students, pin the litter found in the school playground or neighbouring areas. Give these items interpretive labels, including a theory about how the litter got there (e.g. wind, water) and what impact it could have. Alternatively, do a collaborative A4 page about how the litter got to the area, and stick this on the board. Place the soft toys at the base of the pin-board and explain, on a pinned A4 page, how the litter may end up in the ocean, affecting those animals.

LESSON 2
Litterbugs

In this session, students will recall from Lesson 1 the impacts of litter on animals, and study pictures of invertebrates such as spiders, butterflies, dragonflies, and snails, paying attention to details such as the thorax, abdomen and number of legs. Then students will make 'litterbugs' from collected litter/ waste items, supplemented by other craft materials, and display these litterbugs, along with a collective 'artists statement' about the impacts of litter. Students will think about where these animals live (the habitat), and whether litter affects their habitat.

Meets **Science ACSSU030** Living things grow, change and have offspring similar to themselves

Arts ACAVAM107 Use and experiment with different materials, techniques, technologies and processes to make artworks

Arts ACAVAM108 Create and display artworks to communicate ideas to an audience

English ACELY1671 Create short texts to explore, record and report ideas and events using familiar words and beginning writing knowledge

Sustainability OI.2, OI.6, OI.7, OI.9 In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.

Photo EPA Tasmania

You will need

- books/pictures/web images of invertebrates
- glue gun and glue, scissors
- pliers
- craft materials such as pipe cleaners and tissue paper, yarn, fabric scraps, buttons for eyes, and a collection of (clean) small miscellaneous domestic waste items, such as lids, plastic bottles, lolly wrappers, bread tags, plastic strapping, egg cartons
- Also, the (cleaned) litter collected on the litter audit

You will probably need adult/parent helpers for this activity, particularly if using the glue gun.

Method

ENGAGE

Recall the impacts of litter on the environment, from Lesson 1.

EXPLORE

Ask the children if they know what a 'litterbug' is. Discuss the 'play on words' used, where a litterbug is a person who litters, or a bug made from litter.

Ask each child or pair to look at pictures of terrestrial and/or aquatic invertebrates. Then ask the children to make a creature ('litterbug') from a selection of the litter, keeping in mind the anatomical characteristics of the animal they wish to replicate e.g. how many legs, shape of body.

EXPLAIN

Ask each child or pair, in turn, to describe the features of their litterbug and their respective adaptations to their environment.

ELABORATE

Ask each child or pair how litter could affect their litterbug (e.g *it might block their feeding ability, block their mud home, the litterbug might mistake litter for food, the litter might affect the quality of the habitat that they live in*).

Discuss, as a class, how to reduce litter in the environment.

EVALUATE

Display the litterbugs, maybe in the foyer or school hall. Make artist statements about each work and the collective works, using quotes from the children about their work and the impacts of litter on their litterbug/the environment.

LESSON 3
Rubbish-free lunch

In this unit of study, students investigate how their lunch is packaged, and propose different ways that they can minimise the use of packaging, hence reduce the potential for litter at school and waste to landfill. The teacher assists in composing a letter/flier/email to parents, which will assist in providing ideas for packing a rubbish-free lunch. The students observe how waste can be reduced by bringing a rubbish-free lunch compared with a 'normal' lunch.

Meets **Science ACSHE034** Science involves observing, asking questions about, and describing changes in, objects and events

Science ACSIS037 Pose and respond to questions, and make predictions about familiar objects and events

Science ACSIS039 Use informal measurements to collect and record observations

Maths ACSMP050 Create displays of data using lists, tables and picture graphs and interpret them

Sustainability OI.6, OI.7, OI.8, OI.9 Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.

Photo courtesy of Tasmanian Department of Health and Human Services

You will need

- A bucket or similar container
- Children's lunch scraps/wrappers

Method

ENGAGE

Step 1: Choose a 'normal' day where lunch is held at school, but ask the children to retain every item of waste from that lunch, and put that in one container e.g. bucket, before going off to play.

EXPLORE

Step 2: After lunch, investigate the contents of the bucket. Count all food scraps, recyclable packaging and non-recyclable packaging.

