



# How to reduce, reuse and recycle waste in schools

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# Foreword

**Australians are among the most resource hungry consumers in the world.**

**And Victorians are among the world's highest per capita waste generators.**

At the same time, our greenhouse gas emissions and waste levels are continuing to increase with our growing economy and population.

But the solutions are available to steer us towards a low carbon future and zero waste. Sustainability Victoria understands that it must act now for Victoria to be a sustainable state. Its role is to show all Victorians how they can make a difference.

## **Sustainability Victoria**

Our vision is for a thriving community that uses resources wisely. And with concrete solutions, we're showing Victorians how to make change. We partner with government, business, industry, communities and householders to tackle the global challenge of climate change at a local level. Across the state in every sector, we're working to change attitudes and shift behaviour. We want Victorians to be ResourceSmart to secure a low carbon future.

## **ResourceSmart**

ResourceSmart is Sustainability Victoria's overarching strategy for change, providing all Victorians with the right advice and support to act today on climate change.

## **ResourceSmart Schools**

ResourceSmart Schools inspires, informs and supports Victorian primary and secondary schools to minimise waste, reduce energy and water usage, and cut greenhouse gas emissions.

## **About this Guide**

*ResourceSmart Schools – How to reduce, reuse and recycle waste in schools* is aligned with the Australian Sustainable Schools Initiative (AuSSI), the national framework for the delivery of sustainability education in schools. This Guide is supported by teaching and learning resources, which are available to all Victorian schools commencing or continuing the journey with students, teachers and the local community to reduce waste to landfill.



# Acknowledgments

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Particular thanks are extended to the following organisations and individuals for permission to reproduce photographic and copyright material in this resource.

- Bob Winters

## Front cover image

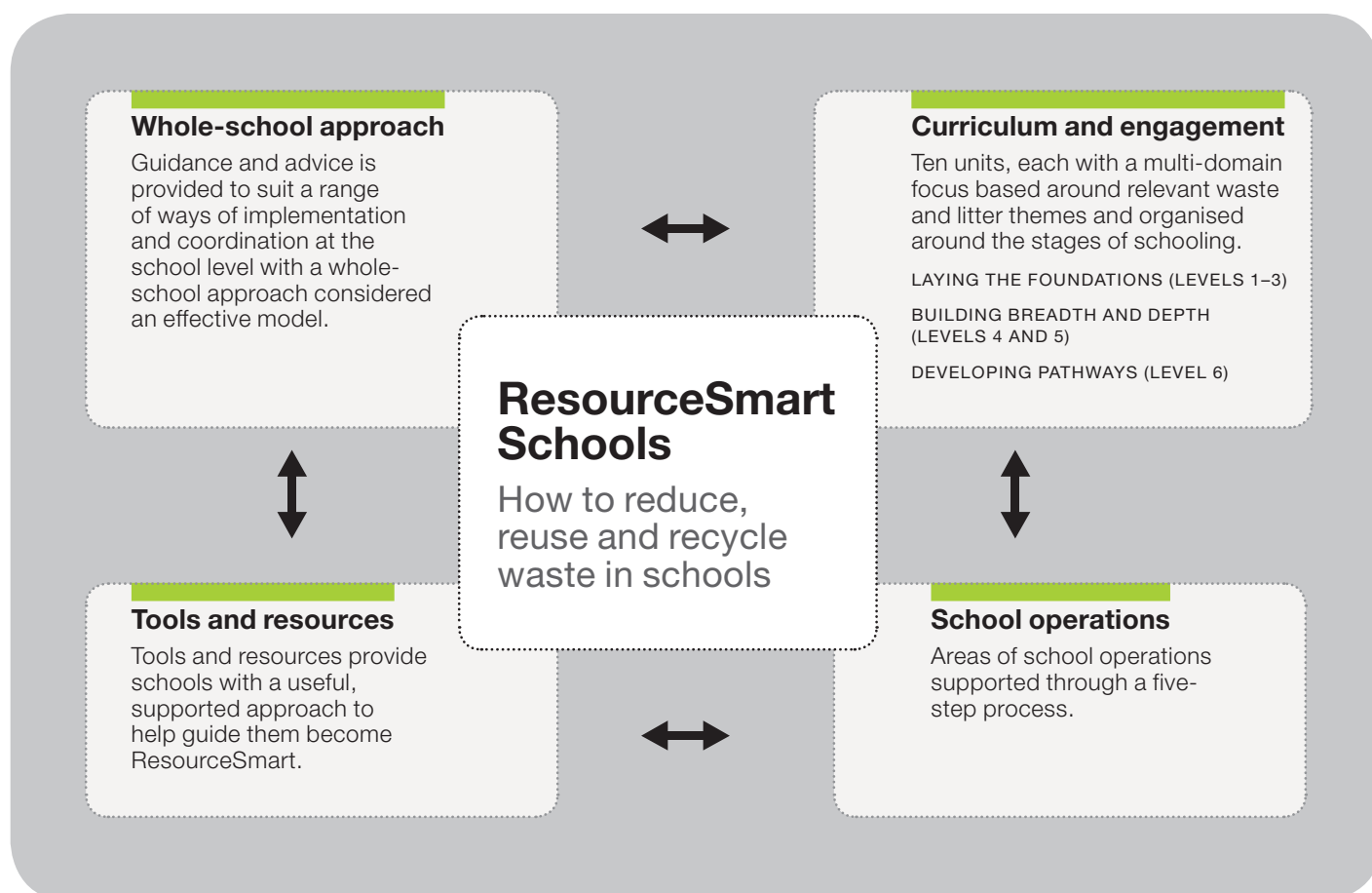
Southmoor Primary

## Other school photographs

Coatesville Primary

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# About this ResourceSmart Guide



This ResourceSmart guide highlights the benefits of minimising consumption of natural resources and production of waste. It fosters environmentally conscious actions that people can readily take as part of their day-to-day lives (such as when choosing and using products for home or work). The guide emphasises the importance of achieving an integrated package of educational outcomes, and other environmental management outcomes such as infrastructure and technology, regulation and financial incentives.

Becoming ResourceSmart is about change – change in attitudes and practices of students, teachers and administrators towards waste and litter – changes that will eventually flow through to their families and the community as a whole.

As such, this guide combines four interrelated areas to assist schools make these changes: planning, implementing, monitoring and evaluating programs, practices and processes to minimise waste and use resources more sustainably.

It is recognised that schools are at varying stages of managing their waste. The materials in this Guide are designed to be used flexibly to assist you and your school in becoming ResourceSmart. You are encouraged to use those aspects of the program that relate to your school's particular situation and requirements within the context of its overall approach to sustainable resource use.



## Whole-school approach

Evidence from evaluations of school waste reduction programs indicates that success in achieving waste management outcomes occurs when schools adopt a whole-school approach. A whole-school approach involves effectively integrating school plans, school operations and curriculum engagement. Outcomes for schools take the form of economic savings, environmental, social and educational benefits.

A whole-school approach is the key to lasting success as it involves all members of the school community working together to change waste management behaviour.

A ResourceSmart program may initially begin with a small team of dedicated teachers, students and parents. But, expanding the involvement and commitment of all school members should be the ultimate goal if you would like your school to become ResourceSmart.

## School operations

An effective ResourceSmart waste program incorporates relevant systems, processes and practices to ensure all aspects of the school's waste is managed, maximising the potential to divert waste from disposal as landfill. It's important to gain commitment from the school community with tasks identified and assigned to committed members of the school community. The approach to waste management is coordinated and monitored, with review, evaluation and reporting as key elements of the process.

The process suggested is based around actions at five stages that include:

- **GET STARTED:** Assess the current approach, gather relevant information and gain commitment
- **PLAN:** Plan the desired outcomes and implementation activities, assign roles and responsibilities, inform others, identify budget required, seek support and document the plan

- **IMPLEMENT:** Follow the plan
- **MONITOR:** Gain feedback about the processes, carry out visual assessments and trouble shoot as the need arises
- **REVIEW, EVALUATE AND REPORT:** Use appropriate tools to review and audit the approach, evaluate its effectiveness, list recommendations, report findings and implement suggested improvements.

Advice to support the school operations is organised under sections:

- *Reduce, reuse and recycle*
- *Greenwaste, composting and wormeries*
- *Litter and stormwater*
- *Green purchasing*
- *Waste disposal*

Throughout the process tools and resources are suggested to assist schools.





## Curriculum and engagement

The ResourceSmart curriculum units have a multi-domain focus and are designed to engage students in their understanding about litter and waste minimisation related concepts. The Victorian Essential Learning Standards addressed within each unit are identified to assist schools to assess students. Where relevant, links to tools and resources are made, and indications given as to how school operations can be integrated in a meaningful way.

A total of ten units are organised under stages of schooling:

- LAYING THE FOUNDATIONS (Levels 1–3): three units
- BUILDING BREADTH AND DEPTH (Levels 4 and 5): five units
- DEVELOPING PATHWAYS (Level 6): two units

An inquiry approach is used to engage students and promote deeper thinking about the topic:

- TUNING IN: Identifying and defining the issue.
- FINDING OUT: Collection of data is not an end in itself, but a means towards developing understandings that lead to appropriate outcomes.
- DRAWING CONCLUSIONS: Requires students to express their understandings and communicate them to others.
- CONSIDERING SOCIAL ACTION: Requires that students be active in decision making during the inquiry and at its conclusion.
- REFLECTION AND EVALUATION: Requires students to reflect on the outcomes of their actions and use this information for further planning and inquiry.

## Tools and resources

A number of tools and resources are identified throughout the Guide to provide schools with a useful, supported approach to help guide them through the process of being ResourceSmart. The tools are available to assist schools with:

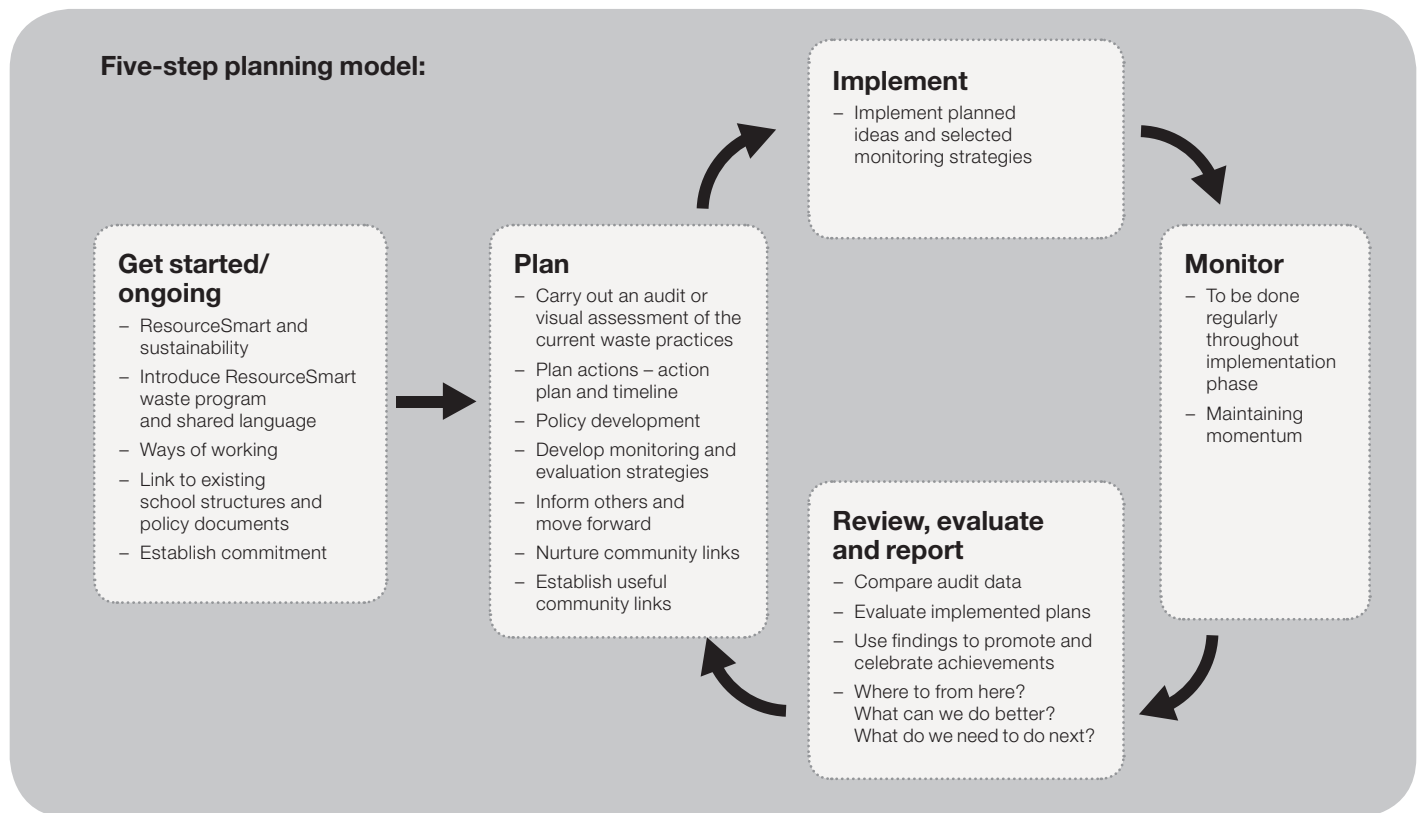
- whole-school approach
- school operations
- implementing curriculum aligned with school operations.

The types of tools include:

- CHECKLIST/ACTION: Used to provide a quick snapshot of what your school is doing about being ResourceSmart and may assist you to identify other areas that may not have been considered previously.
- GATHERING IDEAS: A method of generating ideas to be considered at the next stage.
- SORTING + DECIDING + GOALS: Provides a framework to use ideas developed during the brainstorm; generally ideas are sorted, prioritised and then selected, as a result the goals are refined.

- TARGETS: Assists in documenting what targets your school plans to achieve.
- ACTION PLANNER: Used to identify tasks, when they should be started and completed, and identifies who is responsible.
- AUDIT: Used to estimate the amount of waste your school is generating. It is useful to do this audit before and after you have implemented your ResourceSmart program.
- VISUAL ASSESSMENT: Assists staff and students to keep a record of how well their ResourceSmart program is going. Its purpose is to provide a standard measure for future comparisons.
- COMMUNICATION: Assists in communicating progress and success and keeping everyone informed as the need arises.
- VALUES: Helps individuals affirm which of their values are most important in being involved in ResourceSmart programs.
- SURVEY: Assists in gathering school community data about aspects of the ResourceSmart program.

# Adopting a whole-school approach



Whole-school change usually takes considerable time. It occurs in small stages, one step at a time, but always with the goals in mind. Effective and lasting change needs to be planned and coordinated – and a useful first step in planning for change is to look at other effective schools as a model.

The key to establishing a successful waste minimisation program in a school is to involve the whole school community. That community is made up of:

- Principal and leadership team
- Teachers
- Students
- School council
- ancillary staff, eg administration, cleaners and canteen operator
- Parents
- Broader school community

To achieve ResourceSmart outcomes it is recommended that a whole-school approach to developing a comprehensive waste minimisation and litter reduction strategy is undertaken, integrating the school's operating practices and curriculum. Using this approach, the school community has an opportunity for input in the initial planning, implementation and ongoing maintenance to manage the school's waste as part of a ResourceSmart program. A suggested five-step planning model sets out key tasks and actions which schools can use and adapt as required.



# Get started

## ResourceSmart and sustainability

Many schools are involved in conservation activities that involve students making decisions and taking action such as minimising energy use, increasing biodiversity, conserving water and reducing litter.

Schools have an important role to play in preparing and empowering students to take responsibility for creating and enjoying a sustainable future. Through hands-on locally-centred actions, students begin to understand complex sustainability issues. Using knowledge, critical thinking skills and values they have the capacity to participate in decision making about environmental and development issues.

### Developing a common understanding of sustainability and waste minimisation

The following set of questions could be used to discuss and develop a school-wide view of sustainability. Key groups to participate in discussions include teaching staff, students, ancillary staff and school council; however, if you have the opportunity, broaden the stakeholder group for a more holistic view.

The resulting agreed view would underpin future decisions about waste minimisation practices in the school.

### Probing understandings about sustainability

1. What kind of world do we want for the future, keeping in mind the capacity of Earth's life support systems?
2. What views are based on economic considerations, which have an environmental focus or are some views based around benefits to society? How are they interconnected?
3. If future generations were able to communicate their views to us, what do you think they would ask us to do for them?
4. Based on responses to these questions ask participants to define
  - ~ Sustainability
  - ~ Living more sustainably

Refer to Glossary of terms for current descriptors.

The *ResourceSmart Schools – School Environment Tool* can be used to collect views about the school's sustainability performance.

You may like to identify your school's ecological footprint to further develop understanding of sustainability. The EPA school footprint calculator can be found on: [www.epa.vic.gov.au/ecologicalfootprint/calculators/school/introduction.asp](http://www.epa.vic.gov.au/ecologicalfootprint/calculators/school/introduction.asp)

### Connecting Waste minimisation with sustainability

Using responses to the questions about sustainability, consider connections between waste and sustainability.

- Where does waste have an impact?
- How does it impact?
- What can be done?
- Who is responsible?

### Connecting ResourceSmart with sustainability

The *Values Tool* and *Personal Reflection* may be used to help individuals clarify reasons for being involved in a ResourceSmart program. These tools are suitable for use by teachers, students (Junior and Senior School Councils, student action teams), ancillary staff and school council.

Use responses from the tools to develop a priority list of reasons for the school becoming ResourceSmart and identify issues about the school's current waste practices. An analysis of the results may be conducted through group discussion to develop a clearer understanding of views about the importance of being part of a waste and sustainability program.

Refer to the TOOLS AND RESOURCES section for *Values Tool* and *Personal Reflection*

### Quotation

*'Education for sustainable development is a life-wide and life-long endeavour which challenges individuals, institutions and societies to view tomorrow as a day that belongs to all of us, or it will not belong to anyone.'*

2005–2014 is the United Nations Decade for Education for Sustainable Development

### How ResourceSmart Is our School?

It is important to gather people's perspectives about the current waste situation to ensure everyone has input. Information gathered from some basic surveys early in the process of becoming ResourceSmart can be used to inform policy, direction and form a benchmark against which the effects of any changes you introduce as a result of a ResourceSmart program can be measured.

The *How ResourceSmart is your school?* survey is designed to give you an overview of how your school is performing in waste and litter education. The information from this survey can also be used to further the discussion of connecting ResourceSmart and sustainability.

Information from the *How ResourceSmart is your school?* survey could also be used to introduce a ResourceSmart waste program as it provides a basis for acknowledging effective waste practices and identifying areas of concern. In depth discussions have the potential to generate collaborative actions for improvement.

Refer to the TOOLS AND RESOURCES section for the survey *How ResourceSmart is your school?*

### Suggestion

When discussing sustainability, acknowledge and link to any initiatives currently happening in your school, eg energy, water, biodiversity, air, healthy eating, programs such as *Landcare*, *Waterwatch*.

## Introducing ResourceSmart Schools – Waste

There are many ways that a school could introduce waste minimisation practices. The following approaches are some of the many possibilities.

### System

Many schools adopt this approach; often starting with a manageable area of waste minimisation such as paper recycling and/or composting, which can have significant reduction in waste to landfill.

Schools can reduce their waste by 50% by paper recycling and 80% by a combination of paper recycling and composting.

### Curriculum

Opportunities to use waste and litter reduction as an authentic learning context exist. It's possible to use a multi-domain approach integrating disciplines such as Science, Mathematics, Humanities/Economics, English and The Arts with Physical, Personal and Social Learning and/or Interdisciplinary Learning.

Waste and litter reduction could also be a topic covered in domains such as English, Science and Civics and Citizenship.

Waste minimisation could be a theme in a unit of work. The theme could be a part of the curriculum or a particular current event or issue. It could be a theme for a level or even the whole school during a special period such as World Environment Day, Arbor Week or World Recycling Day.

### An event

Involvement by students, staff and the school community in an event profiles waste minimisation in a positive and rewarding way.

This could involve:

- involvement in Clean-up Australia Day could become a focus for litter education
- participating in the Rubbish Free Lunch Challenge
- an excursion to a waste education centre or waste treatment plant or a visit from a waste educator, with appropriate pre-visit and post-visit activities. Many organisations and local councils provide comprehensive teachers' packages.

### Competitions, awards and festivals

Involving students and the whole school in competitions, awards and festivals is a fun way of promoting the waste reduction practices, increasing knowledge and awareness of waste issues and potentially fostering collegiality in achieving goals. Being involved in such events broadens student views to beyond the school environment and challenges them to think creatively about issues relating to waste.

Preparing a school for a competition can provide the stimulus for either setting up or improving a waste minimisation program in a school.



### Idea

Billanook Primary School ran a 'Sustainability Fair' in school hours from 11am until 1pm. The fair had a recycling focus with trash and treasure stall. Each class organised an sustainability activity for the day such as minimal use of electricity, sustainability message on student's back, competitions, eg who can knock over the tower of cans. This hugely successful two hour event had lots of activities, involved the school community having fun, promoted sustainability and raised \$1200.00!

### Community action program

Starting a school waste program as part of a wider community action program gives the program relevance and local focus.

### Developing a shared language

As with any new initiative there is a new language and understandings to be learnt by those involved. Taking opportunities to assist staff, students and the community to develop these skills will help the journey. Initiatives include staff meeting activities, guest spots in the newsletter, ResourceSmart section on the school website or posters around the school.

### Using data

Using data for discussing the school's current waste management can also be a valid starting point for introducing a ResourceSmart program. The *How ResourceSmart is your school?* survey provides more detail including appropriate tools.

## Ways of working

How a school begins and implements its waste minimisation program is determined by the local context. It is worth spending some time identifying the best way you will work together to achieve the waste management outcomes you want for your school. Doing this will assist you in mapping a pathway for your journey and making links that will support you.

### Principal and leadership team support

Having the principal and leadership team on board is essential in establishing and maintaining a ResourceSmart program. Supporting and generating an expectation of a new school-based initiative being worthwhile and beneficial to the whole school community will assist with the program's successful implementation.

Leadership support provision may include:

- committing support for the ResourceSmart team initiatives
- providing the necessary resources and budget allocation
- providing time for planning, or accessing resources, or particular timetable arrangements.
- establishing support structures
- supporting opportunities and mechanisms for reporting and publicising initiatives, events, successes.