EXPLAIN

Discuss where the lunch wrappers came from and if their use was necessary (e.g. *whether anything was over-packaged, or any items could be in a re-usable, washable container*). Discuss food with little or no packaging, or 'natural packaging' (e.g. *bananas*). Discuss what items could have (accidentally) become windblown litter and which items could be recycled or composted. Discuss what would have ended up in the bin, and where the bin ends up (e.g. *landfill*). Has anyone been to the landfill? What does it look like, smell like? Did you see lots of rubbish?

Count all food scraps, recyclable packaging and non-recyclable packaging. Retain this information.

ELABORATE

Step 3: Set a date for a Rubbish-free lunch. This could be around the time of World Environment Day 5 June, National Nude Food Day on 16 October or National Recycling Week in November.

Step 4: Ask the students "What would a Rubbish-free lunch look like?" (e.g. *yoghurt in re-usable containers, re-usable wrappers such as beeswax wraps, fresh fruit, re-usable drink containers, washable zip-lock bags*). Draft then send a letter/newsletter article/ flier/email for the Rubbish-free Lunch Day that could go home to parents, explaining your goal to reduce litter, including the date for the lunch and suggestions for packing a lunch with little or no packaging.

Step 5: The day before the lunch, remind the class about the Rubbish-free Lunch Day.

EVALUATE

Step 6: Host your Rubbish-free Lunch Day on the advertised date. Collect any waste from the lunch. Compare this with the amount/type of waste from the 'normal' lunch. Compost the organic scraps, if possible.

LESSON 3

Rubbish-free lunch

continued

Step 7: Ask the students to draft or contribute to a newsletter/article for the school newsletter, outlining the outcomes/reduction in the packaging derived from the Rubbish-free Lunch Day. For the broader audience, this could be expressed numbers of items or percentage of waste reduced by hosting the Rubbish-free Lunch Day. Congratulate the class.

Step 8: Try advocating a Rubbish-free lunch day for the whole school, maybe three times per year. Or more often!

There is a comprehensive teaching resource at www.nudefoodday.com.au/resources/

References

Nutrition Australia (2017) Nude Food Day – Resources, viewed 16 February 2022, www.nudefoodday.com.au/resources/

LESSON 4
'The River'

In this lesson, a river is simulated, and litter and various pollutants are added along the length of the 'river', resulting in poor water quality. Students learn that 'a little bit of litter here' and 'a little bit there' can add up to a big impact.

Meets **Science ACSHE034** Science involves observing, asking questions about, and describing changes in, objects and events

Science ACSIS035 People use science in their everyday lives, including when caring for their environment and living things

Science ACSIS037 Pose and respond to questions, and make predictions about familiar objects and events

Arts ACAVAM107 Use and experiment with different materials, techniques, technologies and processes to make artworks

Arts ACAVAM108 Create and display artworks to communicate ideas to an audience

English ACELY1671 Create short texts to explore, record and report ideas and events using familiar words and beginning writing knowledge

Sustainability OI.1, OI.2, OI.3, OI.4 OI.7, OI.9 People use science in their everyday lives, including when caring for their environment and living things

Photo courtesy of Derwent Estuary Program

You will need

- a long piece of blue fabric or tarpaulin, approx. 3–4 metres long, (folded to) approximately one metre wide
- a clear fish tank or large clear glass jar/perspex container to hold water
- 6 small labelled containers, e.g. film canisters, containing the following items –
  1. a tablespoon of loose soil, labelled with the keyword SOIL
  2. tangled fishing line or dental floss, labelled with the keywords FISHING LINE
  3. a few cigarette butts, labelled with the keyword BUTTS
  4. red water (made with red poster paint and water), labelled with the keyword PAINT
  5. a teaspoon of detergent in water, labelled with the keyword SOAPY WATER
  6. vegetable oil, labelled with the keyword ENGINE OIL

  Also, provide small pieces of 'litter' (plastic and paper) in a bag labelled LITTER, and a small PLASTIC BAG

  Provide 8 small pieces of paper, each marked with the keywords either SOIL, FISHING LINE, BUTTS, PAINT, SOAPY WATER, ENGINE OIL, LITTER AND PLASTIC BAG

Photos EPA Tasmania

Method

ENGAGE AND EXPLORE

The blue fabric is rolled out along the floor. At the 'head' is the teacher, as is the fish tank/water container on the floor or short table, approximately three quarters filled with clean water. Children sit along the length and around this 'river' (the blue cloth.) The teacher walks along the length of the 'river' on the outside of the children and randomly hands out the 8 small marked paper signs.

The teacher reads the following script, supplanting the name of the river and the cities/towns with local river/cities/towns. The children given the 8 signs listen carefully for their KEYWORD

LESSON 4
'The River'
continued

e.g. soil, paint. When the appropriate child's key word is mentioned, the story is **paused**, and that child brings his or her piece of paper to the front to receive a corresponding canister, fishing line, plastic bag or rubbish, then empties the container or other item into the water in the fish tank.

For thousands of years, people have lived on the banks of the (… insert your local…) river. Aboriginal people hunted in the forests, harvested food from the wetlands and caught fish in the river. One of the first European explorers to visit the river wrote about the 'sweet water' and seeing so many fish in the river. People began arriving from overseas. They found good land for growing their crops, forests with lots of wildlife and a river that provided lots of food and water. They decided to put a town (……..your local town/city……..) by the river.

*The river has changed since it was first explored. People clear more and more land and build houses and other buildings and **SOIL** washes into the river. People built their houses and needed roads for their horses, carts, then vehicles to drive on, to get from one house to another, to the shops and to schools. They built drains, called stormwater drains, to take rainwater and drain it into the river. But now and then, they wash their cars and the **SOAPY WATER** washes down the drains into the river.*

*People have pride in this neighbourhood, and they like to **PAINT** their homes and sheds. But they do not know where to wash their paint brushes, so they do this in buckets and empty the paint into the stormwater drain, which drains to the river.*

*On weekends, people loved to take their motorboats out on the river. Sometimes a little bit of their **ENGINE OIL** leaks into the water. Some people like to fish, but sometimes their hooks get caught in the weed in the river and they have to cut their **FISHING LINE**, which floats around in the water. Other people on the jetty smoke cigarettes and flick their **BUTTS** into the water, as there is no ashtray.*

*Many people have picnics in the park alongside the river. Sometimes a wind comes up and blows their **PLASTIC BAGS** into the river. Or now and then, forgetful people have a party and leave their **LITTER** behind, and the next time it rains, this washes into the river.*

EXPLAIN

Discuss the state of the water, now that these things have been added to it. How could we have changed any of these things? (e.g. *wash car on the grass, make sure plastic bags do not blow into the river, don't leave litter behind, put paint wash-water onto a flat grassy area or in Council hazardous waste clean-up*).

Explain the role of the storm-water drain (*the drain in the street where water in the gutters empties into*). Explain that storm-water drains flow into creeks and rivers and then to the sea, via big underground pipes. Sometimes they have pollution traps on them on their ends, like giant sieves, but not always.

ELABORATE

Discuss what the children could do to avoid things entering storm-water, hence the creeks, then the sea (e.g. *minimize packaging, use litter bins, make sure litter bins are not overflowing, take rubbish home from picnics, don't throw or leave rubbish anywhere, on the land or in the water*).

EVALUATE

Students draw a representation of how the litter enters the environment/river/sea, and write a small caption to explain this (e.g "*Your litter drains to the sea*", or "*Your picnic could end up in the river*"). It could include glued litter e.g. lolly wrappers or magazine cut-outs as a part collage. These drawings could be displayed for other students and maybe even the parents.

You will need:

- A3 Paper
- Colour pencils
- Some small items of litter e.g. lolly wrappers

Drawing by Georgie Tatton

LESSON 5
Marine litter educational activities

In this lesson, students will learn that one of the most devastating impacts of litter is its effect on the marine environment, especially plastic litter. There are various sources of marine litter, derived from land and sea.

Meets **Science ACSSU030** Living things grow, change and have offspring similar to themselves

Science ACSHE035 People use science in their daily lives, including when caring for their environment and living things

Sustainability OI.1-OI.9 (depending on activities chosen) In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.

Photo courtesy of Alasdair Dermer, in the Dhimurru Indigenous Protected Area

Method

The following website is a compendium of children's activities related to learning about, and preventing, marine litter.

www.marinedebris.noaa.gov/educational-materials

Choose appropriate activities for your class.

References

US Department of Commerce (2016), National Oceanic and Atmospheric Administration Marine Debris Program – Educational Materials, Activities and Curricula, viewed 21 February 2022, www.oceanservice.noaa.gov/education

Between 2011 and 2013, Hobart-based staff of the CSIRO led a three-year Australian survey of marine debris, in partnership with Earthwatch Australia and Shell. It was the world's largest study of its kind. The goal of the study was to develop a national risk assessment for wildlife species affected by marine debris.