### Use a team approach

Establishing a ResourceSmart or Sustainability team is undoubtedly the most effective method of generating enthusiasm and establishing effective waste minimisation practices and initiatives within a school. It is imperative for the coordinator to consider how the team will work. Some strategies to do this are:

- identifying potential key people who share a belief, including teachers, students, ancillary staff and community members
- ensuring that the team ethos is of working together with a shared vision and responsibility
- setting up mechanisms for regular contact and communication such as regular meeting times and email contact
- establishing timelines to help with implementing initiatives and engender collective ownership and responsibility.

#### Leading Teacher

Establishing a Leading Teacher position for a Sustainability Coordinator is a proactive way of promoting and committing to sustainable actions within the school. Their whole-school role is to convene a committee with representatives from every level and aspect of the school, including students, teachers, and ancillary staff, and manage the implementation of initiatives.

### ResourceSmart/Sustainability Coordinator

The ResourceSmart/Sustainability Coordinator ensures the development and implementation of waste minimisation practices within a school. To do this well the coordinator will:

- need time to undertake the tasks involved (negotiate some release from classes)
- understand the issues associated with sustainability and have a commitment to waste minimisation as a sustainable practice
- provide leadership
- build a rapport and involve the principal and leadership team
- manage a strategic process
- encourage teachers and the school community to tackle waste minimisation initiatives through innovative approaches
- work with members of the school community to implement the waste minimisation plan
- monitor initiatives to refine and celebrate successes
- communicate effectively within and beyond the school
- work with the school leadership team to support the project and keep them informed of its progress
- work strategically within the school community and its partners
- celebrate and communicate success.

It is important for the coordinator to ensure that they have the support of the leadership team and that this role is not going to increase their commitments to the point the job becomes unmanageable. Take on tasks within the role that are manageable – small steps!

### Whole-school approach

A whole-school approach to developing a comprehensive waste minimisation and litter reduction strategy would integrate the operating practices and work with curriculum. Using this approach the school community has an opportunity for input in the initial planning, implementation and ongoing maintenance of the ResourceSmart waste program.

### Individual teacher

While not the recommended way of working, it is often an enthusiastic individual teacher who is committed to beliefs of sustainable practices and views waste minimisation as a way of engaging students, teachers and the whole school community in actions that reflect this belief.

It is vital that the teacher is supported by others in the school community to form action teams to achieve waste management outcomes. Forming permanent teams with the goal of adopting a whole-school approach to ResourceSmart implementation should be foremost in future planning.



## Linking to existing school structures and policy documents

A ResourceSmart program has the potential to link curriculum, school operations and involvement of the wider school community. Use ResourceSmart as a platform to strategically link school policies and structures to assist with the implementation of waste management in all aspects of the school.

Considering the simplest way to make these links may involve:

- establishing potential links with Strategic and Implementation Plans with the principal and leadership team

- including ResourceSmart actions in events or initiatives within the school programs such as weekly awards, buildings and grounds actions, newsletter spot
- embedding opportunities for ResourceSmart learning in curriculum
- working closely with school council
- including office and ancillary staff in planning and implementation of initiatives.

## Establish commitment

Establishing commitment early in the journey is important. The degree of commitment will largely be determined by the approach the school adopts. The level of commitment can range from support of events through to sustainability and waste minimisation being a core school vision.

### Possible commitment could include:

- a teacher working independently may have staff commit to help in the organisation of an event and other initiatives
- the principal committing to ResourceSmart by establishing a formally recognised team or supporting a team of committed individuals in establishing ResourceSmart practices
- school council committing to support initiatives involving the school grounds
- a school committing to adopting a whole-school approach to ResourceSmart by establishing policy and structures to support the program.

There is a significant risk that the scheme may lose momentum or cease altogether, if the waste and litter program is just the work of a few committed individuals, especially if those people move away from the school or lose interest in the program. A committed team that meets regularly is the best way of ensuring representation from all levels of the school community.

Evidence of a committed ResourceSmart school will be demonstrated through the school's ethos to minimising their waste production. Actions and practices of all members of the school community reflect a commitment to systems that support the production of less waste and sustainable practices.

Evidence of a school's ResourceSmart commitment may involve:

- a policy on waste minimisation that has been accepted by the whole school and adopted as school policy by the school council
- student owned programs
- a whole-school approach which is supported by staff and the school community
- effective systems put in place that are simple, easy and well maintained
- a process of continuous improvement
- initiatives, events and actions that involve fun, eg Rubbish Free Lunches
- a program built on trust and respect between all members of the school community.
- regularly celebrating school achievements or entries into awards, eg ResourceSmart Schools Awards.

# Plan

## Mapping our current situation

Form a working party to investigate the costs and benefits of setting up a waste minimisation and litter reduction program in your school. Table for discussion the investigation findings at staff, junior or senior school councils, school council and other school community forums. Some issues that should be considered include:

- benefits of the program to the students, the school and the environment
- impact of the program on the education of the students (eg Can it be integrated into the school curriculum so that the students' education will be enhanced?)
- time involvement for staff/students
- occupational health and safety issues (eg washing compost buckets, picking up litter)
- insurance (eg Will the school be covered if, for example, paper for recycling is set alight, or even stored on the school premises prior to collection?)
- aesthetics (eg Will the recycling/ composting systems appear unattractive to outsiders?)
- costs/savings
- level of local council support/services
- positive publicity.

### Gathering useful information

Carrying out some basic surveys early in the process of becoming ResourceSmart will help identify issues and affirm existing systems or initiatives. This information can also inform policy development or review.

The TOOLS AND RESOURCES section has a range of tools to assist you to gather information that will form a benchmark, against which you can measure the effects of any changes you introduce as a result of the ResourceSmart program. They will also help you to identify areas for actions and therefore inform your action plan.

The tools will also be useful as one way of monitoring your actions.

### Set Targets

Once data and information has been gathered, it is important to set targets/goals and work towards these over a period of time. Taking small planned steps is the answer to making the task of implementing a ResourceSmart program achievable. Using the *Set targets* tool will help frame an action plan and set a realistic time frame for implementation of actions.

Refer to the TOOLS AND RESOURCES section for the *Set targets* tool

## Sustainability policy

Essentially, policy shapes almost everything that happens in a school and reflects a set of beliefs or values. A good sustainability policy will demonstrate how the school will operate sustainably, let everyone know what the approach is to sustainability and ensure uniformity and consistency in decisions relating to approaches to sustainability in the school.

School communities that take the time to develop a sustainability policy have a greater chance of making a difference in their school, as the policy clearly communicates to current and new school community members what the school values. The policy will influence decisions and actions that the school makes in key areas of:

- *Reduce, reuse and recycle*
- *Greenwaste, composting and wormeries*
- *Litter and stormwater*
- *Green purchasing*
- *Waste disposal*

### A sustainability policy will:

- provide a set of procedures for managing sustainable practices
- clarify expected behaviours and roles of school community members
- create a whole-school culture of sustainable practices
- demonstrate to the school community the school's commitment to sustainable practices

A suggested approach to developing and reviewing a school's sustainability policy mirrors that of implementing a ResourceSmart program as outlined in the OPERATIONS section. The process includes the whole school and is based around actions at five stages:

- **GET STARTED:** assess the current policy situation using the *Sustainability policy checklist*, gather relevant information and draft a plan
- **PLAN:** draft a policy, seek feedback, improve the policy, endorse the policy
- **IMPLEMENT:** implement the policy
- **MONITOR:** Gain feedback about the policy, carry out informal assessment about policy implementation
- **REVIEW, EVALUATE AND REPORT:** Use appropriate processes to review and evaluate its effectiveness, list recommendations and revise policy in response to recommendations and report findings.

Refer to the TOOLS AND RESOURCES section for the *Sustainability policy checklist*

Included in the OPERATIONS section is clear advice relating to each of the key areas of sustainable practice. These may be useful when informing policy development and reviewing

## Action planning

A ResourceSmart program should be thought of not only as a method of action, but as a process of change. There will be ideas of what needs to be changed and ideas about how this may happen. An action plan sets out *why*, *what* and *when* actions will happen.

Developing an action plan is central to implementation of a *ResourceSmart Schools – Waste* program. The action plan clearly identifies:

- the desired outcomes (environmental, social and economic) and actions that will lead to these outcomes
- who is involved
- how it will be implemented
- when it will occur
- what resources are required
- who can help
- how it will be monitored.

Refer to the OPERATIONS section for information about action planning, tools to support the planning process and accreditation

### Become a ResourceSmart school

- Reduce waste
- Increase dollars
- Reinvest in the school

### Advice

Including specific roles and duties for those involved in the *ResourceSmart* program together with timelines for implementation supports a whole-school approach.

## Moving forward

### Establish a budget

Discuss with your principal what funds can be allocated to the program. Speak to the bursar or business manager to establish how this budget will be set up and the processes necessary to access the budget.

In your discussions with these key people, highlight the benefits of waste minimisation for saving the school money by reducing expenses. Remind them that reducing paper use not only saves money, but also helps the environment by reducing landfill.

Explore possible funding allocations from external sources such as grants and local business.

### Resourcing

Whatever the local context, early identification of appropriate resources is vital. The ResourceSmart coordinator and/or team should take the time to carefully map out the most appropriate resources needed to support an initiative.

Strategically accessed resources from a variety of sources add to the potential of the program.

### Community links and partnerships

The mutual benefit of forging links with the local community can be multifaceted with economic, social, educational and environmental benefits.

Connecting with the local community and industry partners for expertise, resources and funding to support the program helps broaden the program beyond the school boundary. With successful strategic initiatives it is possible for the school to develop a reputation as a leader within the local community for its ethos of sustainability practices.

There are potential opportunities for students to be involved in hands-on real life actions that connect school learning with contemporary approaches to sustainability.

### Students as leaders

A ResourceSmart program fosters student leadership. Students taking responsibility for actions at their school adds depth and authenticity to sustainable waste practices within and beyond the school by:

- problem solving
- taking responsibilities for program implementation
- impacting on family actions and attitude
- working with their local community
- profiling the school culture and ethos beyond the school.



# Implement

Implementing is a process, which involves actions and evidence of planning having taken place. The actions often lead to changes in resources, materials and behaviours, which ultimately reflect an individual's values and beliefs. A ResourceSmart program has the potential to change waste minimisation practices involving the whole school as well as individuals beyond school.

It is important to remember that change is a process that takes time. Support individuals through the process as

it is usually complex, involving the use of new language, new knowledge, implementing practices, actions, and using materials that achieve ResourceSmart outcomes.

The action plan is an effective method to organise the implementation phase where all those involved know what is expected of them, when and how actions are to occur and how the plan will achieve clear goals.

# Monitor

Working out what can be measured and how data will be gathered is an important aspect of the action planning process. Gathering data related specifically to actions being implemented will let you know when there has been improvement. This is a powerful way of clarifying and thinking more deeply about waste minimisation and sustainability.

Adopting an action research approach provides a process by which school and teams investigate identified action/initiatives/programs. This involves using a cycle of identifying an area of interest or concern, developing and trialling, gathering evidence, reflecting on the outcome, reframing, revising or extending the original concern and developing further actions.

This process provides schools with evidence through which they can show what is being done to meet goals and challenges to bring about change and improvements in waste management.

## Monitoring may include:

- Observations and informal conversations with students, teachers and community about what is happening. Recording aspects of these conversations can be useful for possible use later in the reporting phase.
- Using identified tools from the TOOLS AND RESOURCES section or other sources.
- Arranging for opportunities for reporting on progress such as meetings, newsletters.
- Documenting developments occurring and providing ready access to all.

## Maintaining momentum

A difficult aspect of any program is maintaining the momentum after the initial enthusiasm has waned.

Providing rewards to students for their efforts helps to maintain enthusiasm and continues to foster good habits and ultimately reach the goal of sustainable waste management practices being embedded in school life. Some ideas that have been successfully implemented by schools include:

- recycling trophies presented to the class that collected the most paper and other recyclables for the week
- recycling certificates for special achievements
- spot prizes for students who are ResourceSmart
- reward agreed to if a target is reached
- litter awards for individuals, classes or houses.

### Idea

Billanook Primary School has formed a student *Sustainability Team*. Students have responsibility for organising a number of sustainability focuses including water. They wear a special team badge and report to the school community.

Be prepared to try out new ideas, especially those suggested by students and parents.

Feedback from monitoring and evaluation information helps with ongoing ideas and planning of further actions.



How does your school communicate its values?



Have you considered ongoing projects such as mulching your school gardens?

## Blockers and solutions

As with any program it is important to identify any possible blockers that may inhibit the successful implementation. Some simple ideas for dealing with blockers are:

- begin with the committed – staff and students
- start small and make tasks achievable
- ask for help
- think outside the square – be a creative problem solver drawing on the ideas of others
- regularly communicate achievements to build profile
- highlight links to current situation
- highlight and celebrate benefits
- promote as part of school ‘culture’ – it is not an extra, but the way we work.

### Problem solving

When your school becomes aware of a problem, deal with it quickly, otherwise it will undermine the whole program. If, for example, the worms in the wormery died, find out why they died and what you can do to prevent it happening again. At one primary school, the staff innocently added dozens of leftover lamingtons to their wormery. Not only did the worms die, but the smell was appalling and the contents of the whole bin had to be removed and buried. The problem was apparently caused by an excess of sugar.

# Review, evaluate and report

Reviewing and evaluating your ResourceSmart action plan helps to measure the degree of change in waste practices that has occurred as a result of the implemented actions. It also provides data to inform future directions and make improvements to the existing program. The strategies used should be planned with a clear focus and involve all key people in the school including the leadership team, staff, students and community.

Keep records of the achievements in the waste and litter area. This could be the work of the committee, one grade or year level. It is important to do regular waste assessments to show reductions. Use audit and assessment tools in the **TOOLS AND RESOURCES** section of this Guide to record your school's progress over time.

As part of the reviewing and evaluating process of your ResourceSmart program, plan to celebrate your successes with students central to the organisation.

## Reporting

It is important to report to the school about the successes of the program. This will show how actions by individuals and groups are leading to worthwhile results. Where possible encourage the students to initiate this feedback. Reporting can include:

- newsletters
- annual reports
- special noticeboards
- the school's home page on the Internet
- school level and house assemblies
- speech nights
- charts around the school showing the number of full hoppers of garbage collected each week, amount of paper recycled, the amount of paper used, *etc.*
- target thermometer showing dollars saved by halving skip collections, reducing paper use, *etc.* It is equally important to receive feedback from the school about how they see the program working. Some ways to do this might include:
  - a member of the ResourceSmart committee visiting each class and asking them a number of key questions (eg What else could we be doing to reduce litter in the school?)
  - a question about the program as part of the annual opinion survey sent to all parents
  - suggestion box with canteen vouchers for the best idea of the month.



## Publicity

If your school is achieving great results with this program, publicise your successes. Try some of the following:

- school website
- articles in local papers
- interviews on radio and television programs
- banners outside the school
- letters to your local council
- letters to your local politician.

## Networks

Placing the waste and litter education programs on the agenda of existing networking groups – principals, cluster and others – will allow you to share your experiences with other teachers in the area. Communicate regularly with your council waste minimisation officer.

## Where to from here?

Having reviewed and evaluated your actions it is time to look to the future. Questions help frame future directions and these could include:

- Have we achieved our identified goals?
- What can we do better?
- What can we do to further our goals?
- Do we still have issues/problems?
- Have our actions raised new questions we haven't thought of before? What can we do to solve these?

Discussion and decision making about future directions of the next ResourceSmart cycle should involve the whole school. The new cycle should build on what has already been achieved, establish new teams of school community members, set new goals, establish new initiatives and outline mechanisms for monitoring progress. Sustainability policy documents need to be reviewed and amended to reflect any new or revised whole-school decisions.



# School Operations

## Introduction

School Operations is designed to assist you to implement your ResourceSmart waste program. It is framed within a suggested five-stage process. Specific support and advice is provided under the following sections:

- *Reduce, reuse and recycle*
- *Greenwaste, composting and wormeries*
- *Litter and stormwater*
- *Green purchasing*
- *Waste disposal*

Fast facts, Trouble shooting and FAQs provide detailed specific information for the sections.

Developing a ResourceSmart action plan is an essential part of implementing your program. Use the advice and strategies in this section to align your action plan with the five-stage process of school operations and using a whole-school approach.

# Overview of approach to waste minimisation

	Reduce, reuse, recycle	Greenwaste, Compost and wormery
<b>Get started</b>	<p>Consider waste management as part of your school's approach to sustainability. Assess what is currently occurring, who's involved and what is being done? Use tools to assist in the process. Gather data and relevant information to accurately describe the current process and associated costs, identify opportunities to improve waste/litter management and reasons why this is important. Provide opportunities to suggest ideas, raise concerns and address issues.</p> <p>Gain commitment from the school community. Consider a whole-school event or competition to raise the school community's awareness and get actively involved.</p> <p>Identify connections to current/planned curriculum programs that relate to waste and litter themes.</p>	
<b>Plan</b>	<p>List strategies to reduce waste and reuse items.</p> <p>Decide what will be recycled and plan the collection process.</p> <p>Identify storage facilities.</p> <p>Identify processes and who is coordinating/involved.</p> <p>Calculate costing including estimated savings.</p>	<p>Decide on suitable compost/wormery and location.</p> <p>Identify solutions for other greenwaste.</p> <p>Identify processes and who is coordinating/involved.</p> <p>Calculate costing including estimated savings.</p>
	Document the approach as part of the school's waste minimisation policy.	
<b>Implement</b>	Inform and educate the community of the processes being implemented to become ResourceSmart.	
	<p>Organise a roster system for collection and management of the process.</p> <p>Provide feedback to reduce incidences of contamination.</p>	<p>Organise a roster system for collection and management of the process.</p> <p>Provide feedback to reduce incidences of contamination.</p>
<b>Monitor</b>	Keep a track of the appropriate use of bins to minimise contamination, address issues as they arise.	Solve problems as they arise; refer to trouble shooting information.
	Provide incentives to maintain interest and commitment. When required, re-educate about processes involved. Seek feedback from the school community about issues, concerns or positives. Carry out a Visual Assessment on a planned basis using appropriate tools to assist documentation.	
<b>Review, evaluate and report</b>	After at least 6 months implementation and monitoring gain feedback from the principal, teachers, students, parents, school council and ancillary staff. Use relevant tools to assist the process.	
	What volume/percentage of waste is reused or recycled?	What volume/percentage of greenwaste is composted or mulched?
	How can these approaches be improved and what can be done next?	

# Overview of approach to waste minimisation (continued)

	Litter and stormwater	Green purchasing	Disposal
<b>Get started</b>	<p>Consider waste management as part of your school's approach to sustainability. Assess what is currently occurring, who's involved and what is being done? Use tools to assist in the process. Gather data and relevant information to accurately describe the current process and associated costs, identify opportunities to improve waste/litter management and reasons why this is important. Provide opportunities to suggest ideas, raise concerns and address issues.</p> <p>Gain commitment from the school community. Consider a whole-school event or competition to raise the school community's awareness and get actively involved.</p> <p>Identify connections to current/planned curriculum programs that relate to waste and litter themes.</p>		
<b>Plan</b>	<p>Identify problem areas in the schoolyard.</p> <p>Develop and document an approach to deal with the litter issues.</p>	<p>Consider use of a set of criteria for its green purchasing.</p> <p>Identify a set of goods which could be trialled for green purchasing.</p> <p>Locate appropriate suppliers.</p>	<p>Identify materials being disposed of in the hopper that could be recycled, reused or composted.</p> <p>Consider what happens to old computers and furniture.</p> <p>Document goals for better disposal.</p>
	Document the approach as part of the schools waste minimisation policy.		
<b>Implement</b>	Inform and educate the community of the processes being implemented to become ResourceSmart.		
	<p>Implement communication programs to educate staff and students on new approaches.</p> <p>Organise a roster system for litter monitors.</p>	<p>Conduct training or provide support for staff with green purchasing.</p>	<p>School has an effective process for rubbish disposal including system of collection within the school, storage and disposal. Hazardous waste is identified and dealt with appropriately.</p>
<b>Monitor</b>	<p>Provide feedback and incentives and promote improvements.</p> <p>Deal with issues as they arise.</p>	<p>Keep a list of items that are part of the green purchasing program and monitor feedback on their use.</p>	<p>Incentives are used to ensure disposal costs are reduced.</p> <p>Contamination is monitored and minimised.</p>
	<p>Provide incentives to maintain interest and commitment. When required, re-educate about processes involved. Seek feedback from the school community about issues, concerns or positives. Carry out a Visual Assessment on a planned basis using appropriate tools to assist documentation.</p>		
<b>Review, evaluate and report</b>	<p>After at least 6 months implementation and monitoring gain feedback from the principal, teachers, students, parents, school council and ancillary staff. Use relevant tools to assist the process.</p>		
	<p>Is there evidence of improved practices and a reduction in litter?</p>	<p>What items are now purchased that are more environmentally friendly?</p>	<p>What has been the reduction in waste disposed to landfill?</p> <p>What are the cost savings?</p>
	How can these approaches be improved and what can be done next?		

# Ideas for our ResourceSmart plan



# Reduce, reuse and recycle

## The waste minimisation hierarchy

The 3Rs are a simple guide to help each of us minimise waste at work, school and home. Combine the 3Rs with composting and we have a neat package to help us deal with our waste. In minimising waste, remember to first *reduce*, then *reuse*, and finally *recycle* or *compost* what is left. Remember there will still be some items that will remain rubbish.

### Reduce

REDUCE simply means living more carefully so that you have less rubbish to get rid of, avoiding waste is the preferable option of waste management. For example, when shopping look for and purchase products with minimal packaging.

### Reuse

REUSE means to use the same item more than once, preferably many times rather than disposing of it after one use. Reusing saves the energy and resources that would have been used to make a new product and results in less products going into the rubbish bin and ending up in landfill.

### Recycle

RECYCLE means to return a waste product to a factory where it is remade into either the same product or something different. For example, many schools recycle paper which is then used to make paper products using a percentage of recycled content. Schools purchasing paper products made from recycled content help to ensure there is a viable market for recycled products. Recycling saves landfill space and also rescues the resources that were used to make the product in the first place. In many cases, recycling can also save energy.

### Disposal

When none of the 3R options apply then responsible disposal of the waste is required. The irresponsible disposal of waste includes littering.

## Get started

To achieve a successful 3Rs program, the whole school needs to be involved with students actively involved. A coordinator, team or committee leads the school in developing and documenting the approach.

### A whole-school event/competition

Consider a whole-school event, competition or community action program to raise the school community's awareness and get actively involved.

Getting involved in this way engages people and helps develop the culture required to work together towards a common goal. Successes and achievements are reported and celebrated to help generate commitment.

### Whole-school events may include:

- Rubbish Free Lunch Challenge/  
Nude Food Day
- Paper Free day (one-off use only)
- Designate an *environmental hour* once a month or term for all classes to do something to improve your school's environment.

### Community action program

- Say no to plastic bags.

### Gaining commitment

Many people may be reasonably familiar with the approach of reduce, reuse and recycle through their own household waste collection and disposal. There will however be relevant issues, questions, concerns and ideas that relate to the school situation that require discussion. This could be done at staff meetings, an information session/evening and via the school newsletter.

It's important to know what is occurring in the school in regards to waste management and disposal and having data to refer to is an important part of gaining commitment from the school community. Relevant data may include annual costs associated with rubbish disposal and any existing recycling collection together with collection rate and size of bins, hopper or skip. From this data you could extrapolate probable savings by reducing bin skip size or rate of collection. Having costs for recycling collection is also useful to calculate possible cost savings.

Not only would recycling reduce the waste sent to landfill (environmentally better), usually there is also significant cost saving to the school by reducing the collection rate/size for general rubbish even taking into account recycling collection charges.

Use the *Conducting a school waste assessment* to identify current approaches to waste management and calculate your annual waste, recycling and composting figures. Alternatively, conduct the survey *How ResourceSmart is your school?*

To assist discussion about what materials can be recycled at school refer to the Information sheet: *Recycling at a glance*.

Collect data on what percentage of waste is being disposed of, reused, recycled or composted.

Use the checklist: *Disposal versus reusing, recycling and composting*. Keep these results and use them in the review and evaluation of the program.

### Curriculum links

Engage students in relevant studies about ways to reduce waste, reusing items and recycling. Refer to ResourceSmart waste curriculum units.

Students can form part of action teams that have responsibility for developing and implementing the 3Rs program. Student interest may be raised through classes studying waste and litter themes. A teacher from the ResourceSmart/Sustainability Committee may take responsibility for guiding and supporting student teams.



### The green canteen

The canteen provides plenty of potential to reduce waste. Buying in bulk, purchasing items with minimal or recyclable packaging are all useful options. The canteen staff are important members of the whole-school approach to reducing waste.

## Plan

Identify relevant actions to reduce, reuse and recycle. In consultation with those responsible for each area, set long- and short-term goals. Areas include the school canteen, administration, photocopying room, classrooms including technology rooms, cleaning and maintenance.

Use the checklist: *ResourceSmart actions for your school* to reach goals associated with actions to reduce, reuse and recycle. Provide the relevant checklist to staff involved or with responsibility for each area.

### Reduce and reuse

Brainstorm ways waste can be avoided or reused at the school. This may be undertaken by an interested class as part of a unit on the 3Rs.

### Recycle

Identify materials that can be recycled and locate a collector for each material.

#### For each material identify:

- whether collection is onsite or needs to be delivered offsite

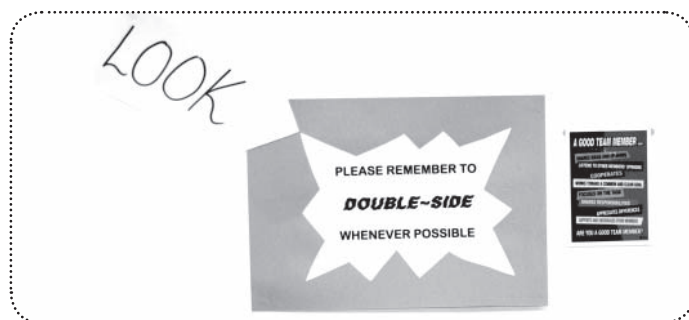
- preferred containers or alternatives, eg wheelie bins, skips or hoppers
- preferred state, eg squashed, rinsed
- any payment incurred by the school, eg wheelie bins/skip/hopper
- any payment to the school, eg for aluminium cans
- minimum quantity for pick up
- frequency and timing of pick up
- any special requirements to avoid the recycling materials being contaminated
- any associated education packages offered.

Identify a suitable storage area that suits your proposed approach to recycling. How will wheelie bins etc be kept clean?

### Documenting the approach

Document the approach as part of the 3Rs strategy that is a component of your overall waste minimisation policy.

- Inform the school community of the approach and who is responsible for aspects of the program.
- Provide opportunities for students to act as leaders and inform other students, teachers and parents.



What improvements can be made to the school's photocopy room?

## Implement

### The collection system

Distinctly labelled wheelie bins, bins or cardboard boxes can be provided in appropriate collection points in classrooms, office, staffroom, outside locations and the canteen.

A roster for monitors is recommended for the daily system of the putting out and collection of bins in the schoolyard and collection of recycling containers from classrooms, staffroom, canteen and the office/administration building. Will you want the volumes recorded?

Training for monitors should include responsible behaviours, safety including crushing of aluminium

cans and plastic bottles and a process for dealing with contaminants in recycling bins. In some cases, unwanted materials (contaminants) may be removed using tongs and disposed of responsibly.

Organise a back up for when the organising teacher or class is away.

At working bees, ensure all helpers are informed about the school's approach to waste management and in particular diverting recyclable materials from disposal.

When holding community events at the school, inform patrons of the school's approach to recycling and provide appropriate signage and bins.

## Monitor

The coordinator needs to set up a process to monitor students' collection of the recyclables, storage and pick up.

Provide incentives to maintain the momentum and promote achievements along the way, eg awards, certificates, bulletins or rewards.

Actively seek feedback about the collection process and storage to identify any areas of concern.

Use the visual assessment sheet: *Recycling* as a means of collecting information about how the recycling program is being implemented. Carrying out these checks help identify any issues or problems associated with the recycling process.





## Review, evaluate and report

After implementation of at least 3–6 months, review the 3Rs program, gaining feedback from the principal, teachers, students, parents, school council and ancillary staff.

Use the checklist: *Reduce, reuse, recycle* to help guide and inform the review and evaluation of the 3Rs program.

Collect data on what percentage is being disposed of, reused, recycled or composted.

Use the checklist: *Disposal versus reusing, recycling and composting*. Compare these results with data gathered at the commencement of the program.

### Hint

When your *ResourceSmart* program is in place, include the frequency of rubbish pick ups in the visual assessment. If the pick ups can be reduced, the school will save money.

List any recommendations to be implemented as part of the continual improvement process.

Report the achievements of the program to the school community. Remember to celebrate the school's achievements: have a special event to mark the occasion.

## Fast facts

- The majority of materials in the school's waste stream is likely to be paper and lunch waste. Depending on the school garden maintenance program, greenwaste can also be significant.
- It takes 13 trees to make a tonne of paper.
- Many plastics can last for hundreds of years when it becomes litter in the environment.
- Research has shown that when students learn about and create waste minimisation programs at school it has a significant improvement on waste reduction in their homes.
- Only some plastics are picked up for recycling.

## CASE STUDY: Portland Secondary College

- Portland Secondary College used to have a serious litter problem. Eighty bins were collected every week, costing nearly \$8,000 a year.
- As for recycling, it was all up to a passionate teacher with a trailer, as was the case for other schools in the area. Recycling was difficult because a private company had to be contracted to provide the service and, despite the longer-term environmental and economic benefits, this was too expensive.
- After-school detention students were the only ones picking up rubbish, so not only was there a rubbish problem, waste management was a punishment. However, Portland Secondary is working hard to transform this mentality and solve its problem.
- A team made up of Portland Secondary College students, a teacher and primary school representatives made a formal presentation to Glenelg Shire Council about accessing recycling services. The result was a fantastic win
  - businesses and schools may now use the council-run service at \$86 dollars a bin per year, collected fortnightly.
- Portland bought 36 co-mingled recycling bins. The first fortnight it put out four bins, the next 10, and lately it's been 20 bins.
- Rosters for 'enviro-time' and duty student jobs have been implemented and waste management is no longer a meaningless chore, but an area where students can take responsibility for managing waste.
- An audit of the monthly general waste collection bill has found that it has fallen by nearly \$100 some weeks.
- An example of the responsibility Portland Secondary students now feel is their participation in Nude Food Day. Twenty-eight Portland students volunteered to run a Nude Food Day audit and they carried the rubbish they produced on a normal day and on Nude Food Day with them all day. This rubbish was brought together, measured and multiplied by the school population. On Nude Food Day the canteen only sold rubbish-free food, by eliminating from the menu anything that could not be recycled or had packaging on it.
- While the recycling program has met with great success at Portland Secondary, it has sometimes been challenging to change whole-school routines, behaviour and attitudes so as to implement waste reduction principles. Recycling bins are still being contaminated, so to address this, staff are working with the art and drama classes to identify the 'Habits of Mind for Sustainability.'
- Portland Secondary is working with its local community to make the Portland Bay Festival sustainable. Two students and two teachers are on the organising committee and have planned a presentation on sustainability and an expo. Students are currently completing projects to help the committee.
- Students are also taking waste reduction and sustainability ideas home. Staff are preparing a unit on eco-footprints, using domestic gas bills that will see students get permission to bring in a domestic gas bill, measure the amount of greenhouse gas and the result if they changed to renewable options. This unit will use journal entries and discussions to encourage students to reflect on and gain an understanding of the process of encouraging change in others and imparting information. They will document their conversations at home and reflect on best practice. Through activities such as this Portland Secondary students now feel empowered to change things in their own environment.

## CASE STUDY: Tooradin Primary School

- Tooradin Primary School is committed to reducing waste by participating in the Rubbish Free Lunch Day, promoting Nude Food Tuesdays, running a successful recycling program and encouraging individual students to adopt waste reduction practices. In 2006, Tooradin Primary participated in the Rubbish Free Lunch day and achieved a fantastic result – an 82% reduction in rubbish.
- Due to the success of the Rubbish Free Lunch day, Nude Food Tuesday has been introduced and many families have embraced this change and support it whole-heartedly. Every grade now aims for zero rubbish on the day. The class with the least rubbish each week wins a golden plate award, the golden lunchbox, and a fruit and veggie platter for morning tea. Every week the results of rubbish audits on Nude Food Tuesday are published in the school newsletter.
- Every day, all classrooms separate rubbish into four different bins, paper/cardboard; food scraps; commingled recycling; and rubbish. Grade 4/5 monitors empty the bins daily. Food scraps go to the compost bin, wormery and the cleaners' chooks.
- To educate students on the importance of recycling, Tooradin Primary has run excursions to landfill sites and recycling depots. Students have formed an Environmental Club and have enthusiastically helped with *Clean Up Australia Day*, establishing a vegetable garden and compost bin, and planting around the school.
- On a personal level, teachers and students are also working to reduce waste by adopting these practices:
  - ~ good practices, eg picking up litter unprompted;
  - ~ using non-disposable items, eg hankies rather than tissues;
  - ~ bringing their own mugs for soups and drinks;
  - ~ providing a lunchbox for their canteen lunch orders; and
  - ~ using clean waste materials in the art room and classroom.
- All members of the school community are encouraged to contribute suggestions for improving the school's efforts to minimise waste and reduce rubbish. Some of these suggestions were incorporated into Tooradin Primary's targets for 2006/07, including:
  - ~ reduce the frequency of skip bin collection from fortnightly to every three weeks;
  - ~ reduce litter in the yard by 30% over the next 12 months (*Clean Up Australia* data and results to be used as a baseline);
  - ~ reduce the amount of packaged foods sold in the canteen;
  - ~ introduce cork recycling;
  - ~ increase the waste and litter topics covered by the school curriculum (eg units on *Rubbish Free Lunch* studied a week before the event by the whole school); and
  - ~ a rubbish free canteen.

Case studies are from 2006 Sustainability and Waste Wise school awards, now known as the ResourceSmart Schools Awards – for more information visit the Sustainability Victoria Website:

[www.sustainability.vic.gov.au/resources/documents/2006\\_Sustainability\\_and\\_WasteWise\\_Award\\_Case\\_Study\\_Booklet.pdf](http://www.sustainability.vic.gov.au/resources/documents/2006_Sustainability_and_WasteWise_Award_Case_Study_Booklet.pdf)



# Greenwaste, composting and wormeries

## Composting

COMPOSTING is the breaking down of waste organic materials (vegetable and fruit scraps and garden waste) in a large container or heap. Over time composting converts vegetable and fruit scraps and garden waste into dark coloured compost (humus) which can be used on the school garden beds.

## Wormery

A WORMERY containing large numbers of compost worms is used to break down vegetable and fruit scraps. This waste is converted into worm castings and a liquid which can be used as a plant fertiliser. 10,000 compost worms can eat about 9 kg of fruit and vegetable waste per week.

## Greenwaste

GREENWASTE is a term that includes garden waste and fruit and vegetable scraps and can be processed by composting, using worms or shredded in a mulcher. Mulched greenwaste can be applied to garden beds to prevent loss of water from the soil by evaporation.

## Get started

To achieve a successful composting/wormery or greenwaste program, the whole school needs to be involved with students actively involved. A coordinator, team or committee leads the school in developing and documenting the approach.

### Assessing what is currently occurring

It's important to know what is occurring in the school in regards to waste management and disposal.

Use the *Conducting a school waste assessment* tool to identify current approaches to waste management and calculate your annual waste, recycling and composting figures.

### A whole-school event/competition

Consider a whole-school event, competition or community action program to raise the school community's awareness and get actively involved.

Getting involved in this way engages people and helps develop the culture required to work together towards a common goal. Successes and achievements are reported and celebrated to help generate commitment.

### Whole-school events may include:

- Rubbish Free Lunch Challenge
- Nude Food Day

Through their involvement in this type of event, students will observe the amount of fruit and vegetable scraps generated on a daily/weekly basis and look for ways in which they can be put to good use, eg composting, wormery, digging directly into vegetable garden or feeding to chooks.

### Gaining commitment

Addressing questions, concerns and explaining the benefits of composting, wormeries and using greenwaste is fundamental in gaining commitment from the school community. Explain your current approach to waste management and composting and share results

of the waste assessment, highlighting annual waste, recycling and composting figures. This could be done at a staff meeting, information session/evening or via the school newsletter.

As a basis, use the information sheet: *FAQs about composting and greenwaste* to help inform the school community about composting and diverting greenwaste from disposal.

### Curriculum links

Engage students in relevant studies about greenwaste composting and wormeries. Refer to ResourceSmart curriculum units.

Students may form action teams that have responsibility for developing and implementing the composting and wormery program. Student interest may be raised through classes studying waste and litter themes. A teacher may take responsibility for guiding and supporting student teams.



## Plan

### Composting and wormeries

- Determine approximately how much fruit and vegetable waste and garden waste the school produces on a weekly basis to help determine the type of compost enclosure or size of the wormery.

Use the information sheet: *FAQs about composting and greenwaste* to help calculate the size and type of wormery or compost and determine the environment and social benefits.

- Identify any cost savings that could be expected through composting.
- Identify a suitable area to house the compost heap or wormeries.
- Identify costs of compost enclosures or wormeries suitable for your school situation.
- Consider other items such as spades, tongs, buckets and fencing.
- Identify who will maintain the compost heap/wormery and how food scraps are collected.
- Identify how the compost or worm system will not be contaminated with meat, bread and fat products.
- Distinctly labelled buckets or re-used ice-cream containers can be provided in appropriate collection points in classrooms, office, staffroom, outside locations and the canteen.

- Refer to the resources section to learn more about composting/wormery and greenwaste.
- Identify and seek community support to get the composting/wormery project underway.

### Garden waste

- Determine how much garden waste the school produces on a monthly basis.
- Identify peak times where garden waste becomes an issue, such as Autumn, after working bees etc.
- Identify solutions for using greenwaste such as hiring/buying/borrowing a mulcher, or using leaves on garden beds.
- Consider who will coordinate the greenwaste program.

### Documenting the approach

Document the approach as part of a greenwaste strategy that is a component of your overall waste minimisation policy, which indicates environmental, social and economic outcomes for sustainability.

- Inform the school community of the approach and who is responsible for aspects of the program.
- Provide opportunities for students to act as leaders and inform other students, teachers and parents.



## Implement

### The collection system

A roster for monitors is recommended for the daily system of collecting fruit and vegetable scraps from the classrooms, office, staffroom, outside locations and canteen. Collection containers should be washed and returned. Collected food scraps are delivered to the compost/wormery. Unwanted materials such as meat, fats and bread in the food scraps are removed using tongs.

A roster system could also be used, eg who:

- for composting turns the compost heap, ensures it's moist and applies the mature compost to the garden beds
- for the wormery adds food scraps, ensures it's covered and moist, applies collected liquid and mature compost to garden beds, removes excess worms to start new wormeries.

Organise a backup for when the organising teacher or class is away.

At working bees ensure all helpers are informed about the school's approach to diverting greenwaste from disposal.

## Monitor

Provide incentives to maintain the momentum and promote achievements along the way, eg awards, certificates, bulletins or rewards.

Actively seek feedback about the collection process and compost/wormery maintenance to identify any areas to celebrate and areas of concern.

Use the visual assessment tool: *Composting and wormery* as a means of collecting information about how

the composting program is being implemented. Carrying out these checks help identify any issues or problems associated with composting process.

As with any process, schools may from time-to-time experience problems with their composting or wormery.

Use the information sheet: *Trouble shooting: composting* to help identify and solve the causes of common problems associated with composting.

## Review, evaluate and report

After an implementation period of at least 3–6 months, review the composting/wormery program, gaining feedback from the principal, teachers, students, parents, school council and ancillary staff.

Use the checklist in the **TOOLS AND RESOURCES** section: *Greenwaste, composting and wormeries* to help guide and inform the review and evaluation of a greenwaste program.

List any recommendations to be implemented as part of the continual improvement process.

Report the achievements of the program to the school community.





## Fast facts

- Garden and food organics make up 25–30% of all landfilled waste in Victoria.
- Why divert food and organics waste from landfill?  
In anaerobic or airless landfills food waste produces methane, a harmful greenhouse gas. Methane is 21 times more potent than another dangerous greenhouse gas, carbon dioxide (CO<sub>2</sub>). About 1 tonne of food waste sent to landfill produces methane with the equivalent of about 750kg of CO<sub>2</sub>. This would fill 15,000 balloons, and is the same as driving more than 3,000 km.
- Compost is excellent for conditioning the soil, developing better soil structure and retaining more moisture. Compost can be low in nutrients.
- Worm castings and worm liquid are good for fertilising plants.

## References

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Taylor D et al., 1998, *The Compost Book*, New Holland

Shepherd, 2007, *The Little Book of Compost*, HarperCollins, <http://books.buyaustrian.com/featuredbook1.asp?StoreURL=buyaustrian&bookid=9780007267279>

## CASE STUDY: Beechworth Primary School

- Beechworth Primary School has made great progress since starting a waste reduction program in Term 2, 2006. During 'Learnsapes' time students pick up rubbish, sweep paths and tend to the gardens via activities such as weeding, mulching, planting and pruning. The school hopes this will raise students' awareness of the importance of their school and local environments.
- Grades 5/6 at Beechworth Primary has formed five student committees that are each responsible for a major waste reduction strategy: reducing rubbish; educating the whole school; compost; policy writing; and Rubbish Free Lunch days. These committees have set goals and written an action plan detailing how to achieve their goals. Students from Year 5/6 have demonstrated what a rubbish free lunch is by bringing in lunchboxes and setting an example for the whole school. Each week, the Rubbish Free Lunch Committee awards small orange lunchboxes, certificates and a 'Golden Bin Award' to the class with the most rubbish free lunches.
- Beechworth Primary has also set up a three-bin system. In the yard and each classroom there are colour-coded landfill, recycling and compost bins. It is Grade 5/6's responsibility to empty, clean and maintain these bins, as well as ensuring that all students understand how to use them. For example, when the compost committee found litter in the compost bins it provided instructions and reminders about what can and can't go in the compost.
- In May 2006, the students ran a waste audit of the school. The amount of rubbish recorded was 35kg compost, 23kg recyclables and 34kg landfill. Another audit a month later, after the implementation of Year 5/6's waste reduction strategies, found 22kg compost, 16kg recyclables and 9kg landfill. The results of Beechworth Primary's waste audit show what a difference a positive attitude to waste reduction can make in even a short time.

# Litter and stormwater

Schoolyards like many areas in the community suffer as a result of the human behaviour of littering. Litter makes an area look dirty and uncared for and often attracts more litter. In schools, items that make up litter include PET bottles, fast food wrappers, chewing gum, plastic chip and confectionery bags, plastic bags, paper, beverage bottles or cans and polystyrene. Many of these items lying around the school environment, apart from being unsightly and potentially causing harm, could have been recycled.

## Common littering behaviours

Much of the litter in schools and the community is due to littering behaviour. Littering behaviours often identified in schools include:

- litter is thrown at a bin, it misses the bin and the person walks away
- most of the rubbish is put into a bin, but some is left behind, or smaller items are dropped
- on arriving at a table where others have littered, waste is swept onto the ground
- pieces of litter are stuffed into gaps between seats and other places
- litter is thrown through the air or dropped without any apparent concern.

REFERENCE: Beverage Industry Environment Council (BIEC) report developed by Community Change.

### Fact

Research has shown that less litter is dropped when an area is litter free compared to the same location where litter is obvious.

## Other causes of school litter

Litter can also occur due to:

- bins falling over
- bins not having lids
- bins being over filled
- on-site building contractors
- dogs, cats, large birds like ravens and at night possums, rummaging through bins.

## Connection between litter and stormwater

Litter that ends up in our streets or close to any stormwater drain travels into our waterways through the stormwater system.

### Young litterbugs?

Research has shown that children, including teenagers, are *not* the worst litterers in our community. Teenagers litter more when they are in groups. This may be due to them not wanting to leave their social group. Personal research could not find any link between littering and rebellious behaviour in teenagers.

## Get started

### Assessing what is currently occurring

Obtaining an accurate picture of what is occurring in the school can help identify areas of concern. Areas for further research may include surveying particular students as to reasons for littering. Students may be useful in conducting these surveys through an organised topic on litter reduction.

Use the visual assessment *Litter and stormwater* to assess the school's litter situation.

Surveys which question why people litter don't seem to provide answers that assist in targeting behavioural change. Survey questions need to be framed carefully and ensure they address the behaviour change outcomes desired by the litter reduction program.