The project engaged with 5,500 students, teachers and Shell employees, promoting science education by providing them with the opportunity to survey sites at approximately every one hundred kilometres around the whole coast of Australia, including Tasmania.

The study found that approximately three quarters of the rubbish on the coast is plastic. Most is derived from sources near to the particular beach, with some likely to be from overseas. In the water, most floating debris is plastic, with a density of between a few thousand pieces per km² to 40,000 pieces per km².

LESSON 6
Beach cleanup

A trip to the beach can offer an opportunity to address Science curriculum, and can also develop into a Maths, Art and Sustainability activity. In this lesson, students and teachers go for a walk on a beach – exploring marine organisms, habitat and adaptations. Students could also survey the litter on the beach or bring any litter that they have found back to the classroom. This litter will be used for Lessons 7 and Lesson 7 Extension1.

In regard to the 5Es, Lesson 6 will cover Engage and Explore, Lesson 7 will cover Explain, Elaborate and Evaluate.

Meets **Science ACSSU030** Living things grow, change and have offspring similar to themselves

Sustainability OI.1- OI.9 In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.

Photo courtesy of Derwent Estuary Program

Teachers Notes

In undertaking this beach visit, take the opportunity to discuss any marine plants and animals found at the beach, and their respective habitats, life cycles and adaptations. Encourage your students to leave animals and plants (and seaweed) where they found them, and not to disturb nesting birds. In southern Australia, most beach-nesting birds breed between September and December, so avoid these times if possible.
See www.birdlife.org.au/images/uploads/education_sheets/INFO-sharing-beaches.pdf

There is an option of doing a marine litter survey/cleanup on the beach using the Tangaroa Blue methodology*, see www.tangaroablue.org/. Then dispose in beachside waste bins. Or, simply take a trip to the beach and pick up some litter! Bring it back to the classroom for lessons 7 and/or Lesson 7 Ext 1.

*The Australian Marine Debris Database was created to enable volunteers and organisations who were running beach clean up events to also collect data on what they were finding so it could be collated into a standardised national database on marine debris.

There is also an opportunity to do a beach clean-up in Grade 4 of this teaching manual series, when looking at the impact of plastics in the environment.

You will need

- a beach, and transport!
- adult volunteers/parents, if needed
- gloves or tongs for everyone in the class (or one pair of gloves or tongs can be shared between two people)
- large rubbish bags
- first aid kit
- hats/sunscreen
- water
- rain jackets/warm clothing as appropriate

Method

ENGAGE

At the beach, allocate boundaries beyond which students cannot go. You may wish to group the children and encourage them to observe any animals or plants, while at the same time, picking up litter. Elicit what is waste/litter. Tell the children that rocks, logs, nests and weed should not be dislodged, they should be left as habitat for plants, animals and birds. Living animals such as crabs must be left in their respective habitats. Encourage children to

LESSON 6
Beach cleanup
continued

collect litter in their rubbish bags, but avoid anything sharp. Come back to a central point.

EXPLORE

Discuss what was found, living and non-living. Discuss the habitats of any of the animals/plants found, and the adaptations each of these animals/plants have to their environment. Bring the litter back to the school and keep it for Lesson 7, but remove anything organic!

References

Birdlife Australia (undated) Sharing our Beaches with Birds, viewed 16 February 2022,

www.birdlife.org.au/images/uploads/education_sheets/INFO-sharing-beaches.pdf

Tangaroa Blue (2018) Australian Marine Debris Initiative, viewed on 16 February 2022, www.tangaroablue.org

Dr Heidi Auman is a pioneer in the research of plastic ingestion and studied human effects on seabirds for twenty-five years. More than 97% of the birds she studied had ingested plastic, often handfuls of it. Heidi lives in southern Tasmania and in 2014 published a children's book called 'Garbage Guts'. It is about how Aria the Albatross rescues her friends from choking on, or being entangled by, marine litter. Aria also appeals to humans to be mindful of what enters the sea, and how they can prevent it. See www.HeidiAuman.com

Heidi is willing to give talks to schools about her scientific work and her book.