### Gaining commitment

Using data from the visual assessment, areas of concern can be identified and discussed with staff and students. A team or committee could devise an approach seeking input from school community members.

### Curriculum links

Engage students in relevant studies about litter reduction and stormwater. Refer to ResourceSmart curriculum units.



## Plan

In developing a school litter reduction policy the school may consider:

- involving students as leaders
- encouraging the canteen to sell products with minimal/ recyclable packaging
- encouraging all staff to enthuse and inspire students to reduce the amount of litter
- establishing procedures to increase school pride and responsibility towards the school in both teacher and students
- organising rubbish/litter monitors and rotating on a regular basis; provide litter monitors tongs for pick up
- providing positive incentives for litter collections, eg redeemable /vouchers tokens from the canteen (avoid giving litter duty as a punishment)
- considering litter as a holistic approach and part of the school's waste management approach to sustainability, eg including recycling bins and compost buckets in appropriate areas. Label bins clearly and educate staff and students on their use
- ensuring bin placement is in appropriate areas and an adequate number of bins are available. Ensuring bins have lids, can't fall over and animals can't get in

- developing effective communication programs (to be done by students) that are directed at changing littering behaviour
- including litter and stormwater in the school's curriculum.

As part of the planning keep the following in mind:

- picking up litter should not be used as a punishment
- relate litter to environmental impact rather than people don't like it. Involve students in initiatives beyond the classroom and school environment
- students are justifiably cynical when their first environmental responsibility is to keep the school free of litter so it is important to know where your students are at and what roles they want to have
- surveys have shown that teachers claim that students have been provided with litter education, while their students claim they have never been provided with litter education. It would seem that what teachers called litter education, students may have interpreted as nagging.

Document the approach to be taken and seek feedback and gain approval to implement the strategies identified. Source any funding required to purchase bins, other equipment or curriculum materials.

## Implement

Introduce the strategies identified to reduce litter.

Organise for staff and students to be educated in any new approaches using appropriate strategies such as:

- student leaders explaining to each class
- student leaders and/or principal at assembly
- littering is part of the curriculum with a communication focus

- sustainability coordinator/litter coordinator explaining approach at staff meeting.

Organise the roster for litter monitors and provide them with necessary equipment, eg buckets and tongs. Have a year level responsible for developing communication projects about littering throughout the year.



### Stormwater Pollution

Litter becomes a stormwater pollution problem. This link can be used in the school's curriculum to help change littering behaviour.

## Monitor

Provide immediate feedback/incentives as set out in the plan.

Encourage staff to praise non-littering behaviours and provide feedback on improvements to areas that are relatively litter-free.

Have a 'litter reduction' noticeboard to promote improvements and identify areas that are still of concern.

Have ongoing communication projects being passed down from year to year.

Continue feedback through school assemblies and newsletter.

## Review, evaluate and report

After implementation of at least 3–6 months, review the litter reduction program, gaining feedback from the principal, teachers, students, parents, school council and ancillary staff.

Use the visual assessment: *Litter and stormwater* to help guide and inform the review and evaluation of the school litter reduction program.

List any recommendations to be implemented as part of the continual improvement process.

Report the achievements of the program to the school community.

## Fast facts

- Littered areas are not pleasant to be in and are less likely to be used by people. In contrast, people are more reluctant to litter clean areas.
- We must significantly reduce the amount of litter in our environment to protect the health, safety and visual quality of the environment for people and wildlife.
- Plastic litter is found in every part of the oceans.
- It is claimed that millions of animals die by ingesting litter or being entangled in litter every year.
- Whales have died by ingesting litter.
- About a third of platypuses in urban creeks show past injuries caused by litter.
- The majority of pollution in urban waterways comes from stormwater.





## References

Winters B, 2002, *Drains to our Bays*, Melbourne Water.

Winters B et al., 2003, *Living Water Literacy Kit*, Gould League. (18 reading titles and 4 activity books)

### Internet

#### Victorian Litter Alliance

Leaders in litter education in Victorian Communities.  
[www.litter.vic.gov.au](http://www.litter.vic.gov.au)

#### Clean up Australia

Clean up Australia has become a lot more than removing litter from the environment.  
[www.cleanup.com.au](http://www.cleanup.com.au)

#### Keep Australia Beautiful

Has a long history of developing litter reduction programs.  
[www.kab.org.au](http://www.kab.org.au)

#### Australian Marine Environmental Protection Authority

Access student research information and curriculum materials by clicking on Marine stormwater pollution.  
[www.ausmepa.org.au](http://www.ausmepa.org.au)

# Green purchasing

All products are likely to have some environmental impact. The aim of green purchasing is to choose products that reduce their impact on the environment. By actively making better environmental choices when purchasing products, schools can support those businesses that are providing environmentally friendly alternatives. The more that consumers demand environmentally friendlier products, the more that business will be prepared to make changes to their products.

## Buying recycled – Closing the loop

An easy way to start green purchasing is to buy products made from recycled content therefore helping close the loop. Most people contribute to recycling programs; however, purchasing products made from recycled materials helps maintain a high demand for recyclables and therefore recycling programs. Schools can help by purchasing products with recycled content and developing a database of preferred environmentally focused suppliers and products.

### Green costs

Some schools may consider cost over any other factors. It may be necessary to explain reasons for purchasing green products. Refer to *FAQs about green purchasing*.

## Green purchasing

By following several criteria schools can be empowered to broaden their green purchasing. A common definition of green purchasing is to consider the following impact on the environment and judging if the product has less environmental impact compared with other choices based on:

- suitable quality and cost
- minimum use of virgin materials
- energy and resource efficient
- minimal packaging
- potential for reuse and recycling
- non/minimal polluting
- durable/repairable

Remember the best form of green purchasing is to avoid purchasing in the first place. Find an alternative to purchasing or at least purchase only as much as you need.

## Get started

### Assessing what is currently occurring

It's important to know what is occurring in the school in regards to budgeting and purchasing procedures and if green purchasing contributes to decision making. The school may already be involved in an area that supports the concept of green purchasing through sales of secondhand uniforms and books.

Use the visual assessment: *Green purchasing* to identify current approaches to purchasing.

### Gaining commitment

Addressing questions, concerns and explaining the benefits of green purchasing process is fundamental

in gaining commitment from the school community. Explain the school's current approach to budgeting and purchasing procedures and share results. Be sure that all affected staff are included. This may include canteen, cleaning and gardening staff. This could be done at a staff meeting, information session/evening or via the school newsletter.

As a basis, use the information sheet: *FAQs about green purchasing* to help inform the school community.

### Curriculum links

Engage students in relevant studies about green purchasing. Refer to ResourceSmart curriculum units.

## Plan

Your school may find it useful to refer to a list of criteria for its green purchasing policy.

For consumable and capital items such as equipment purchases consider:

- suitable quality and cost
- minimum use of virgin materials (eg high recycle content)
- energy and resource efficient
- minimal packaging

- potential for reuse and recycling
- non/minimal polluting
- durable/repairable.

Refer to the checklist: *Green purchasing*.

### USEFUL WEBSITES FOR PLANNING:

[www.ecooffice.com.au](http://www.ecooffice.com.au)

for a range of tools for green office planning.

[www.environment.gov.au](http://www.environment.gov.au) and locate the *Green office guide*.

GREEN PURCHASING can be easily started by purchasing items such as office photocopy paper made from a high percentage of recycled content. Steps towards further green purchasing may include:

1. Identify a product your school purchases
2. Identify a recycled content alternative which is cost effective, available and good quality
3. Purchase it
4. Trial it and check that it meets your needs and performs as good as the alternative, if yes continue its use, if not ...
5. Start at 1. again and select another green product.

Other products which can be targeted include:

- Toner cartridges and ink refills (choose recycled)
- Batteries (use mains power if possible, long life or rechargeable batteries)
- Post-it notes (not recyclable so minimise their use)
- Note pads
- folders made from PVC (toxic chemical released when burned or biodegrade)
- window style envelopes (contain non recyclable material)
- sticky tape and adhesives
- cleaning products.

Check with the *Government Schools Reference Guide* on the list of cleaning products for those that are environmentally friendly.

Consider making green purchase choices at two stages:

- For consumables at the time of purchasing.
- When purchasing equipment consider using green purchasing criteria at the time of budget application.

Even better, develop a green purchasing policy and green purchasing procedures document.

### One step at a time

If you are experiencing resistance to green purchasing perhaps start with one item to trial and monitor its use. Evaluate its effectiveness and take the next step which may be to try another product if it proved to be unsuccessful.

Alternatively, if successful identify other products to trial.

Choices can be decided in a number of ways:

- As part of applying for funds to purchase products in the budget (other than consumables) the green choice is identified using the school criteria.
- A permanent list of green consumable products is developed and maintained by office staff.
- As part of students' learning, they are provided with tasks of researching and reporting on the latest green products. This can be an ongoing task.

### Procedures

One way to help staff to make choices is to provide pro formas to guide them through the information gathering and decision making process. In most cases, a simple process is better than a complicated process.

### Documenting the approach

Document the approach as part of a green purchasing strategy.

- Inform the school community of the approach and who is responsible for aspects of the program.
- Provide opportunities for students to act as leaders and inform other students, teachers and parents.

### Compatible with recycled paper?

If purchasing a new school photocopier investigate those which specify their compatibility with using recycled paper.

## Implementing

### Training staff

For those responsible for budgeting or purchasing provide a brief workshop along with the criteria and pro formas to assist them with green purchasing.

### Research for greener products

New green products are becoming available regularly. Check with the school's current suppliers of consumables for any updates.

Refer to relevant green product websites such as:  
Green pages [www.greenpagesaustralia.com.au](http://www.greenpagesaustralia.com.au)  
and Eco-buy [www.ecobuy.org.au](http://www.ecobuy.org.au)

### Developing a green purchasing culture

Encourage staff to share their knowledge about green purchasing. Have a noticeboard dedicated to the latest green purchases and purchasing ideas in the school. Acknowledge those who have helped the green purchasing program to work. Highlight the school's success stories.

## Monitor

A green purchasing program needs to be monitored.

- Monitor how staff responsible for the program are going.
- Find out if staff needs assistance. Is the process easy to follow and working?

- Obtain suggestions for fixing any problems and simplifying the procedure.

## Review, evaluate and report

After implementation of at least 3–6 months, review the green purchasing program, gaining feedback from the principal, teachers, students, parents, school council and ancillary staff.

Use the checklist: *Green purchasing* to help guide and inform the review and evaluation of the school disposal program.

List any recommendations to be implemented as part of the continual improvement process.

Report the achievements of the program to the school community.

## Fast facts

- 15 trees are needed to make a tonne of virgin paper.
- Making paper from recycled material requires 90% less water and 50% less energy.
- All materials when recycled need less energy than virgin materials to produce products.
- Buying energy-efficient equipment may cost more upfront however they have lower operating costs than less energy-efficient equipment.
- The amount of energy needed to turn equipment on and off is minimal compared to leaving it on.
- Companies refilling ink and toner cartridges don't need to be messy and waste unnecessary ink.



## Appendices

### FAQs about green purchasing

Common questions	Suggested response
<b>Why bother with green purchasing?</b>	<ul style="list-style-type: none"> <li>– Green products have less impact on the environment.</li> <li>– Green products produce less greenhouse gases than that of the alternatives.</li> <li>– Green purchasing supports those industries which are making greener products. These businesses can only survive if they have a market.</li> <li>– Purchasing green products that contain recycled content provides a market for recyclables therefore ensuring recycling programs remain viable.</li> </ul>
<b>How can some products have less impact on the environment?</b>	<p>Green products will have some but not necessarily all of these features:</p> <ul style="list-style-type: none"> <li>– made with some recycled content</li> <li>– has less packaging</li> <li>– uses less energy to produce</li> <li>– uses less water to produce</li> <li>– can be reused or recycled</li> <li>– does not produce toxic waste</li> <li>– avoids the use of scarce resources.</li> </ul>
<b>Will it create a lot of extra work?</b>	<p>A simple system may initially take some set up time, to avoid problems ensure that:</p> <ul style="list-style-type: none"> <li>– the system is easy to follow</li> <li>– if it takes too long to find a green alternative, purchase an available product</li> <li>– regular suppliers are contacted and asked to check availability of green products</li> <li>– new suppliers of green products are listed.</li> </ul>
<b>Aren't green products of a poorer quality and cost more?</b>	<p>Sometimes they could be a poorer quality. If they are purchased and don't meet expectations try another green product. Often most green products are of equal or higher quality compared to non-green products currently available.</p>
<b>Will recycled paper jam up the photocopier?</b>	<p>The most likely problem causing paper jams due to paper in photocopiers is the moisture in the paper. It is best to store all photocopy paper in a cupboard that has no moisture problems. We should avoid any paper that is dusty.</p>
<b>How will we know what to do?</b>	<p>We will have a workshop and those involved will create a process they are happy with. If we find after a while the process has some bugs, we will make changes to solve the problem.</p>
<b>Does equipment use a lot of energy every time it is turned on?</b>	<p>The tiny amount of energy used to turn on equipment does not compare with leaving the equipment on for even a few minutes.</p>
<b>Do green cleaning products clean as well as the toxic cleaning products?</b>	<p>Most if not all green cleaning products will clean as well and some even better than toxic cleaning products. Depending on the chosen green cleaning products, there will be environmental benefits as well as improved health and safety for the person using the product.</p>
<b>Using recycled toner cartridges invalidates printer warranties.</b>	<p>This is simply NOT TRUE .</p>

# Waste disposal

Schools generate a range of waste materials that cannot be recycled, composted or reused. Some, but not all of this waste will be treated as rubbish and sent to landfill. Some waste will be too toxic or break down into toxic chemicals (hazardous waste) to be placed into landfill and must be disposed of using safer methods. Best practice disposal methods will address the related safety needs of your school community.

Schools with a range of waste minimisation strategies in place will be able to reduce the volume of rubbish that needs to be disposed of into landfill. This helps the environment and reduces the cost of rubbish disposal.

Schools must be mindful that they do not contaminate their recycling collection as many materials can't be recycled. Many materials must be disposed of through the rubbish system. For example, glassware from the science room must never be placed into the recycling as the glass is probably a Pyrex material that can ruin a batch of molten recycled glass. Science glassware must go into the rubbish taking special precautions not to injure anyone.

## Some useful definitions:

**WASTE** – any material no longer needed for its original purpose

**RUBBISH** – waste that will be sent to landfill

**LITTER** – solid waste that has been allowed to escape into the environment

**HAZARDOUS WASTE** – waste that poses a problem if left untreated in a landfill site or in the environment

Hazardous waste is waste that can become an environmental and/or a health problem if placed in landfill. This includes materials like household paint. Paint is safe in a tin in a shed. However liquid paint must be specially treated on disposal and must not go to landfill.

## Get started

Your school will have a current disposal process that handles rubbish. It may not have fully addressed what to do with its hazardous waste. For example, the school may not realise that electronic equipment such as computers produce toxic chemicals when disposed of in landfill.

### Assessing what is currently occurring

It's important to know what is occurring in the school in regards to waste management and disposal. Where is normal and hazardous waste stored?

Use *Conducting a school waste assessment* to identify current approaches to waste management and calculate your annual rubbish, recycling and composting figures.

### Gaining commitment

Addressing questions, concerns and explaining the benefits of an improved disposal system is fundamental in gaining commitment from the school community. Explain your current approach to waste management including disposal and hazardous waste and share results of the waste assessment, highlighting annual waste, recycling and composting figures. This could be done at a staff meeting, information session/evening or via the school newsletter.

As a basis, use the information sheet: *FAQs on disposal* to help inform the school community about composting and diverting greenwaste from disposal.

### Curriculum links

Engage students in relevant studies about rubbish, landfill and hazardous waste. Refer to ResourceSmart waste curriculum units.

## Plan

### Disposal

- How much rubbish is going to landfill? What volume is being disposed of each week? Has past waste minimisation programs reduced the volume of rubbish? Can you perform a visual assessment to estimate the break up of different kinds of waste?
- Do you need to communicate to the school that their recycling, composting and reusing programs need to be improved?
- What is the current cost of rubbish disposal? What is the cost of disposal of hazardous waste?
- Identify materials being disposed of in the hopper that could be recycled, reused or composted.
- Approximately by how much could the school reduce its disposal of rubbish? How much money would this save?

- How suitable is the current location for the school hopper? Are students safe from litter and trucks? Is there good access to emptying bins? Is the area easy to keep clean and safe?
- Identify improvements needed to the hopper area. The improvements may enhance health and safety for the school community.
- Who in the school has an understanding of hazardous materials and hazardous waste?
- How does the school community know what materials become hazardous if it goes to landfill? For example, computers release hazardous chemicals in landfill.
- In what places are hazardous materials and hazardous waste stored? How is student access restricted?
- What becomes of potentially hazardous materials when they are no longer wanted?
- Are there easy accessible written directions about what should never be poured down drains?

### Disposal goals

Determine the goals of your disposal program.  
Suggestions include:

1. Reduction in the volume of rubbish going to landfill.

2. A better understanding by the school community about which materials should be placed in the rubbish system so that recycling materials are not contaminated by rubbish. Also hazardous waste is not included in the normal rubbish system.
3. A safer and cleaner area around the school hopper.
4. An improved disposal system for hazardous waste that also includes its temporary storage and a better understanding of what potential hazardous waste is within the school community.
5. A responsible method for disposing of electrical equipment such as computers.
6. Unwanted and broken furniture to be collected and eventually sent to a country where schools have few resources.

### Documenting the approach

Document the approach as part of a disposal strategy that is a component of your overall sustainability policy.

- Inform the school community of the approach and who is responsible for aspects of the program.
- Provide opportunities for students to act as leaders and inform other students, teachers and parents.

## Implement

### The collection system:

#### 1. Rubbish

Can the rubbish collection system be improved?  
(Students must not be emptying bins into the hopper or reaching into the hopper.)

Are OH&S procedures in place for emptying bins into the hopper.

Is there a reporting/monitoring system in place to provide feedback when inappropriate materials are put into the bins?

How can the cleaning of bins be improved? Are they being washed onto an area of grass avoiding any runoff into stormwater drains?

#### 2. Hazardous waste

The school has developed a list of items that when no longer needed will be treated as hazardous waste.

### The storage system:

#### 1. Rubbish

The hopper is kept locked to prevent unauthorised usage and student access.

There is a barrier to restrict student access.

The area around the hopper is kept free of litter and build-up of dirt.

#### 2. Hazardous waste

There is a student restricted area where these materials are safely stored.

The storage complies with OH&S procedures.

### Disposal:

#### 1. Rubbish

Trucks can access the hopper without needing to avoid students.

Rubbish does not fall from the hopper when it is being emptied.

#### 2. Hazardous waste

A procedure is in place to transport hazardous waste materials to a facility or different facilities so that the waste will be appropriately processed.

The transport of this hazardous waste complies with OH&S procedures.

#### 3. Other

A decision has been made and will be followed through on what to do with unwanted computers and furniture.



## Monitor

Provide incentives to maintain the momentum and promote achievements along the way, eg awards, certificates, bulletins or rewards.

Actively seek feedback about the collection process and identify any areas of concern.

Use the visual assessment sheet: *Disposal* as a means of collecting information about how the disposal program is being implemented. Carrying out these checks help identify any issues or problems associated with the school's disposal process.

As with any process, schools may from time-to-time experience problems with their disposal procedures.

Use the information sheet: *Trouble shooting: disposal* to help identify and solve the causes of common problems associated with composting.

## Review, evaluate and report

After implementation of at least 3–6 months, review the disposal program, gaining feedback from the principal, teachers, students, parents, school council and ancillary staff.

Use the checklist: *Disposal* to help guide and inform the review and evaluation of the school disposal program.

List any recommendations to be implemented as part of the continual improvement process.

Report the achievements of the program to the school community.

## Fast facts

Victoria is running out of suitable areas for landfill.

Many hazardous materials are processed by being burnt in high temperature incinerators.

Other less hazardous waste is placed in special landfill sites.

Australians generate a million unwanted computers every year.

Most pollution in our urban waterways is carried by rain through stormwater drains. This includes waste being poured down drains.



# From great ideas to your ResourceSmart program or project plan

When considering developing a ResourceSmart program or project it is important that the process is designed to facilitate locally based decisions and that the plan is an agreed position generated by the team or whole school.

The challenge is to establish an opportunity for the group to present their ideas and lead them through a process to implementation of a program or project. Involving everyone in the entire process of program or project development creates an ethos of ownership and shared vision.

Develop great waste reduction ideas into actions, a ResourceSmart program or project.

## Gather ideas

Use a strategy to gather and record ideas about an issue or problem to do with waste management in the school. It is valuable to build on participant ideas during this process.

## Sort

Sort by firstly looking at logical links between ideas and condense them into groups. Identify trends. The criteria for sorting ideas may include sorting ideas against existing goals or an agreed criteria for goals developed by the group.

Refer to the following tools:  
*Deciding and goals tool*

## Decide

Decide which ideas will best achieve identified goals is the next important phase in developing a plan. Prioritise the list of ideas.

Refer to the following tools:  
*What have we decided?*  
*Desired targets*

## Plan

Plan a program/project using the agreed ideas and goals generated by the group. The tools in this guide are designed to assist with developing a ResourceSmart program or project in your school.

Refer to the following tools:  
Planning a ResourceSmart program initiative  
Project implementation planner

**Use any successful teaching strategies to facilitate these steps and engage rich discussion.**

- Keep the end in mind!
- Reach a consensus
- Turn ideas into actions

# Curriculum

## Introduction

The *ResourceSmart* curriculum units are designed to engage students in their understanding about waste minimisation within the context of sustainable living. The focus of the units is to develop knowledge and understandings, skills, attitudes and values related to a key question. Each unit provides ideas for student participation and action to help them create a sustainable future through waste minimisation and litter reduction practices and behaviours.

The curriculum units link with school operations and promote the use of a whole-school approach. Each unit addresses a range of Victorian Essential Learning Standards using a multi-domain inquiry approach. Teachers are encouraged to use the units in a flexible manner to best suit their school's particular needs. While the units reflect specifically identified Victorian Essential Learning Standards, there is no reason why a unit or sections of the unit could not be adapted to suit any level.

### **Educating for a Sustainable Future**

An essential part of the environmental education for sustainability vision is students learning to achieve a better understanding of the world in which we live and provide opportunities for them to be empowered to create a sustainable future. Within this vision, students' knowledge, skills, values and actions are enhanced through active, self-directed learning and ethically responsible citizenship.

A National Environmental Education Statement for Australian Schools, 2005

# ResourceSmart Curriculum unit matrix

## Laying the foundations: Levels 1–4

### Unit 1

#### *Caring for our local environment*

Students develop their understanding that they are part of a community and explore ways that they are connected to the environment. They explore and investigate ways they, their school and their families care for the environment. They consider their role in caring for the environment and are involved actively.

### VELS Level 1

Physical, Personal and Social Learning  
– Interpersonal Development

Discipline-based Learning

- English
  - ~ Writing
  - ~ Speaking and listening

### Unit 2

#### *Composting and worms*

This unit aims to have students start a class composting or wormery system to process fruit and vegetable scraps.

Students examine composting and worm methods for processing greenwaste. They will organise a system that will process the fruit and vegetable scraps from their lunches.

### VELS Levels 2–3

Discipline-based Learning

- Mathematics
  - ~ Measurement, chance and data
- Science
  - ~ Science knowledge and understanding
  - ~ Science at work

Interdisciplinary Learning

- Information and Communications Technology (ICT)
  - ~ ICT for visualising thinking

### Unit 3

#### *Creating a sustainable classroom*

In this unit, students develop an understanding of living sustainably by exploring actions that minimise their impact on the environment. Students take responsibility for the development and implementation of sustainable classroom practices, including a focus on the 3Rs.

### VELS Levels 2–3

Physical, Personal and Social Learning

- Civics and Citizenship
  - ~ Civic knowledge and understanding
  - ~ Community engagement

Discipline-based Learning

- The Humanities
  - ~ Humanities, knowledge and understanding
- Science
  - ~ Science knowledge and understanding

Interdisciplinary Learning

- Thinking Processes
  - ~ Creativity

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**Building breadth and depth: Levels 4–5**


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**Unit 4***What a waste!*

This unit is designed for those schools that can provide Years 5–8 students with an opportunity to become actively involved in developing, re-instigating or enhancing the school approach to waste management. This action project provides an authentic context for learning with students drawing on and refining a range of skills and knowledge to help the school reduce waste disposed of to landfill.

**VELS Level 4–5**

- Physical, Personal and Social Learning
- Civics and Citizenship
    - ~ Community engagement
- Discipline-based Learning
- The Humanities/Economics
    - ~ Economic knowledge and understanding
  - English
    - ~ Writing
    - ~ Speaking and listening

**Unit 5***Waste arts*

This unit aims to challenge students to use the Arts to promote, inspire and educate people about the importance of being ResourceSmart and sustainable living. Students will creatively communicate their perspectives about waste minimisation through their preferred form of the Arts including Art, Dance, Media, Music and Visual Communication.

**VELS Level 4–5**

- Physical, Personal and Social Learning
- Civics and Citizenship
    - ~ Community engagement
- Discipline-based Learning
- The Arts
    - ~ Creating and making
    - ~ Exploring and responding

**Unit 6***The environment counts*

This unit aims to demonstrate that sustainability issues require the application of mathematics to find solutions.

In this unit, students accept a challenge to solve a sustainability/waste issue within their school. They investigate and analyse their chosen issue using their understandings of mathematics. They produce a report that includes their solutions providing maths to support their contentions.

**VELS Level 4–5**

- Inter-disciplinary Learning
- Information and Communications Technology (ICT)
    - ~ ICT for visualising thinking
    - ~ ICT for creating
- Discipline-based Learning
- Mathematics
    - ~ Measurement, chance and data
    - ~ Working mathematically
  - Science
    - ~ Science at work

**Unit 7***Waterway pollution*

This unit aims to make a link and find solutions between litter and other irresponsible waste disposal and the pollution in local waterways.

In this unit, students will identify and plan solutions for reducing the school's impact on local waterways. They will develop a communication project to support their solution.

**VELS Level 4–5**

- Discipline-based Learning
- Humanities
    - ~ Geographical knowledge and understanding
    - ~ Geographical skills
  - Science
    - ~ Science knowledge and understanding
    - ~ Science at work
- Interdisciplinary Learning
- Communication
    - ~ Listening, viewing and responding
    - ~ Presenting



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**Building breadth and depth: Levels 4–5 [continued]**


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**Unit 8***Waste message makers*

Litter is waste of any type thrown where it doesn't belong and it is having a major impact on the environment. In this unit students consider how litter issues impact on the environment and develop ways to communicate actions to reduce litter at school and the broader community.

**VELS Level 4–5**

Physical, Personal and Social Learning

- Civics and Citizenship
  - ~ Community engagement

Interdisciplinary Learning

- Communication
  - ~ Listening, viewing and responding
  - ~ Presenting
- Information and Communications Technology (ICT)
  - ~ ICT for communicating
- Thinking Processes
  - ~ reasoning, processing and inquiry

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**Developing pathways Years: Level 6**


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**Unit 9***Consumerism and consumption*

In this unit, students research the way in which consumerism is part of Australian society and its impact on waste. Students explore consumer decisions and debate the opportunities for adjusting their lifestyles to become more sustainable.

**VELS Level 6**

Physical, Personal and Social Learning

- Interpersonal Development
  - ~ Working in teams

Discipline-based Learning

- Science
  - ~ Science knowledge and understanding
- English
  - ~ Reading
  - ~ Writing
  - ~ Speaking and listening

Interdisciplinary Learning

- Thinking Processes
  - ~ Reasoning, processing and inquiry

**Unit 10***How to make biodiversity work for the community*

In this unit, students will be involved in a long-term class project focussing on designing and creating a sustainable garden using understandings of biodiversity as it relates to creating compost and using varieties of suitable food plants. The garden needs to have a direct benefit to the community. Students will raise community awareness of the particular issue being addressed (social or environmental) and develop a report on how to manage resources sustainably.

**VELS Level 6**

Physical, Personal and Social Learning

- Civic and Citizenship
  - ~ Community engagement

Discipline-based Learning

- Science
  - ~ Science knowledge and understanding

Interdisciplinary Learning

- Design, Creativity and Technology
    - ~ Investigating and designing
    - ~ Producing
    - ~ Analysing and evaluating
-

# UNIT 1 LEVEL 1

## Caring for our local environment

### Considerations prior to commencing the unit



## Overview

In this unit, students develop their understanding that they are part of a community and explore ways that they are connected to the environment. They explore and investigate ways they, their school and their families care for the environment. They consider their role in caring for the environment and are involved actively.

### Key question:

- How do you care for our environment?

### Focus questions:

- What is our local environment?
- What is rubbish and what is not rubbish?
- What can we do with things we no longer need?

### Suggested unit elements

- Immersion activities that lead students to question, explore and form an understanding of their local environment.
- Undertake a school walk to introduce ways in which the school cares for the environment.
- Investigate an aspect of minimising waste that needs to be addressed or improved at the school.
- Discuss whole-school approaches being implemented to care for the environment.
- Review areas covered during the unit and draw conclusions.
- Implement social action.
- Ask students to think about what they learned about caring for the environment.

### Victorian Essential Learning Standards

*The following Strands, domains and dimensions are covered in this unit for Level 1:*

- Physical, Personal and Social Learning
  - Interpersonal Development
- Discipline-based Learning
  - English
    - ~ Writing
    - ~ Speaking and listening

## Tuning in

Immerse students in activities which lead them to question, explore and form an understanding of their local environment. Learning experiences may include:

- Use enlarged photographs of the local area such as local streets, parks, main shopping centre, sports ovals and nature reserves to develop a sense of what their local environment consists of and how they are connected. Discuss the needs of people, animals including pets and plants and how the area meets their needs. Develop a labelled visual display of the local environment.
- Read picture story books with an environmental focus such as *Lester and Clyde* by Reece J. to develop a sense of the environment and how people can have an impact.

- Display two large photographs – one depicting a local area free of litter and the other, an area where litter is evident. Develop descriptive words for each photograph. Discuss where the litter comes from, how they feel about areas that have litter and what effects the litter may have on people and animals.

In class discussions use strategies to ensure all students are engaged in listening, thinking and discussing their ideas. Strategies include 'wait-time or thinking time' and 'hands down'. Where appropriate ask students to discuss their ideas with a partner before opening up for discussion among the class. Discuss taking turns and listening to each other.

Pose the question: 'In what ways do you care for our environment.' As a class discuss the idea. Students draw and/or write a sentence about how they care for the environment. Refer to these for assessment purposes.

## Finding out

Undertake a school walk taking in aspects of the school which have an environmental link, including ways in which the school cares for the environment.

- Prior to undertaking the walk, discuss appropriate behaviours and assign students a partner.
- Areas of interest may include school garden and compost, canteen area, rubbish bins, hopper, recycling bins, planted areas, water harvesting and energy saving approaches.
- If possible take photographs of these areas to stimulate discussion in the classroom.
- Use the photographs of the school areas to visually represent what the school does to care for the environment. Using photographic evidence gained from the school walk, identify areas where the school could improve.
- Discuss how these approaches care for the environment.

Investigate an aspect of minimising waste that needs to be addressed or improved at the school such as reusing, recycling, composting, reducing schoolyard litter.

Learning experiences may include:

- a bin sort using laminated cards of everyday items that can be composted, recycled or disposed of through the rubbish bin.
- an investigation of their lunchboxes before snack and lunch break to discuss wrappers and ways to reduce waste
- providing students with the opportunity to think laterally and creatively about how items can be re-used for another purpose
- discussing the litter problem and writing a class letter to the principal/other classes describing the problem and possible solutions.

### Links

Where appropriate link to whole-school approach to:

- Nude food/Rubbish Free Lunches
- using food scraps for compost or wormery
- reusing and recycling
- energy reduction activities, eg turn off light switches when not in the room
- minimising water use

### Ideas

Year 5–6 students take on the role of Students as Leaders and present workshop at Prep information sessions explaining and demonstrating school's approach to Nude food/Rubbish Free Lunches with handy hints.

Discuss whole-school approaches being implemented to care for the environment such as Nude Food or Rubbish Free Lunch program, use of food scraps in composting/wormery, recycling, energy saving/reduction and minimising water use.

Organise senior school children to present a talk to students about the school's approach and each student's role in contributing to making the program work throughout the school.

Use de Bono's *Six Thinking Hats* to think more deeply about a particular approach (Yellow hat) Why is it worth doing? (Green hat) What can we do about it? (Red hat)

How do you feel about it? (White hat) What information do we have about the approach? (Black hat) Are there any bad points about the approach? Display students' ideas visually.

Provide the opportunity for students to present what their family does at home to care for the environment.

- Send home the worksheet: *What my family does to care for the environment*. Share and display completed worksheets as a class.
- Invite interested parents to discuss the approaches they use at home to care for the environment.



What is in your school ground that helps students to live more sustainably?

## Drawing conclusions

Review the areas covered during the unit. Under three headings, list what students do, the school does, families do to care for the environment.

Revisit the Question: *In what ways do you care for our environment?* Students draw and write about their ideas.

List students' ideas about what we can do better to care for the environment.

## Considering social action

Identify an area indicated by students, where their efforts could be focussed to better care for the environment.

The action may have a class focus, school focus or involve their family.

## Reflection and evaluation

Ask students to think about what they learned about caring for the environment. What did they enjoy doing? What do you know now that you did not know before? Are we doing a better job now caring for the environment?

Use a beliefs continuum for students to indicate their response to particular questions about how well they are caring for the environment, their level of enjoyment of the unit, whether they believe they know more about caring for the environment.

Refer to this for assessment purposes.





## Assessment

Keep students' work associated with the topic for evidence of learning and development including:

- drawing and writing ways that you care for our environment (initial and final ideas)
- completed worksheets including *What my family does to care for the environment*.

Keep anecdotal records of class discussion to assess speaking and listening. Observe and record students discussing their ideas based on using the different types of thinking.

## Links to PoLT

This unit has links to *Principles of Learning and Teaching* in particular *PoLT Principle 6*, learning that connects strongly with communities and practice beyond the classroom.

[www.sofweb.vic.edu.au/blueprint/fs/polt/principles.htm](http://www.sofweb.vic.edu.au/blueprint/fs/polt/principles.htm)

## Resources

### Books

Palmer, J, 1991, *First Starts: Oceans, Pollution, Waste and Recycling, Animals in Danger*, Franklin Watts.

Pritchett, J, 1996, *The Environment and Us*, Rigby Heinemann (big book).

Reece, J, 1997, *Lester and Clyde*, Scholastic (reprint).

### Websites

Edward DeBono's *Six Thinking Hats*  
[www.edwdebono.com/debono/sths.htm](http://www.edwdebono.com/debono/sths.htm)

*Rubbish Free Lunch Challenge*,  
 Level 1 resource (pdf format) [www.eduweb.vic.gov.au/edulibrary/public/commrel/events/RFL/rubbishfreelunchVELSLv1.pdf](http://www.eduweb.vic.gov.au/edulibrary/public/commrel/events/RFL/rubbishfreelunchVELSLv1.pdf)

Sustainability Victoria  
[www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

### Worksheet

*What my family does to care for the environment*

## Victorian Essential Learning Standards

This unit addresses the following standards for students at Level 1:

Strand	Domain	Dimension	Standards
<b>Discipline-based Learning</b>	<b>English</b>	<b>Writing</b>	Students: ... write personal recounts and simple texts about familiar topics to convey ideas or messages. ... use conventional letters, groups of letters, and simple punctuation such as full stops and capital letters.
		<b>Speaking and listening</b>	... ask and answer simple questions for information and clarification, contribute relevant ideas during class or group discussion, and follow simple instructions. ... listen to and produce brief spoken texts that deal with familiar ideas and information.
<b>Physical, Personal and Social Learning</b>	<b>Interpersonal Development</b>	<b>Interpersonal Development</b>	... describe basic skills required to work cooperatively in groups.

**Other possible VELS links could include:**

- Physical, Personal and Social Learning/Civics and Citizenship
- Interdisciplinary Learning/Thinking Processes

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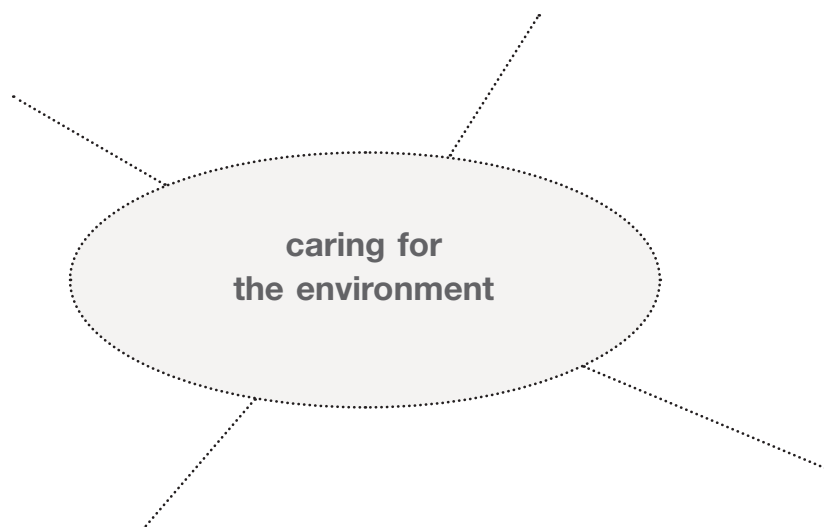
# STUDENT WORKSHEET:

## What my family does to care for the environment

Our class is currently studying how we care for the environment. We are discussing approaches such as recycling, composting and using bins for rubbish. As a class we are interested in what families are doing to care for the environment.

Please discuss what your family does to care for the environment and help your child label their drawings. Please return completed work to school for sharing and discussion.

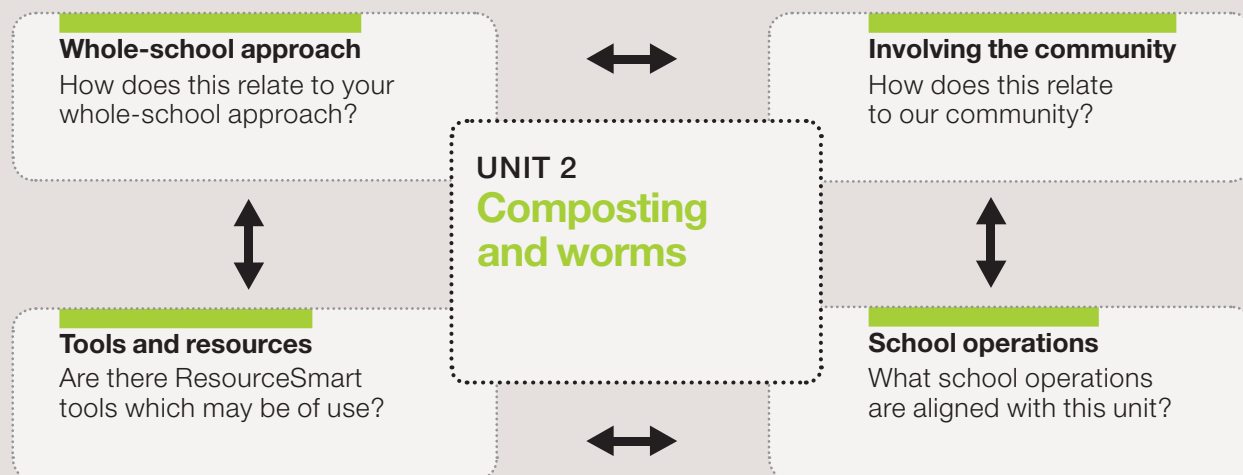
This is what ..... family does to care for the environment:



## UNIT 2 LEVELS 2–3

# Composting and worms

### Considerations prior to commencing the unit



## Overview

This unit aims to have students start a class composting or wormery system to process fruit and vegetable scraps.

Students examine composting and worm methods for processing greenwaste. They will organise a system that will process the fruit and vegetable scraps from their lunches.

### Key question:

- How can we turn greenwaste into something useful?

### Focus questions:

- How do compost bins and wormeries work to turn greenwaste into compost?
- How can we set up a compost bin or wormery to process fruit and vegetable scraps?
- How can we use the products from a compost bin or wormery?

### Suggested unit elements

- Investigate the basic biology of earthworms.
- Investigate the action of bacteria in decomposition.
- Measure the volume of fruit and vegetable scraps generated by the class lunches.
- Set up and maintain a compost bin or wormery.
- Organise the collection and processing of lunch greenwaste.
- Use the products created by the compost bin or wormery.

### Victorian Essential Learning Standards

*The following Strands, domains and dimensions are covered in this unit for Levels 2–3:*

#### Discipline-based Learning

- Mathematics
  - ~ Measurement, chance and data
- Science
  - ~ Science knowledge and understanding
  - ~ Science at work

#### Interdisciplinary Learning

- Information and Communications Technology (ICT)
  - ~ ICT for visualising thinking



## Tuning in

### Investigating earthworms

Provide students with common garden earthworms or compost worms (red worms or tiger worms) sourced from a compost or worm retailer. If possible compare the compost worms to the common garden variety.

- Students can use a hand lens, digital microscope or naked eye to observe and record the features of a worm including segments, saddle and mouth. It's possible to view the internal organs by viewing against a glass surface.
- Draw a labelled diagram and use a digital camera. Describe how the earthworm moves and its body surface.
- As a challenge, each student can produce a scientific diagram of their worm. In groups of four they place the four worms they drew into a container. Students in the group identify their worm from the others in the container, referring to their scientific drawing (A good reason to draw details carefully).
- Ensure students wash their hands after handling earthworms.
- Develop a list of ideas about earthworms and questions which can be confirmed/answered using a variety of approaches.

Red and tiger worms used in wormeries can be purchased through many gardening outlets and ordered over the Internet. To attract worms to a garden bed, place some oat meal under a damp layer of carpet (dry garden beds will not have earthworms).

When students are examining earthworms place a small handful of damp compost with worms on a saucer, clean plastic meat tray *etc.* Students can handle the worms using plastic spoons or with their fingers.

Organise students to work in groups of three and carry out a Predict, Observe, Explain (POE).

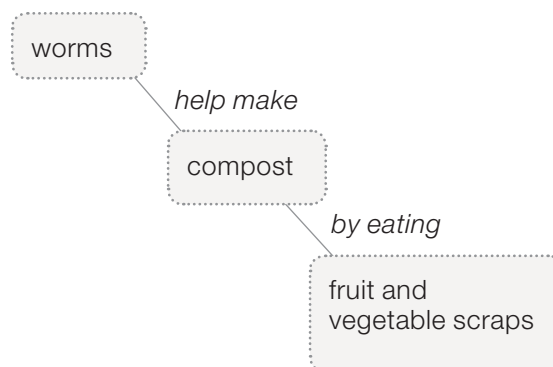
Students add layers of soil, sand and vegetable and fruit scraps to a PET bottle with the top section removed. A small amount of water is added to the contents to ensure it is moist and a handful of worms are added. The PET bottle is wrapped in newspaper to keep it dark.

**PREDICT:** Students predict what will occur over the following week. They draw what they think will happen and describe what they think they will see.

**OBSERVE:** Students make daily observations and compare these to their predictions. Drawings are made and digital photographs are taken.

**EXPLAIN:** Students explain what occurs and why the different layers are mixed.

Create a mind map or concept map using key words such as capsule, earthworm, castings, compost, break down, greenwaste, worm liquid, wormery, fruit and vegetable scraps, adult worms. Use the concept map to find out what students know about worms and compost. Students use these words on cards and move them around and connect them using arrows and a descriptor, *ie*



Ask the class if anyone composts at home. Invite students to:

- Relate experiences about collecting kitchen greenwaste at home
- Describe different kinds of compost bins and wormeries people have at home
- Describe what the contents of compost bins look like.

Start a class glossary with a suggested list including:

<i>Earthworm</i>	<i>Greenwaste</i>	<i>Capsule</i>
<i>Compost</i>	<i>Saddle Fungus</i>	
<i>Wormery</i>	<i>Worm liquid</i>	<i>Bacteria</i>

#### *Decomposition*

If the class has previously investigated healthy eating, students can recall what they learnt about the importance of eating fruit and vegetables.

## Finding out

Organise a day where all the students have lunch in the classroom. Depending on break times and when students eat, it may be necessary for students to sort their waste during two breaks.

Review with students what kind of waste is generated by lunches. Classify the different types of materials, including plastic, cardboard drink containers, fruit and vegetable scraps and other food.

Arrange a bucket for each type of material (preferably buckets of equal size) and label each bucket.