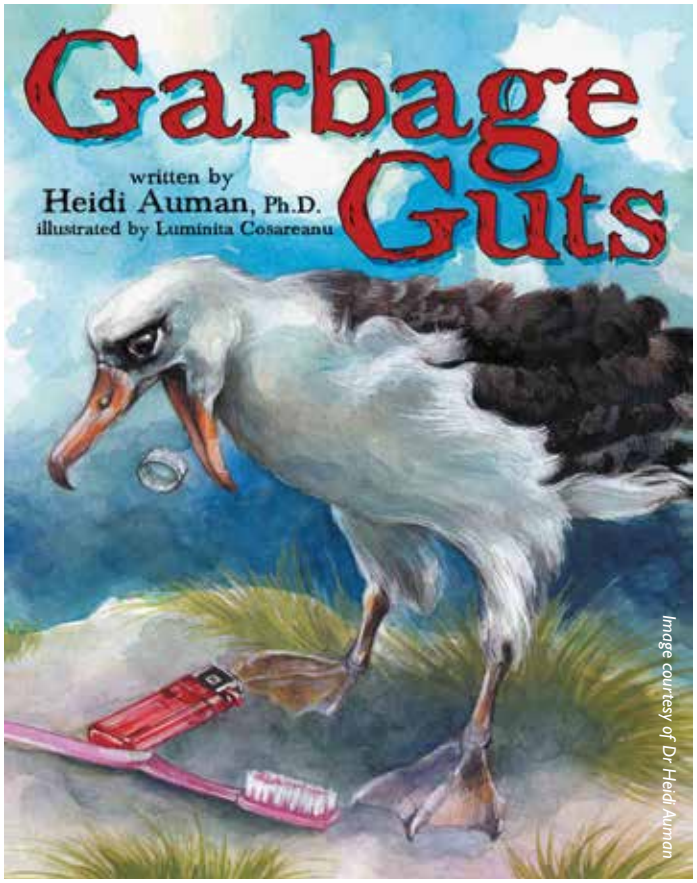


Image courtesy of Dr Heidi Auman

Reference

Auman, H (2014) Garbage Guts, Dog Ear Publishing, USA.

LESSON 7

What is the effect of beach litter?

In lesson 7, litter will be sorted and counted. The sources and potential impacts of this marine litter will be discussed, in light of how long it takes litter to break down in the environment.

Meets **Maths ACMNA028** Group, partition and rearrange collections of up to 1000 in hundreds, tens and ones to facilitate more efficient counting

Science ACSSU030 Living things grow, change and have offspring similar to themselves

Science ACSHE034 Science involves observing, asking questions about, and describing changes in, objects and events

Science ACSHE035 People use science in their everyday lives, including when caring for their environment and living things

Science ACSIS037 Pose and respond to questions, and make predictions about familiar objects and events

Sustainability OI.1, OI.2, OI.3, OI.4, OI.5, OI.6, OI.7, OI.8, OI.9 In summary, sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.

(If you are doing the Extension to this activity, keep the non-organic litter for that lesson).

Photo courtesy of the Tasmanian Parks and Wildlife Service

Method

Group the litter from the beach cleanup into groups or categories, for example, using the Tangaroa Blue Marine Debris Beach Survey form, including cloth, metal, plastic etc. Alternatively use the survey form in Lesson 1 from the Litter Audit. Count the number of items in each category. **Discuss what was found.**

EXPLAIN

Consider the impact of the litter on the animals that live in the sea. Explain that there are two main mechanisms whereby animals are affected by marine litter (1) ingestion and (2) entanglement.

Ingestion

For example, there are sea birds which mistake plastic for food, then feed such food to their chicks. The chicks die with a stomach full of plastic. Some muttonbirds have been found with more than 80 fragments of plastic in their guts. Large animals such as whales ingest plastic bags and this may block their digestive tract.

Microplastics are now known to be consumed by invertebrates, reducing their feeding ability and reducing their chance of survival. Some studies have shown that components of plastic ingested may be transferred between tissues e.g. in mussels. Animals with microplastics inside them may be eaten by animals higher in the food chain, although the effect on the latter animals is still the subject of research.

Entanglement

Then there are animals such as seals which become entangled in rope or fishing nets. These animals can eventually be strangled by these ropes or nets, or become prey if they cannot swim away as fast as they normally would. Alternatively, it may impede their hunting ability.

(There are many internet sources of photos of dead or injured wildlife, which have suffered from the effects of marine pollution. These include the photos by Chris Jordan, from Midway Atoll. You may find these photos inappropriate for this age group).