On the day, ask each student to sort their lunch waste into the buckets.

In the afternoon, ask how students can measure and compare the waste in each of the buckets. Encourage students to use maths equipment to test ideas about measuring and comparing.

Discuss which measuring methods students preferred. Make a bar graph to compare the waste in each of the buckets. Data may be collated electronically using a software package to present the graph.

Discuss with students why waste going to landfill is a problem. What can be done with greenwaste if it is not sent to landfill?

Challenge students to think about starting a wormery. Begin by reviewing what they know about earthworms, including what they eat.

Working in pairs, ask students to create a list of important questions they need to ask before they can start a wormery.

Create a class list of ideas about where we can find more information.

Share questions that pairs of students have listed to generate a class research finder. Important questions to include are:

- What products do worms create that we can then use?
- What do earthworms need in a wormery to survive?
- What will harm earthworms in a wormery?
- Find out about one or more wormeries. How are they assembled? What needs to be placed in a wormery for the worms to live in? What can be placed over the worms to help them remain damp?
- How can castings be removed from a wormery?
- How can worm fluid be removed from a wormery?
- How can earthworms be removed from a wormery?
- What food can be fed to earthworms?
- What food can't be fed to earthworms?
- What must be done to the food to prepare it for worms? Experiment using different methods to find a simple and safe way to chop up the fruit and vegetable scraps.



Worms need to have their food prepared by having it chopped into small pieces. Schools often use a large metal pan or bucket to place the fruit and vegetable scraps. A spade or similar implement is used to chop up the food.

The major danger of earthworms dying is caused when the wormery is allowed to dry out. Other problems don't usually kill earthworms. Worms survive short periods of starvation. When their home is overcrowded with earthworms, they stop growing.

What do students need to know about looking after worms? What do students need to do to remain safe? Use a software package and write instructions on the best method for looking after earthworms and chopping up fruit and vegetable scraps.

Puzzling worm questions for student to observe and research:

- Worms don't have eyes. Why do worms want to remain in the dark?
- When worms grow, do they grow more segments?
- How can you tell which end of an earthworm is the head?
- Can earthworms move in reverse?
- Locate on an earthworm the segments and the saddle. (the saddle is a swollen area that produces the eggs and capsule). Can you find a capsule? (It is shaped like a tiny brown teardrop and contains up to ten eggs).

Develop investigations to answer the following questions:

- Should citrus or onion peel be added to a wormery?
- How do you know that ‘worm tea’ or castings are actually good for plants?

As a class develop a fair test to answer questions based on collected evidence. What will you test? What will you change? What will stay the same? What will you measure?

Compare and contrast information students have found out about operating compost bins, including the bins they are familiar with at home and school.

Ask students to contribute to a class Compost Bin Information and Operating Sheet, including key information about:

- Things that can go into a compost bin.
- Things that should not go into a compost bin. Identify the consequences of placing the wrong things into compost bins.
- Differences between dry, moist and wet inside a compost bin.
- What could students do with dry contents in a compost bin?

- What could students do with wet contents in a compost bin?
- How might students aerate the contents of a compost bin?
- The role of the many tiny creatures that live in a compost bin.

A software application may be used to develop Compost Bin Information and the Operating Sheet.

### **Compost bin extension**

Obtain the Compost Creature poster from the Gould League (Gould Group).

Use petrie dishes to capture some of the animals in a compost bin. View the animals using a flex camera and TV. Observe how the animals move, and their shape, number of legs and other features.

The simplest method for composting is to place greenwaste into a plastic compost bin and allow nature to take its course. However the composting process is sped up when the conditions in the compost bin are optimal. Two ways a high decomposition rate can be maintained is to make sure the contents of the compost bin is damp, not dry or wet, and to increase the air getting to the decomposing material.

## **Drawing conclusions**

Organise students into small groups to conduct a discussion forum about the question:

How can composting and wormeries help the environment?

As a class, share group views.

Challenge forum groups to develop a plan for operating a wormery or a compost bin. Provide the class with guiding questions such as:

- Where will the wormery or compost bin be kept? Where will tools be kept?
- How will greenwaste be collected?
- How will the greenwaste be processed?
- How will buckets and the compost or worm area be kept clean? How will students remain clean?

- Who will do these tasks?
- Who will make sure the moisture content is correct?
- Is a list of instructions required?
- Is a timetable for doing tasks by individuals or groups required? Use a software application to make a timetable for when groups or individuals need to complete tasks.
- What will the class do with the products produced by the wormery or compost bin?
- Will the products be used to make something new?
- Will they have a product they can sell to the community to raise money?

Forum groups present their plan to the class. Conduct a class vote for the best plan.





How can nature's earthworms be used to help us manage waste and create better soil?

## Considering social action

As a class, discuss the importance of communicating information about composting. Students can make a product to communicate key messages about composting, including what can be composted and how compost can be used. Share ideas for different communication products such as posters, information sheet, newsletter articles, website guest spots. Appropriate final products could also be displayed in the local community library or other community facilities.

When the wormery or compost bin is successfully in operation, ask a local newspaper to write an article about the students' work.

### Relating to your community

There are number of ways this unit can relate to your community:

- Ask experts from your community for advice on developing a composting and worms.
- Ask experts in your community for advice on using compost and worm products.
- Educate the family and community about the need to reduce greenwaste through composting and worms and describe the benefits to the environment.

## Reflection and evaluation

Some questions for students to reflect on – What did you find interesting about earthworms? Do you prefer compost bins or wormeries? Do you regularly sort the waste from your lunch? What do you think is the best use for products from compost bins or wormeries?

How effective has the class been in reducing the greenwaste going into the rubbish bin?

Use a thinking tool students are familiar with, eg Venn diagram, to help students to organise their ideas.



## Assessment

Retain students' work, including:

- composting and wormery communication products
- timetables and instructions
- earthworm scientific drawing and report.

With students, develop a rubric that assesses how students worked in teams, completed their tasks on time, reported their findings, contributed to class problem solving *etc.*

## Links to PoLT

This unit has links to *Principles of Learning and Teaching* in particular *PoLT Principle 6*, learning that connects strongly with communities and practice beyond the classroom.

[www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm](http://www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm)

## Resources

### Books

Appelhof, M, 2006, *Worms Eat My Garbage*, Flower Press.

Ebeling, E, 2003, *Basic Composting: All the Skills and Tools You Need to Get Started*, Stackpole Books.

MacLean, R, Armstrong, P & Winters, B, 1997, *Compost activities for Schools*, Gould League.

Murphy, D, 2005, *Organic Growing with Worms: A Handbook for a Better Environment*, Viking.

Rutherford, P, 1997, *Australian Compost and Worm Book*, Apollo Books.

Shepherd, 2007, *The Little Book of Compost*, HarperCollins.

Taylor D, et al., 1998, *The Compost Book*, New Holland.

### Equipment and materials

- Small plastic PET bottles
- Soil
- Earthworms
- Soap and paper towel
- Plastic spoons
- Buckets
- Measuring equipment
- Metal bucket and spade for chopping fruit and vegetable scraps
- Compost bin or wormery.

### Poster

Winters, B, *Compost Creatures*, Gould League.

### Websites

*Munchy the Worm* from the Yarra Ranges Council provides students with a load of composting and worm resources. Suitable for younger student research. [www.yarraranges.vic.gov.au/upload/munchy/index.htm](http://www.yarraranges.vic.gov.au/upload/munchy/index.htm)

Reln Plastics has pioneered the development of plastic wormeries. These are suitable for indoor use. [www.reln.com.au/](http://www.reln.com.au/)

Learn more about wormeries and composting at Sustainability Victoria's website [www.sustainability.vic.gov.au/www/html/1966-sustainable-gardening.asp](http://www.sustainability.vic.gov.au/www/html/1966-sustainable-gardening.asp)

The NSW Department of Environment and Climate Change also has useful information on worm farms. [www.environment.nsw.gov.au/envirom/wormfarm.htm](http://www.environment.nsw.gov.au/envirom/wormfarm.htm)



## Victorian Essential Learning Standards

This unit addresses the following standards for students at Levels 2 and 3:

### Level 2

Strand	Domain	Dimension	Standards Students:
<b>Discipline-based Learning</b>	<b>Mathematics</b>	<b>Measurement, chance and data</b>	<p>... describe and compare measurements of length, area, volume, mass and time using informal units.</p> <p>... recognise the key elements of the calendar and place in sequence days, weeks and months.</p>
	<b>Science</b>		<p>... observe and describe phenomena, eg lifecycles.</p> <p>... investigate ways of reducing waste in their classroom, eg recycling and composting.</p> <p>... repeat observations over time to make predictions.</p>
<b>Interdisciplinary Learning</b>	<b>Information and Communications Technology (ICT)</b>	<b>ICT for visualising thinking</b>	<p>... With some assistance, students use ICT to locate and retrieve relevant information from a variety of sources.</p>

**Level 3**

<b>Strand</b>	<b>Domain</b>	<b>Dimension</b>	<b>Standards</b> Students:
<b>Discipline-based Learning</b>	<b>Mathematics</b>	<b>Measurement, chance and data</b>	... recognise and use different units of measurement. ... use a column or bar graph to display the results of an experiment.
		<b>Number</b>	... develop fraction notation and compare simple common fractions.
	<b>Science</b>	<b>Science knowledge and understanding</b>	... identify and describe the structural features of living things. ... distinguish between biotic and abiotic factors in their environment and describe interactions that occur between them.
		<b>Science at work</b>	... plan, design, conduct and report collaboratively on experiments related to their questions about living and non-living things and events.
<b>Interdisciplinary Learning</b>	<b>Information and Communications Technology (ICT)</b>	<b>ICT for visualising thinking</b>	... explain how these strategies can be used for different problems or situations.

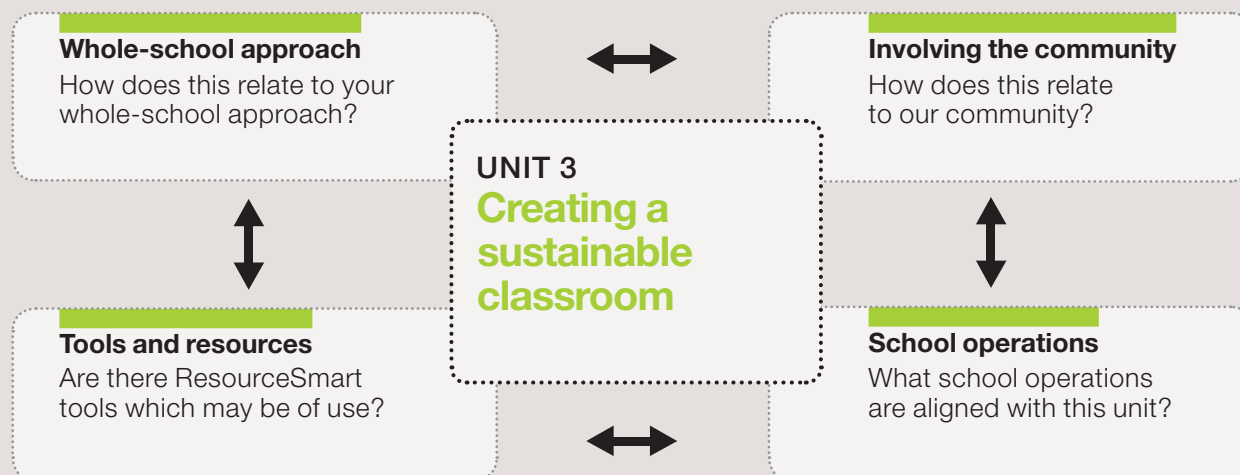
**Other possible VELs links could include:**

- English/Reading, Listening and speaking
- Humanities/Humanities knowledge and understanding

## UNIT 3 LEVELS 2–3

# Creating a sustainable classroom

### Considerations prior to commencing the unit



## Overview

In this unit, students develop an understanding of living sustainably by exploring actions that minimise their impact on the environment. Students take responsibility for the development and implementation of sustainable classroom practices and behaviours, including a focus on the 3Rs.

### Key question:

What does it mean to live more sustainably?

### Focus questions:

- What are sustainable actions?
- How will sustainable actions help the environment?
- How can I take responsibility for waste minimisation and other sustainable actions?

### Suggested unit elements

- Introduction to the idea of sustainable living.
- Find out about ideas for sustainable actions.
- Create a visual classroom plan of ideas.
- Develop a class approach to implementing sustainable actions including rules and method of implementation.
- Getting involved in the 3Rs.
- Observing and reflecting on sustainable behaviours in the classroom.

### Victorian Essential Learning Standards

*The following strands, domains and dimensions are covered in this unit for Levels 2–3:*

#### Physical, Personal and Social Learning

- Civics and Citizenship
  - ~ Civic knowledge and understanding
  - ~ Community engagement

#### Discipline-based Learning

- The Humanities
  - ~ Humanities, knowledge and understanding
- Science
  - ~ Science knowledge and understanding

#### Interdisciplinary Learning

- Thinking Processes
  - ~ Creativity



## Tuning in

Introduce students to the idea of sustainable living through visual stimulus such as:

- Storybooks. Suggested books include:
  - ~ *Window* by Jeannie Baker
  - ~ *Belonging* by Jeannie Baker
  - ~ *The World that we Want* by Kim Michelle Toft
  - ~ *The Lorax* by Dr. Seuss
  - ~ *World Wide Waste... It's Not A Load Of Rubbish* by Caren Trafford
  - ~ *Greta the Garbo* by Irena Sibley
- Newspaper and magazine articles
- Photos of the various environments including the school grounds
- Posters

Encourage students to discuss, consider and question the impact of human actions on the environment, including why decisions were being made to take certain actions. Key questions for promoting discussion could be:

- What changes are being made to the environment? Why do you think they are happening?
- How are they impacting on the environment?

- What is happening as result of the changes; for example, pollution, litter, more cars and other vehicles, cutting down trees?
- Are these sort of changes happening in our area? Are they happening in our school? Do you think that the changes have been helpful? (Explore with students if they think there have been different benefits resulting from the change, including social, economical, environmental.) How do you think these changes will affect the way we live, financial and other costs and the environment?
- What changes can we make to how we live to better care for the environment?

An important aspect of the discussion is considering the balance of social needs and economic reasons for decisions being made about changes to the world we live in.

Invite students to contribute to a class sustainable living ideas bank. The ideas bank may include possible lifestyle changes to better care for the environment, and actions that can happen at school, in the classroom, at home or in the local community. Introduce other benefits or considerations, eg sometimes there is a financial cost and at other times there is a saving.

## Finding out

Make a set of sustainability cards using the templates at the end of this unit. Organise students into pairs and provide each pair with a card.

Ask pairs to discuss their sustainability word, including any problems they are aware of and why it is a problem, concerns they have for the environment relating to their card focus and ideas for action to improve problems such as using less paper, not dropping litter. Students record their discussion ideas in a way they decide best demonstrates their thoughts, such as drawings, diagrams, word lists, story, tables, venn diagrams.

*Ollie Saves the Planet* CD-ROM may be used to assist students in developing ideas for action. It provides a wide range of simulations, activities, games and information to help students relate to the big ideas of sustainability, waste, energy, air, reduce, reuse, recycle and biodiversity.

Exploring *Ollie Saves the Planet* CD-ROM could be a 'buddies' activity for younger students.

*Ollie Saves the Planet* CD-ROM was distributed to all schools.

Alternatively, this activity may have a class focus with the teacher listing key ideas on the whiteboard or interactive whiteboard.

Using student actions ideas from the sustainability cards, generate a class 'sustainability actions ideas file'. Discuss and describe actions students know are happening at school and home, including why they think these are helping the environment.

A visual assessment of the school may be conducted to gather evidence of known actions, such as recycling, litter programs and switching lights off when not in the room, to evaluate if they are in fact working successfully. *Sustainability Visual Assessment* Tool allows students to enter their focus areas for assessment, identify if it is happening and suggest actions. Photographs could be taken as supporting evidence.

Conducting a classroom waste visual assessment could establish how much waste is being produced each day.

*Guidelines to assessing your waste* factsheet provides advice on assessing waste.

The 3Rs is a simple guide to help us deal with our waste. In minimising waste, remember to first *reduce*, then *reuse*, and finally *recycle* or *compost* what is left.

Refer to *Glossary of terms* for an explanation of terms relating to sustainability.



How can students modify their classroom so it is managed more sustainably?

## Drawing conclusions

Using the approach Jeannie Baker uses in her book *Window*, ask students to 'look in through the window' into the classroom. What would they see happening in a sustainable classroom? How would this help the environment?

Students draw an annotated view of the classroom showing sustainable actions in place, for instance, rubbish bins with little waste, lunchboxes with no plastic wrap, paper recycling bin, lights switched off when not in the classroom.

Share classroom views. Evaluate action ideas using criteria decided by the class; for example, already doing, could be done better, need to start.

Using the evaluation results, students vote on actions they think could be adopted in the classroom.

The worksheet: *Ideas for our sustainable classroom* may be used to expand students' ideas beyond their initial thoughts.

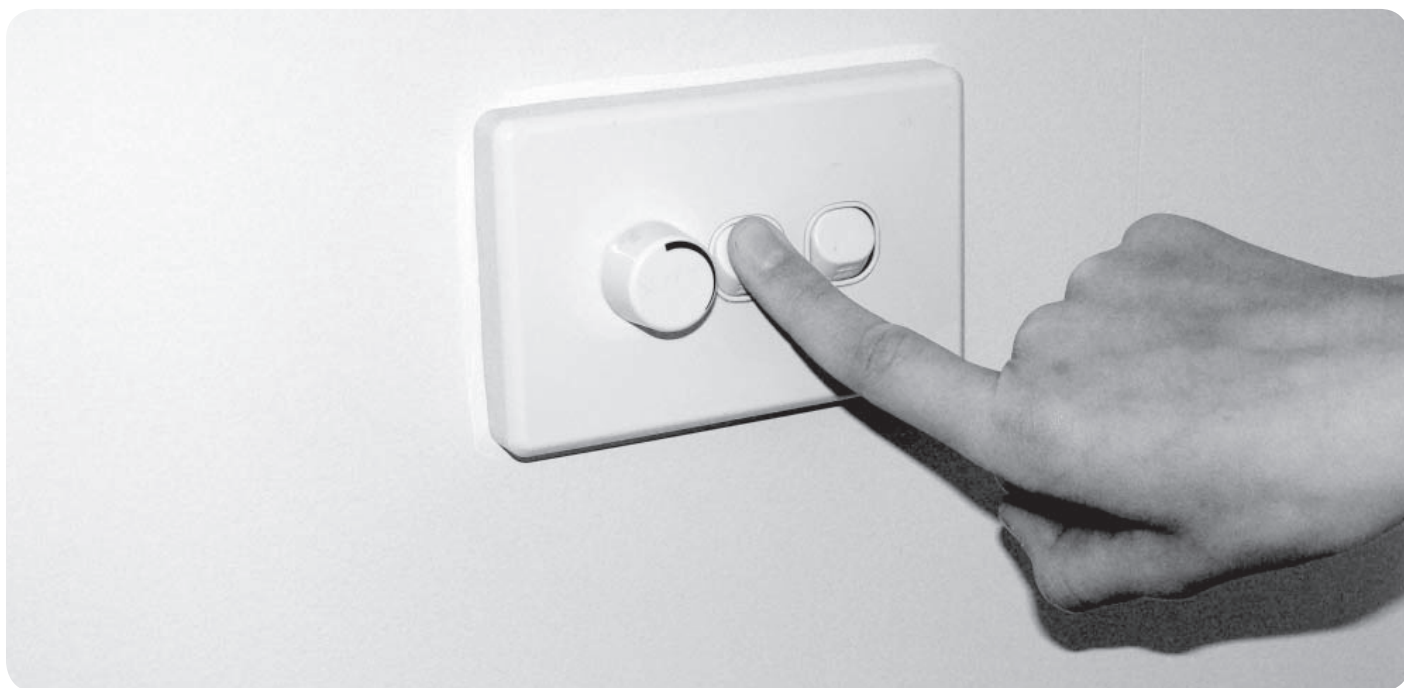
### Types of plastic

The two most commonly recycled plastics are PETE or PET code 1 (polyethylene terephthalate) and code 2 HDPE (high density polyethylene). There is also a third, PVC poly vinyl chloride code 3. Many plastic products like bottles and containers are marked with the recycling code to facilitate sorting by their particular resin type.

### Whole-school

Encourage students to consider how they can spread the word so that every classroom is a sustainable classroom.

Consider how the office and other parts of the school can adopt sustainable practices and behaviours.



What sustainable actions can your young students do?

## Considering social action

As a class, discuss why students think it is important that all students value working in a sustainable classroom using questions such as:

- Why is it important that everyone cares for the environment?
- How will caring about the way we use resources in the classroom help the environment?

A class sustainability values statement may be created, displayed and referred to on a regular basis.

Using a suitable mechanism, prioritise which actions the class will adopt, including a suggested timeline for implementation.

Ask small groups to discuss and agree on some rules for implementing and managing the action; for instance, a paper management system – having a scrap paper box and using scrap paper for drafts, bringing lunch in reusable containers, an energy management system – switching off the lights at recess and lunch with monitors to check. If there is a system already operating in the school, then students could design and conduct an evaluation and suggest ideas for improvements.

The OPERATIONS section has advice to support

- *Reduce, reuse and recycle*
- *Greenwaste, composting and wormeries*
- *Litter and stormwater*
- *Green purchasing*
- *Waste disposal*

Teacher information *Focus on sustainable actions* has teaching ideas for the key areas of *Reduce, reuse, recycle* and paper. Additional teaching may be required to support student understanding of these areas before a plan is developed.

Ask groups to develop a plan to reduce waste based on the agreed actions using the worksheet: *Reducing waste plan*. Invite groups to share their ideas. As a class, negotiate and agree on the action's rules for implementation and management. Prompt students to consider key aspects using questions such as:

- Do the ideas support our class sustainability values statement? Why? How?
- Who has responsibility?
- How will the action be managed?
- Do we need to find out more about it?
- How will all students in the class know what to do?
- How will we know we are making a difference?

### Involving the community

The big challenge is to promote sustainable practices and behaviours in the school community.

How can this be done?

Who would be involved?

## Reflection and evaluation

If the plans are implemented, students may conduct a review of the current situation using the Visual Assessment tool again and compare the results to their original findings. What are the differences, *eg* costs, quantity of paper, time lights turned off?

Ask students to observe and record sustainable behaviours of the class using a method of their choice

such as drawing, story, picture, storyboard, photos. Encourage students to reflect and include their thoughts on how the class is helping the environment to live more sustainably.

Invite students to suggest ideas for adopting the action by the whole school or at home.

## Assessment

Assess students' annotated view of the classroom for evidence of understanding sustainable living actions such as:

- bin placement and use
- paper recycling
- lights off when not in the classroom
- blinds or shade creating devices on windows
- food scrap bin
- heating not running on a warm day.

Assess the reducing waste plan for creative ideas that reflect a detailed plan for implementation.

Review students' ability to observe sustainable behaviours and involvement in sustainable actions.

## Links to PoLT

This unit has links to *Principles of Learning and Teaching* in particular *PoLT Principle 2, 4* and *6*, learning that connects strongly with communities and practice beyond the classroom.

[www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm](http://www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm)

## Resources

### Books

- Baker, J, 1991, *Window*, Greenwillow Books.
- Baker, J, 2004, *Belonging*, Walker Books Ltd.
- Dr Seuss, 1971, *The Lorax*, Random House Children's Books.
- Reece, J, 1997, *Lester and Clyde*, Scholastic (reprint).
- Sibley, Irena, 2002, *Greta the Garbo*, Lothian.
- Toft, Kim Michelle, 2005, *The World That We Want*, Charlesbridge Publishing.
- Trafford, C, 2001, *Worm's Eye View: the History of the World*, Etram Pty Ltd.
- Trafford, C, 2006, *World Wide Waste... It's Not a Load of Rubbish*, Etram Pty Ltd.

### CD-ROM

*Ollie Saves the Planet*, CD-ROM, Sustain-Ability.

### Worksheets

- Sustainability cards*
- Ideas for our sustainable classroom*
- Reducing waste plan*

### Additional teaching ideas

Teacher Information: *Focus on sustainable actions*

*Right Angled Thinking*: This strategy is a structured thinking process which scaffolds thinking in a linear structured manner as well as making connections to associated ideas and creative thoughts. [www.cap.nsw.edu.au/QI/TOOLS/pqr/rightangle.htm](http://www.cap.nsw.edu.au/QI/TOOLS/pqr/rightangle.htm)





## Victorian Essential Learning Standards

This unit addresses the following standards for students at Levels 2 and 3:

### Level 2

Strand	Domain	Dimension	Standards
			Students:
<b>Physical, Personal and Social Learning</b>	<b>Civics and Citizenship</b>	<b>Civics and Citizenship</b>	<p>... begin to appreciate the common values important to groups and individuals; for example, fairness, tolerance, understanding and respect.</p> <p>... begin to participate in a range of class and school activities such as recycling, taking responsibility for class resources.</p>
<b>Discipline-based Learning</b>	<b>Science</b>	<b>Science</b>	... investigate ways of reducing waste in their classroom; for example, recycling and composting.
	<b>The Humanities</b>	<b>The Humanities</b>	... introduced to the concept of resources and their management, and begin to understand how resource use reflects community interdependence and economic sustainability.
<b>Interdisciplinary Learning</b>	<b>Thinking Processes</b>	<b>Thinking Processes</b>	<p>... develop their skills in making accurate observations about people and events, and they begin to use a variety of means to record their observations.</p> <p>... presented with simple problems, students work with peers to develop a range of creative solutions and test their effectiveness against given criteria.</p>

**Level 3**

Strand	Domain	Dimension	Standards Students:
<b>Physical, Personal and Social Learning</b>	<b>Civics and Citizenship</b>	<b>Civic knowledge and understanding</b>	... explain why protection and care for the natural and built environment is important.
		<b>Community engagement</b>	... contribute to the development and support of class rules. ... work with other students to identify a local issue and plan possible actions to achieve a desired outcome. ... participate in activities to protect and care for the natural and built environment.
<b>Discipline-based Learning</b>	<b>Science</b>	<b>Science knowledge and understanding</b>	... describe human influences in the environment, which affect the survival of living things.
	<b>The Humanities</b>	<b>Humanities knowledge and understanding</b>	... describe how people use and affect different environments in Victoria.
<b>Inter-disciplinary Learning</b>	<b>Thinking Processes</b>	<b>Creativity</b>	... apply creative ideas in practical ways and test the possibilities of ideas they generate.

**Other possible VELS links could include:**

- English/Reading/Writing
- Interpersonal Development/Working in teams

**Sustainability cards**

paper

waste

rubbish

electricity

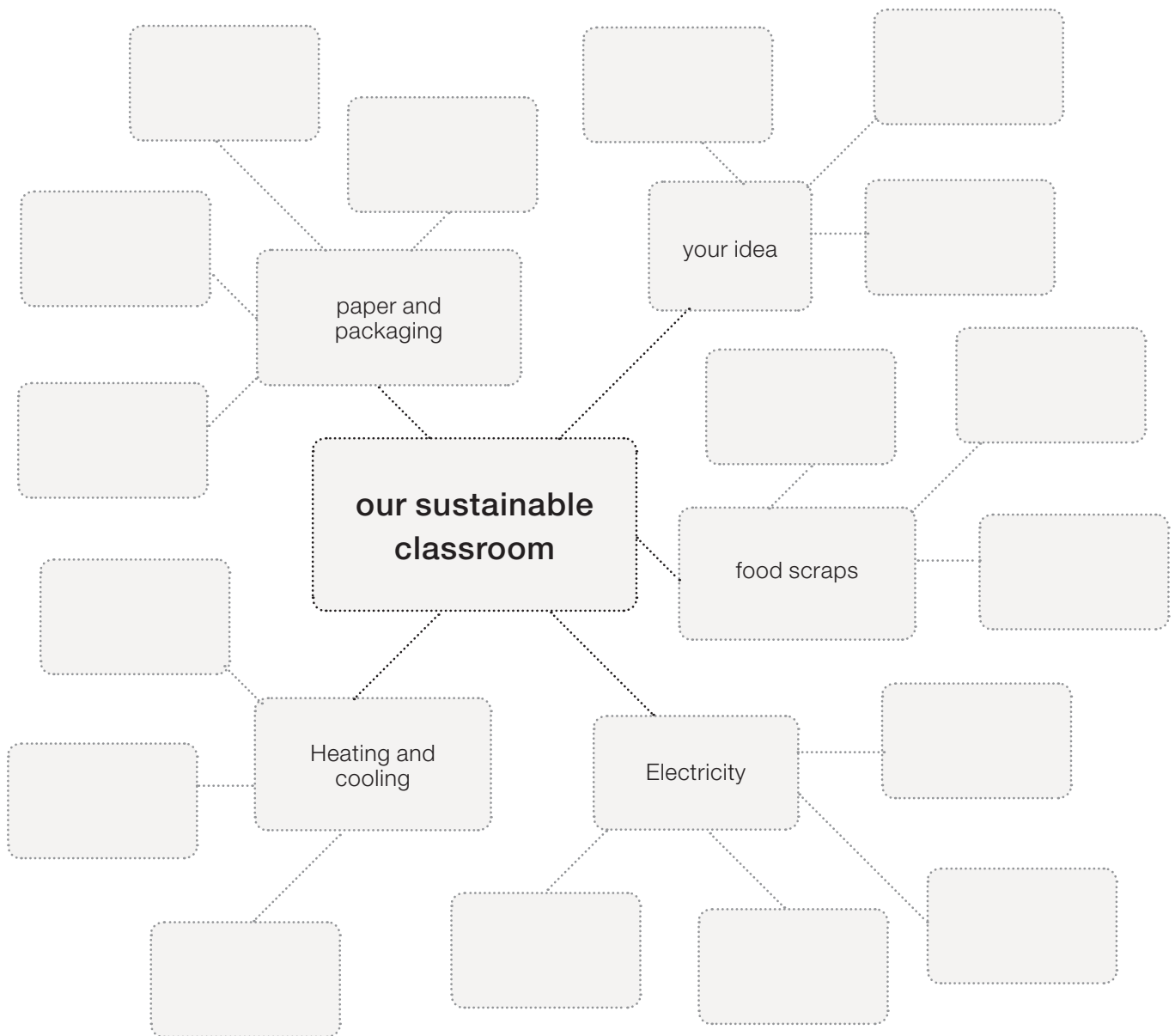
litter

water

# STUDENT WORKSHEET

## Ideas for our sustainable classroom

Use the diagram to list your ideas for actions to help the environment.





---

# STUDENT WORKSHEET

## Reducing waste plan

Plan how you will reduce waste in your classroom.

---

What do I want to do?

---

What ideas do I have to do it?

---

What will I do?

---

What do I need to know about it before I can start?

---

What things will I need to do it?

---

How will I tell others what I found out?

---

Other:

---

# UNIT 4 LEVELS 4–5

## What a waste!

### Considerations prior to commencing the unit



## Overview

This unit provides students with an opportunity to become actively involved in developing, re-instigating or enhancing the school approach to waste management. This action project provides an authentic context for learning, with students drawing on and refining a range of skills and knowledge to help the school reduce waste disposed of to landfill.

### Key question:

- Who is responsible for reducing the school's waste?

### Focus questions:

- What is waste?
- How does our school manage waste and who is responsible?
- How does minimising waste contribute positively to our community?
- How can students contribute to the minimisation of school waste?

### Suggested unit elements

- Encourage students to think about the school's waste, pose questions and set relevant, open-ended tasks.
- Review the three Rs waste hierarchy.
- Analyse the school's approach to waste and litter reduction.
- Review areas covered during the unit and draw conclusions.
- Implement social action.
- Ask students to think about what they learned about caring for the environment.

### Victorian Essential Learning Standards

*The following strands, domains and dimensions are covered in this unit for Levels 4–5*

#### Physical, Personal and Social Learning

- Civics and Citizenship
  - ~ Community engagement

#### Discipline-based Learning

- The Humanities/Economics
  - ~ Economic knowledge and understanding
- English
  - ~ Writing
  - ~ Speaking and listening

## Tuning in

Encourage students to think about the school's waste. Use prompts such as:

- How much waste would our school produce in a year?
- What is the break up of waste into the categories such as rubbish, recycling materials, reuse materials, greenwaste and litter?
- What are the benefits of recycling (environmental, social and economic)?
- What is the most common type of material disposed of as rubbish at our school?
- Where does the waste go to after it is collected?
- In our school, where does the majority of waste come from?
- Why do some people litter?
- On average, how much waste does each student produce a week/year?
- What is meant by disposing of rubbish responsibly?

Engage students in a selection of the following tasks grouped under related domains:

- Use a photograph of the hopper (and recycle bins) as a stimulus to predict the amount of waste the school disposes of per year. Provide data of bin/hopper/skip volume, collection rate and annual cost. Students use the data to :
  - extrapolate the school's approximate yearly amount of waste and weekly or per student cost (compare to their predictions)
  - create a sliding scale showing the annual costs associated with no recycling and disposal and increasing the amount and/or rate of recycling and reducing the amount and/or rate of waste disposal.
- Challenge students, working in small groups, to create a flow chart describing where waste in the school is produced and steps or processes involved to describe what happens to it. Relate the waste production to the different services provided by the school, provision of food, areas for learning, provision of learning materials, communication to school community, areas for play. (Use for diagnostic assessment purposes.)

- Invite students to write a creative piece from the perspective of an item of waste in the school. The journey covers how it got to school, how it was collected and where it went after it left the school ground. This writing task can be used to assess students writing and what they know about rubbish disposal, collection and recycling. (Use for diagnostic assessment purposes.)
- Organise a beliefs continuum (scale of 1–10) and discuss the range of views. (Use for diagnostic assessment purposes.) Develop your own questions or use the following:
  - How important to you is recycling?
  - How important to you is it that the school reduces what it throws in the rubbish?
  - To what extent do you think it is everybody's responsibility?
  - How important is it to dispose of rubbish responsibly?
  - How important is it to avoid buying items that create more waste?

### Definitions

**WASTE:** It describes any material no longer needed for its original purpose. The different kinds of waste dealt with in this unit are:

**RUBBISH:** Waste that is sent to landfill or disposed of so that it cannot be used again.

**DISPOSED:** Used to describe how rubbish is processed.

**RECYCLE:** Waste that is processed and made into something new.

**REUSE:** Waste that is used for a different purpose from its original use.

**GREENWASTE:** Organic waste that comes from plant material, including garden and fruit and vegetable scraps.

**LITTER:** Waste that has been allowed to escape into the environment where it may cause pollution.

## Finding out

Use the tuning in tasks as a starting point to assess what students know about the school's waste management practices and to develop experiences that will enable students to find out more and begin to apply this knowledge.

Review the three Rs waste hierarchy. Refer to the OPERATIONS section: *Reduce, reuse and recycle*. Relate this to the school's current approach to reusing waste, including:

- brainstorm creative ways to avoid using particular items so that waste is reduced, eg no plastic bags, ensure no over ordering of items, reduce paper usage making better use of message size
- reusing particular items used commonly in the school that are disposed/recycled after a single use, eg cardboard boxes, pens, sheets of office paper, newspaper.

Students gather information about what is occurring in the school related to managing waste and reducing litter, for example:

- As a class, record the number and type of waste produced per person, during a typical day. Each student keeps their own tally using an agreed format. Refer to worksheet: *A typical day* as an example of the data to collect. Use the data to calculate the approximate waste per week by all students in the school. Discuss ‘consumer decisions’ and how this can affect the amount of waste each person produces.
- Discuss the resources the school uses to combat schoolyard litter. Pose the question: *Is there a group in the school that predominantly litters?* In small groups develop several survey questions to gather data about littering. Share the questions and develop an agreed set of questions to gather data across the school. Organise for students to conduct the brief survey and record data. Aggregate the data and interpret using graphs to visually compare data sets. Conduct a litter audit of the school using the visual assessment: *Litter and stormwater*.
- Assign project teams to conduct a visual assessment to assess areas such as schoolyard, school office, staffroom, canteen, other classrooms. Gain approval from relevant staff and provide supervision where required. Use visual assessment tools to help guide and support the process. Gather data on the types of containers or bins used to sort waste, how full they are and whether there is evidence of contamination. Ensure students view the bins and do not touch the litter as part of their assessment.

Organise a visit to a Materials Recovery Facility (MRF) or have an education officer visit the school to discover what happens to materials recovered for recycling. Students may be interested to know about the types of careers available in the waste and recycling industry.



Students research new enterprises that have developed as a result of the market for goods made from recycled content. They produce a poster for display that:

- describes a product and its recycled content
- describes how the materials are collected and processed
- explains the social, environmental and economic benefits
- discusses how supply and demand affect the manufacturing of the product
- explains the importance of buying products made from recycled content.

## Drawing conclusions

Use de Bono's *Six Thinking Hats* to think more deeply about the school's approach to waste management and litter reduction.

YELLOW HAT	GREEN HAT	RED HAT	WHITE HAT	BLACK HAT	BLUE HAT
Why is it worth doing?	What can we do about it?	How do you feel about it?	What information do we have about the approach?	Are there any bad points about the approach?	Look at the approach from all view points.

Develop a series of actions, recommendations or goals as a result of the discussion.

Refer to the following tools to provide guidance with the process:

- *Developing an action plan*
- *ResourceSmart actions for your school*.



## Considering social action

Students are actively involved and take the lead, supported by staff, to improve the waste management, including the reduction of litter in the school yard. They implement actions identified through their analysis of the school's current approach to waste management and litter reduction.

This may be organised through:

- junior school council
- student-run special interest groups (convened at lunchtime)
- an elective type of project facilitated by an interested teacher.

Students are involved in waste related mini-projects:

- design a self composting origami compost bin made from newspaper; the top ten designs are promoted and used throughout the school
- design a use for birthday, name day, Christmas cards *etc*, *eg* make a box to hold something you treasure or for a small gift.

Students may be given the opportunity to undertake a community action project, for example:

- Say no to plastic bags (refer to Resources section, Rubbish Free Lunch Challenge material for Level 5)

Organise for students to communicate with students from other schools about their ResourceSmart practices. Students can describe their short-term goals, what they have achieved and issues with which they have dealt.

### Whole-school approach

A whole-school approach may include forming eco-teams with interested students leading others to follow the necessary and agreed approaches to lessen their impact on the environment.

## Reflection and evaluation

After working through the unit, students develop the final draft of their creative piece of writing. They compare their initial draft to their final draft to assess:

- improvements that may include clarity, coherence and consistency of style, and correct spelling, punctuation and addressing grammatical errors
- ideas and understandings that have developed related to waste reduction.

Ask students to develop a flow chart based on the new approaches to waste management that have been implemented as a result of the project. Compare flow charts and discuss improvements to the waste management including litter reduction.

Ask students to reflect and think about what they learned about being involved in an action project.

- focus on the 'life' skills developed, how they overcame issues, how they worked with others, how they felt when they achieved/ did not achieve goals

- evaluate the process followed: Was it realistic? Was everyone committed? What would they do differently?
- what has improved as a result of the project/action?

### Values for Australian Schooling

Nine Values for Australian Schooling were identified for the National Framework for Values Education in Australian Schools. *Responsibility* is one of those nine values and underpins the ResourceSmart program.

**RESPONSIBILITY:** Be accountable for one's own actions, resolve differences in constructive, non-violent and peaceful ways, contribute to society and to civic life, take care of the environment.

## Assessment

View students' work and look for evidence of improved understandings about waste, recycling, collection, disposal and how materials are processed.

As evidence refer to:

- initial creative writing, subsequent drafts and final copy

- beliefs continuum response before and after unit (self evaluation)
- the initial flow chart compared to the final flow chart.

Keep anecdotal records of class/group discussion to assess students' speaking and listening.

## Links to PoLT

This unit has links to *Principles of Learning and Teaching* in particular *PoLT Principle 6*, learning that connects strongly with communities and practice beyond the classroom.

[www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm](http://www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm)

## Resources

### Websites

Sustainability Victoria  
[www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

Edward DeBono's *Six Thinking Hats*  
[www.edwdebono.com/debono/sths.htm](http://www.edwdebono.com/debono/sths.htm)

Rethink  
[www.rethink.vic.gov.au/home.html](http://www.rethink.vic.gov.au/home.html)  
[www.rethink.vic.gov.au/pdf/Landfill.pdf](http://www.rethink.vic.gov.au/pdf/Landfill.pdf)

Useful information about landfill  
[www.rethink.vic.gov.au/pdf/MatRepro.pdf](http://www.rethink.vic.gov.au/pdf/MatRepro.pdf)

Useful information about recycling materials  
Rubbish Free Lunch Challenge, Level 5 resource (pdf format) [www.eduweb.vic.gov.au/edulibrary/public/commrel/events/RFL/rubbishfreelunchVELSLvl5.pdf](http://www.eduweb.vic.gov.au/edulibrary/public/commrel/events/RFL/rubbishfreelunchVELSLvl5.pdf)

### Worksheets

*A typical day*  
*Amount of yearly waste produced by the school*

## Victorian Essential Learning Standards

This unit addresses the following standards for students at Levels 4 and 5:

### Level 4

Strand	Domain	Dimension	Standards
			Students:
<b>Physical, Personal and Social Learning</b>	<b>Civics and Citizenship</b>	<b>Community engagement</b>	... present a point of view on a significant current issue or issues and include recommendations about the actions that individuals and governments can take to resolve issues.
<b>Discipline-based Learning</b>	<b>English</b>	<b>Writing</b>	... write a variety of texts for different purposes using structures and features of language appropriate to the purpose, audience and context of the writing.  ... employ a variety of strategies for writing, including note-making, using models, planning, editing and proofreading.
		<b>Speaking and listening</b>	... plan, rehearse and make presentations for different purposes.  ... adjust their speaking to take account of context, purpose and audience, and vary tone, volume and pace of speech to create or emphasise meaning.
	<b>Humanities/Economics</b>	<b>Economic knowledge and understanding</b>	... describe the nature of the economic problem (scarcity) and explain how selected goods and services are produced and distributed.

**Level 5:**

Strand	Domain	Dimension	Standards Students:
<b>Physical, Personal and Social Learning</b>	<b>Civics and Citizenship</b>	<b>Community engagement</b>	<p>... present points of view on contemporary issues and events using appropriate supporting evidence.</p> <p>... use democratic processes when working in groups on class and community projects.</p> <p>... participate in school and community events and participate in activities to contribute to environmental sustainability or action on other community issues.</p>
<b>Discipline-based Learning</b>	<b>English</b>	<b>Writing</b>	<p>... write extended narratives or scripts with attention to characterisation, consistency of viewpoint and development of a resolution.</p> <p>... edit their writing for clarity, coherence and consistency of style, and proofread and correct spelling, punctuation and grammatical errors.</p>
		<b>Speaking and listening</b>	<p>... express creative and analytical responses to texts, themes and issues.</p> <p>... use a variety of multimodal texts to support individual presentations in which they inform or persuade an audience.</p>
	<b>Humanities/Economics</b>	<b>Economic knowledge and understanding</b>	<p>... explain the nature of the economic problem and how economic choices involve trade-offs that have both immediate and future consequences.</p> <p>... explain key factors that influence the Australian economy, including the quantity and quality of factors involved in production, resource use, ownership and management, and types of businesses.</p>

**Other possible VELS links could include:**

- Physical, Personal and Social Learning/ Interpersonal Development
- Interdisciplinary Learning/Thinking Processes

# WORKSHEET

## Amount of yearly waste produced by the school

Our school disposes of rubbish in a ..... m<sup>3</sup> (cubic metre) hopper  
which is ..... m<sup>3</sup> a school year.

Our school recycles ..... bins a week which is about ..... bins a school year.

I predict the hopper contains .....

Just by looking at the top layer of waste in the hopper I can see .....

Items that should not be in there are .....

Instead of throwing them out in the school bin we could .....

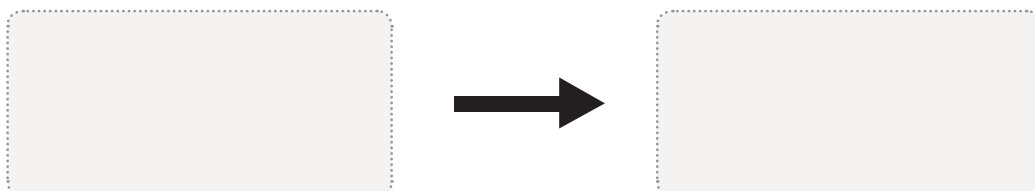
Where does the waste come from? .....