ELABORATE

Gather one of each of the following items, if possible: aluminium can, cardboard, fishing line, leather, nylon fabric, plastic bag, plastic bottle, polystyrene, steel can, woollen item. Add an apple or a piece of fruit.

If you have, say 6 items, choose 6 children and give each of them one item collected. Ask the children to arrange themselves in front of the class in order of the rate that these items take to decompose. For example, 'quickly decompose' on the right and 'slowly decompose' on the left.

LESSON 7

What is the effect of beach litter?

continued

ELABORATE

Gather one of each of the following items, if possible: aluminium can, cardboard, fishing line, leather, nylon fabric, plastic bag, plastic bottle, polystyrene, steel can, woollen item. Add an apple or a piece of fruit.

If you have, say 6 items, choose 6 children and give each of them one item collected. Ask the children to arrange themselves in front of the class in order of the rate that these items take to decompose. For example, 'quickly decompose' on the right and 'slowly decompose' on the left.

Share the following tabulated information, and rearrange the children (above) accordingly.

ITEM	HOW LONG TO DECOMPOSE AT SEA
Paper	2-4 weeks
Cotton shirt	1-6 months
Orange/banana peel	Up to 2 years
Wool socks	1-5 years
Plastic coated paper	5 years
Plastic Bag	10-20 years
Nylon fabric	30-40 years
Leather	up to 50 years
Tin can	50 years
Aluminium can	80-100 years
Plastic bottle	Indefinitely
Fishing line	600 years
Glass Bottle	1,000,000 years

EVALUATE

Lead a class discussion on the different types of rubbish and the timeline each takes to degrade.

Why do some things decompose quicker than others in the environment? (e.g. *some things are more natural and there are organisms/mechanisms that help break things down – the more manufactured something is, the longer it takes to break down*)

Why would it take less time for the steel can to break down than the plastic? (e.g. *it rusts*) What if there was an aluminium can? (e.g. *that may last longer than a steel can as it does not rust*). Note how long the plastic takes to break down. The 450 year timeframe for plastic is an estimate, as plastic has only been around for about 150 years.

Were students shocked by how long some of the everyday objects take to degrade? If so which ones?

Ask each child to individually write down, then volunteer to share with the class, HOW the litter may have entered the ocean (e.g. *from commercial fishing, recreational fishing, cruise ships, merchant ships, beach-goers, storm-water, rivers etc*). Discuss what we can do to prevent this (e.g. *pick up litter at the beach, do not drop rubbish in or near the stormwater, try not to use excess packaging, be careful if you have a picnic to ensure packaging does not blow away etc.*)

The Great Tasmanian South West Marine Debris Cleanup is a non-profit 100% volunteer-run event that has been cleaning up some of Tasmania's wildest beaches annually since 1999. The volunteers travel by boat to remote beaches and spend approximately a week picking up rubbish, sorting and counting each day's haul on deck in the evening. In 2018 alone, the cleanup team picked up over 112,000 pieces of rubbish from beaches located in Tasmania's World Heritage Area on the wild southwest coast.

References

South West Marine Debris Cleanup (2021), viewed 16 February 2022, wha-marinedebris.blogspot.com.au/

Tangaroa Blue (2019), Protect Our Oceans, viewed on 16 February 2022, www.tangaroablue.org

National Park Service (2015), How Long Will Litter Last?, viewed on 17 February 2022, www.nps.gov/olym/learn/kidsyouth/how-long-will-litter-last.htm

LESSON 7 *EXTENSION 1*

Making marine creatures from marine litter

In Lesson 7 Extension 1 students will make marine creatures from (the) marine litter, which will encourage the students to think about the form and function of marine animals and at the same time, continue to observe the types of marine litter. The students will prepare an artists' statement regarding their marine creature and how marine litter affects marine life.

Meets **Science ACSSU030** Living things grow, change and have offspring similar to themselves

English ACELY1671 Create short imaginative, informative and persuasive texts using growing knowledge of text structures and language features

Arts ACAVAM107 Use and experiment with different materials, techniques, technologies and processes to make artworks,

Arts ACAVAM108 Create and display artworks to communicate ideas to an audience

Sustainability OI.6, OI.7, OI.8, OI.9 In summary, actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.

Photo courtesy of Cradle Coast Natural Resource Management

You will need

- books/pictures/web images of sea animals
- tools such as glue gun and glue, drill, scissors, pliers
- craft materials such as pipe cleaners and tissue paper, yarn, buttons for eyes
- a collection of (clean) miscellaneous domestic waste items, such as lids, plastic bottles, lolly wrappers, bread tags, plastic strapping
- the beach litter collected on the beach litter collection in Lesson 6

Method

Re-visit the effect of marine litter on animals in the sea.

Students then study animals from the marine environment, using the resources (books, pictures etc) that are provided.

Ask the children to work individually or in pairs to create a marine animal from the collected litter/waste. They should consider the features and adaptations of the animals. They could even show their animal being affected by marine litter.

EVALUATE

Exhibit these works for the parents/school community. Ensure that you write an artists' statement to accompany the exhibition, including what the children learnt, why they made their particular creatures and what personal action they will do to prevent marine litter.

Photo EPA Tasmania

Photo EPA Tasmania

Photo courtesy of Cradle Coast Natural Resource Management

LESSON 7 *EXTENSION 2*
Make a poster

Students make a poster, which could become part of a calendar encouraging people not to litter (the land or the sea).

Meets **Science ACSSU030** Living things grow, change and have offspring similar to themselves

English ACELY1671 Create short imaginative, informative and persuasive texts using growing knowledge of text structures and language features

Arts ACAVAM107 Use and experiment with different materials, techniques, technologies and processes to make artworks,

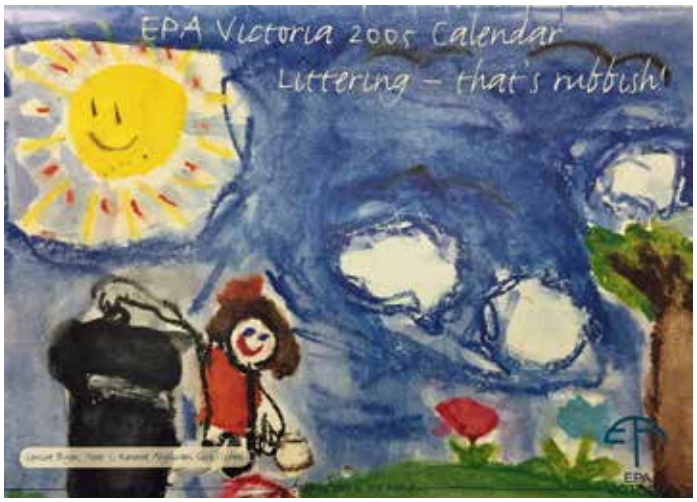
Arts ACAVAM108 Create and display artworks to communicate ideas to an audience

Sustainability OI.1, OI.2, OI.6, OI.7, OI.8, OI.9 In summary, actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.

Images coutesy of EPA Victoria

Method

Ask the students to make a poster, which could become part of a calendar encouraging people not to litter (the land or the sea).



LESSON 7 *EXTENSION 3*
Design a litter bin

The children design a litter bin which inspires people to put their rubbish into it. Children's ideas are often valuable to creating a positive future.

Meets **Design and Technologies ACTDEP005** Explore needs or opportunities for designing, and the technologies needed to realise designed solutions

Design and Technologies ACTDEP006 Generate, develop and record design ideas through describing, drawing and modelling

Sustainability OI.6, OI.7, OI.8, OI.9 In summary, actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments.

Photo EPA Tasmania

Method

Ask the children to design a litter bin which inspires people to put their rubbish into it. Encourage the students to be creative. Give them some time to work alone or in groups, and give them an opportunity to draw their litter bin, then present their idea/s to the class. Explain that children's ideas are often valuable to creating a positive future.

After they have had a chance to show their examples, show them the following examples from around the world. Possibly the funniest is the singing or talking bin.

www.youtube.com/watch?v=iP2wTzlktX8

www.inhabitat.com/the-city-of-lucerne-turns-taking-out-the-trash-into-a-fun-game/

Also, people have invented basketball hoop litter/recycling bins.

References

Inhabitat (2011) Lucerne's Clever Street Decals Make Taking out the Trash Fun, viewed 16 February 2022, http://inhabitat.com/the-city-of-lucerne-turns-taking-out-the-trash-into-a-fun-game/

Keep Britain Tidy (2011) Talking Bins – Love Where You Live, viewed 16 February 2022, www.youtube.com/watch?v=iP2wTzlktX8

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Tasmanian Government