### Tick the appropriate box:

- |  |   |
|--|---|
| <input type="checkbox"/> Classrooms    | <input type="checkbox"/> Computer/Art/Technology room |
| <input type="checkbox"/> School Office | <input type="checkbox"/> School grounds               |
| <input type="checkbox"/> Outside bins  | <input type="checkbox"/> Other                        |
| <input type="checkbox"/> Canteen       |   |

### Draw a flow chart showing what happens to waste in the school.

Where does it come from and what happens to it? Use these boxes as a starting point or draw your own on the back of this worksheet.





# WORKSHEET

## A typical day

WASTE MATERIAL PRODUCED	NUMBER PRODUCED IN A DAY	RECYCLED?
Aluminium cans	..... per day	<input type="checkbox"/> Yes <input type="checkbox"/> No
Fruit juice and milk cartons	..... per day	<input type="checkbox"/> Yes <input type="checkbox"/> No
Chip, chocolate, lolly wrappers <i>etc</i>	..... per day	<input type="checkbox"/> Yes <input type="checkbox"/> No
Glass containers	..... per day	<input type="checkbox"/> Yes <input type="checkbox"/> No
Other food items, eg cake, sandwich	..... per day	<input type="checkbox"/> Yes <input type="checkbox"/> No
Paper bags	..... per day	<input type="checkbox"/> Yes <input type="checkbox"/> No
Pieces of fruit	..... per day	<input type="checkbox"/> Yes <input type="checkbox"/> No
Plastic bags	..... per day	<input type="checkbox"/> Yes <input type="checkbox"/> No
Plastic drink containers	..... per day	<input type="checkbox"/> Yes <input type="checkbox"/> No
Plastic wrappers	..... per day	<input type="checkbox"/> Yes <input type="checkbox"/> No
Sheets of A4 paper	..... per day	<input type="checkbox"/> Yes <input type="checkbox"/> No
Sheets of other paper	..... per day	<input type="checkbox"/> Yes <input type="checkbox"/> No
Other	..... per day	<input type="checkbox"/> Yes <input type="checkbox"/> No

How many waste items did you produce in one day? .....

How many of these waste items were recycled? .....

How many of these waste items were NOT recycled? .....

What happened to the items that were not recycled? .....

.....

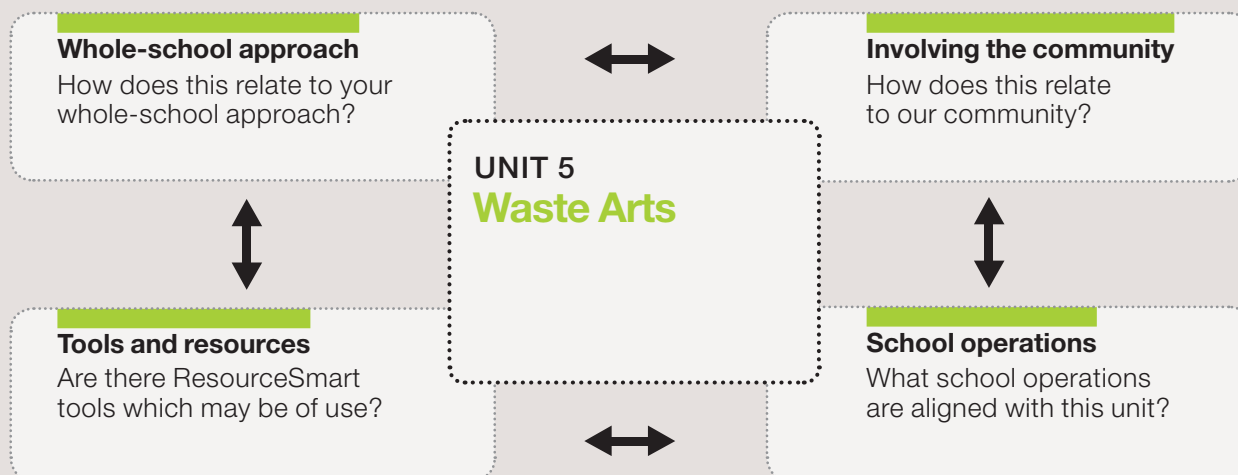
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# UNIT 5 LEVELS 4–5

## Waste arts

### Considerations prior to commencing the unit



## Overview

This unit aims to challenge students to use the Arts to promote, inspire and educate people about the importance of waste minimisation and sustainable living. Students will creatively communicate their perspectives about waste minimisation through their preferred form of the Arts including Art, Dance, Media, Music and Visual Communication.

### Key question:

- What role do the Arts play in society?

### Focus questions:

- What is sustainable living?
- How can waste be minimised?
- How can the Arts promote, inspire and educate people about waste minimisation practices?

### Suggested unit elements

- Consider the issues associated with living sustainably.
- Investigate recycled materials, artwork, materials.
- Plan and create an artwork to communicate a message about waste minimisation.
- Plan, organise and conduct the display of artworks.
- Evaluate the effectiveness of using art to promote, inspire and educate people about being waste conscious.

### Victorian Essential Learning Standards

*The following strands, domains and dimensions are covered in this unit for Levels 4–5:*

Physical, Personal and Social Learning

- Civics and Citizenship
  - ~ Community engagement

Discipline-based Learning

- The Arts
  - ~ Creating and making
  - ~ Exploring and responding

## Tuning in

Provide students with a range of experiences that encourage them to consider issues associated with living sustainably. These may involve:

- Creating a concept map to explain sustainability. The *Glossary of terms* provides a definition of sustainability.
- Using magazines and newspapers to collect a range of images of products regularly used by them, their family or school. Discuss why these products were selected and how they are useful. List what resources and processes are used to make these products; for instance, wood, electricity, plastics, metals. Consider and list the common disposal method of these products and their components. Discuss how the production and waste from the products relates to the ideas of sustainability in the context of the definition on the left-hand side.
- Generate a class word/ideas bank associated with sustainability. Key words could include biodiversity, citizenship, natural resources, cultural diversity, tolerance, accounting, human needs, conservation. Discuss and demonstrate links between the ideas in fostering sustainable living. Encourage students to provide examples to support their thinking.

Use a full rubbish bin as a stimulus for introducing a discussion relating to the issue of waste. Ask students what they think the rubbish bin has to do with sustainability? How does it contribute to the global and

local sustainability issues? Why is waste a sustainability issue? What actions could be taken to reduce waste production?

Pose the challenge of communicating a waste minimisation through the Arts, asking students to contribute suggestions to a class ideas bank. An important aspect of this process is to encourage students to explain their reason for using the form of communication and message; for instance, a garden sculpture made out of recycled cans reduces the amount of waste and demonstrates that recycled materials can be used creatively, a song promotes waste reduction in a fun and meaningful way.

### THE DEFINITION: **Sustainable consumption, sustainable resource**

*A change to society's historical patterns of consumption and behaviour that enables consumers to satisfy their needs with better performing products or services that use fewer resources, cause less pollution and contribute to social progress worldwide.*

— Sustainability Victoria  
2007

## Finding out

Students will need to carry out a number of investigations to support them in designing and creating an artwork that promotes recycling and reusing to reduce the volume of waste going to landfill, including:

- recyclable and reusable waste
- Arts disciplines: Dance, Drama, Media, Music and the Visual Arts (the focus of this aspect of finding out may be discipline focused or involve all disciplines depending on your context)
- how artists have conveyed a message about waste.

### Waste

Research types of waste that can be recycled and reused using suitable references such as Sustainability Victoria, *Ollie's World* CD-ROM, local council recycling information.

Evaluate the listed material's suitability for use in an artwork based on criteria developed by the class such as material, easy to use, accessibility. Use the *ResourceSmart Schools – Health and Safety Guidelines* to ensure identified materials are suitable for use.

Refer to the **TOOLS AND RESOURCES** section for *Guidelines for conducting waste or litter assessments in schools*

Students view and consider how artists created their work using recycled materials and portrayed their waste message. A selection of websites is included the resources section of this unit.

### Art disciplines

Investigate a range of art forms, styles, media, materials, equipment and technologies in the Arts. The investigation could involve:

- visiting a local gallery or exhibition
- reviewing a variety of media technologies such as television, cartoons
- viewing a drama or dance production
- listening to a band or piece of music which has an environmental message such as Midnight Oil
- conducting an Internet search relating to the specific art disciplines.

During the investigation, students consider how artists in the different disciplines have created their work to promote a message, and what style, materials and techniques are used, and record ideas for their artwork.

## Messages through art

Draw on students' knowledge of messages conveyed through an art discipline or a number of disciplines by asking small groups to discuss and create a resource list of examples with which they are familiar. For instance:

- **VISUAL ART:** is it the technique, use of colour or material?
- **DRAMA:** is it the dialogue, the set, the lighting?
- **MUSIC:** is it the tempo, the words?
- **MEDIA:** is it the language, images?
- **DANCE:** is it the light and shade, body shape, technique?

Invite each group to speak about one of their examples using focus questions such as:

- What was the message?
- Why do they think it is so effective?
- How does art inspire or educate others?



### Involving the community

Investigate and make links with local businesses for possible materials that could be useful for visual arts.

Invite professional artists to support the venture by providing expert advice, such as musicians, actors, local newspaper journalists.

## Drawing conclusions

In small groups or individually, students use a Y-chart to plan an artwork that informs and inspires the wider community about waste minimisation and sustainable living. The focus of their Y sectors could be:

- What is the waste message?
- What materials and techniques will I use?
- What are my initial ideas?

Using the plan, students create their artwork to communicate a message about waste minimisation. The focus of artwork could also be designed to communicate the school's commitment to waste minimisation; for example, artwork for display in the school grounds, art pieces for the school website, performances at open nights.

## Considering social action

As a class, decide on possible ways of displaying, promoting and celebrating waste minimisation artworks with the broader community.

Highlight important aspects of planning such an event:

- establishing who the audience is, including, eg school community, local community
- information about the purpose of the artworks
- how it will be organised – foyer display, art show, festival
- when and where will it happen
- how will it be promoted
- roles and responsibilities.

In planning a display/event, students should be encouraged to liaise with key people in the school, such as buildings and grounds staff, school council, school leadership team, to gain a full understanding of what it would be necessary to do to conduct the event.

Refer to *Communication tool* to assist with the planning process.

Using the plan, students organise and conduct the display of artworks.

### Whole-school approach

Consider who needs to be involved with planning and conducting a major event such as an exhibition, a celebration or a display.

Do you need permission?

Will there be a budget?

What would be the best time considering the school timetable?



## Reflection and evaluation

Ask students to reflect on the whole experience using the following lenses:

- artist
- community member
- sustainability messenger.

Using their reflections, ask students to evaluate the effectiveness of using art to promote, inspire and educate people about the importance of being ResourceSmart and sustainable living.

Groups assess how effectively they have worked together at various stages of the process.

## Assessment

Evaluate students' Y chart plans for evidence of learning and development of ideas including:

- planning an artwork with a waste message
- appropriate identification of materials and techniques for an artwork.

Use student reflections to assess their appreciation of perspectives of artworks and their capacity to promote awareness of an issue to others in the community.

## Links to PoLT

This unit has links to *Principles of Learning and Teaching* in particular *PoLT Principle 6*, learning that connects strongly with communities and practice beyond the classroom.

[www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm](http://www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm)

## Resources

### Websites

Bencarroll – Furniture  
[www.johnmurrayart.com.au/beautiful.htm](http://www.johnmurrayart.com.au/beautiful.htm)

Clean Up Australia  
Green Artists – Visual representations of the waste  
[www.cleanup.com.au/au/LivingGreener/greenartists-overview.html](http://www.cleanup.com.au/au/LivingGreener/greenartists-overview.html)

Elemental Trash 2005  
An art event where ten artists created art from recycled materials.  
[www.elementaltrash.com/](http://www.elementaltrash.com/)

John Dahlsen  
Recycled art and abstract paintings including environmental sculptures, installation art, driftwood art, eco-art, digital prints, assemblage art wall works and public art. [www.johndahlsen.com](http://www.johndahlsen.com)

Sustainability Victoria  
[www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

Trash to Treasure  
The SF Recycling and Disposal, Inc. has an Artist In Residence Program providing local artists with access to materials, a work space, and other resources to produce their work.  
[www.sunsetscavenger.com/AIR/index.htm](http://www.sunsetscavenger.com/AIR/index.htm)

The Sustainable Living Foundation (SLF)  
A community-based not-for-profit organisation committed to promoting, celebrating and practising principles of sustainable living.  
[www.slf.org.au/festival/](http://www.slf.org.au/festival/)

Y Chart Thinking Strategy  
Victorian Curriculum and Assessment Authority (VCAA)  
<http://vels.vcaa.vic.edu.au/support/teaching.html>

## Victorian Essential Learning Standards

This unit addresses the following standards for students at Level 4 and 5:

### Level 4

Strand	Domain	Dimension	Standards
			Students:
<b>Physical, Personal and Social Learning</b>	<b>Civics and Citizenship</b>	<b>Community engagement</b>	<p>... present a point of view on a significant current issue or issues and include recommendations about the actions that individuals and governments can take to resolve issues.</p> <p>... demonstrate understanding that there are different viewpoints on an issue, and contribute to group and class decision making.</p>
<b>Discipline-based Learning</b>	<b>The Arts</b>	<b>Creating and making</b>	<p>... independently and collaboratively experiment with and apply a range of skills, techniques and processes using a range of media, materials, equipment and technologies to plan, develop, refine, make and present arts works.</p> <p>... communicate ideas and understandings about themselves and others, incorporating influences from their own and other cultures and times.</p> <p>... evaluate the effectiveness of their arts works.</p> <p>... consider purpose and suitability when they plan and prepare arts works for presentation to a variety of audiences.</p>
		<b>Exploring and responding</b>	<p>... discuss traditional and contemporary arts works using appropriate arts language to describe the content, structure and expressive qualities of their own and other people's works from a range of arts disciplines and forms.</p>

**Level 5**

Strand	Domain	Dimension	Standards Students:
<b>Physical, Personal and Social Learning</b>	<b>Civics and Citizenship</b>	<b>Community engagement</b>	<p>... present points of view on contemporary issues and events using appropriate supporting evidence.</p> <p>... participate in school and community events and participate in activities to contribute to environmental sustainability or action on other community issues.</p>
<b>Discipline-based Learning</b>	<b>The Arts</b>	<b>Creating and making</b>	<p>... independently and collaboratively, plan, design, improvise, interpret, evaluate, refine, make and present arts works that represent and communicate ideas and purpose.</p> <p>... experiment with, select and use appropriate skills, techniques, processes, media, materials, equipment and technologies across a range of arts forms and styles.</p> <p>... generate and develop ideas that explore particular concepts, techniques and issues when making arts works.</p> <p>... combine and manipulate arts elements, principles and/or conventions to represent and communicate ideas and develop imaginative solutions to set tasks.</p>
		<b>Exploring and responding</b>	<p>... research, observe and reflect on their explorations to develop, discuss, express and support opinions about their own and others' use of arts elements, principles and/or conventions, skills, techniques, processes, media, materials, equipment and technologies.</p>

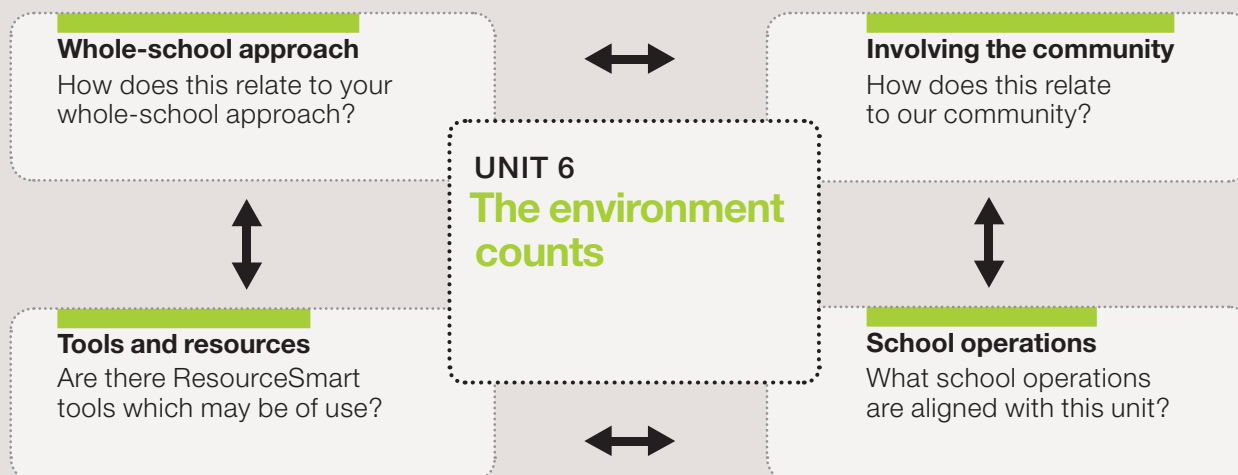
**Other possible VELs links could include:**

- English/Reading
- Information and Communications Technology (ICT)/ICT for Communicating
- Interpersonal Development/Working in teams

# UNIT 6 LEVELS 4–5

## The environment counts

### Considerations prior to commencing the unit



## Overview

This unit aims to demonstrate that sustainability issues require the application of mathematics to find solutions.

In this unit, students accept a challenge to solve a sustainability/waste issue within their school. They investigate and analyse their chosen issue using their understandings of mathematics. They produce a report that includes their solutions, providing maths to support their contentions.

### Key question:

How important is mathematics in solving sustainability/waste issues in schools and the community?

### Focus questions:

- What kind of waste issue can groups of students solve?
- How can mathematics be used to measure, analyse and find solutions to the issue?
- How can the data and analysis be used in a report to show others how waste issues can be solved?

### Suggested unit elements

- Use maths to describe how school waste is a problem for the environment?
- Decide on investigating a waste challenge.
- Design a waste investigation.
- Collect data.
- Analyse and present the data.
- Create solutions using maths as the basis.
- Produce a report.
- Present the report.

### Victorian Essential Learning Standards

*The following strands, domains and dimensions are covered in this unit for Levels 4–5*

#### Interdisciplinary learning

- Information and Communications Technology (ICT)
  - ~ ICT for visualising thinking
  - ~ ICT for creating

#### Discipline-based Learning

- Mathematics
  - ~ Measurement, chance and data
  - ~ Working mathematically
- Science
  - ~ Science at work



## Tuning in

Waste refers to all materials that are no longer needed for their original purpose. Some waste can be reused or recycled. The term rubbish is used for waste that is sent to landfill.

An important question for students to consider is: How can the reduction of school rubbish going to landfill help the environment?

Below are some activities and sample questions to help students clarify their understanding of terms, find out what waste is generated in the school and present their ideas on how rubbish impacts on the environment.

- What is meant by the term waste? Why is rubbish that will go to landfill and recyclable materials both called waste? How is greenwaste different to other kinds of waste?
- Make a list of different kinds of waste created in the school.
- Classify the waste into groups, eg rubbish that will go to landfill, recycling material, greenwaste, litter, old computers, broken furniture etc.
- Provide each student with three sticky notes or scraps of paper. Students write on each note a reason why reducing waste helps the environment.
- Students take turns to go to the front of the class and explain one of their reasons. They stick their notes along with notes with similar reasons.
- When all the notes are up, summarise the reasons why reducing waste helps the environment.

Students can investigate what is already being done to reduce waste in the school. A suggested approach for students conducting an investigation is:

- In small teams, students investigate how the school is reducing their waste. Discuss and decide which aspects of waste each team will investigate.
- Each team will estimate the amount waste being generated over a year for their chosen area. They should explain how they calculated their estimation.
- Provide a fixed amount of time for students to come back and provide a quick (eg two minute) verbal report.

## Finding out

Students will be completing investigations and developing a report on their chosen challenge. All aspects of finding out can be used as part of the report.

The web reference has information to help your students remain safe while completing litter and audit activities.

### What school operations are aligned with this unit?

- Does your school encourage and have systems that enables student to contribute and participate in implementing sustainability solutions?
- What are the audit needs of the school?
- Does your school want to have annual audits?
- Can this responsibility be given to a year level?
- How will the information be stored and communicated?

Students can create a permanent visual record of how waste is managed in their school. This type of record can provide additional and unexpected information compared with written records for those looking at the images many years from now.

- Using digital cameras, generate a photo-library about the school's current waste practices.
- What information needs to be attached to each photo?
- How will the photographs be filed and retrieved?
- How will this material be archived?

Footprints is a concept that helps people visualise how their consumption and lifestyle impacts on the planet. The easiest of the footprint programs is on the *Ollie Saves the Planet* CD-ROM. Environmental Protection Authority (EPA) Victoria has on its website an excellent footprint simulation. Students may investigate the school's footprint using the indicated software.

The Victorian EPA has a footprint calculator: [www.epa.vic.gov.au/ecologicalfootprint/calculators/default.asp](http://www.epa.vic.gov.au/ecologicalfootprint/calculators/default.asp)

### Thinking globally

*Ollie saves the Planet* CD-ROM can be used to investigate the footprint of Australians and individual students on the world's environment. On the menu go to *rethink* and then choose *global rethink*.

The last download on this website provides guidelines for doing waste and litter audits in schools: [www.sustainability.vic.gov.au/www/html/1864-managing-a-waste-wise-school.asp](http://www.sustainability.vic.gov.au/www/html/1864-managing-a-waste-wise-school.asp)

### Taking on a waste reduction challenge

Students will work in groups and each group accepts a waste challenge to solve. Groups may be determined by students and based on interests or challenge focus. The concept of this challenge is for students to choose a waste challenge that is relevant to their school and develop a report that will help the school to reduce its waste.

The challenge may involve:

- one of the suggestions below
- waste area that your school is currently tackling that students would like to improve
- a challenge that a group has thought of.

### Examples of challenges:

- Find solutions to reduce the waste produced by the school canteen. This can involve calculating the waste generated by the canteen and suggesting alternative forms of packaging. Students can investigate if this will affect profits. Students could include healthier food choices (often these have less packaging).
- Find solutions to reduce the amount of rubbish going to landfill. How many skips of rubbish goes to landfill each year? What has your school achieved so far in rubbish reduction? What are the ratios for different types of waste going to landfill? How will different strategies reduce the amount of waste?
- Find solutions to reduce the amount of paper being used for photocopying. Gather data about how and what is being photocopied. Can students identify and calculate areas of paper waste? Analyse the data to find solutions.
- Find solutions to reduce the amount of litter in the school. Survey the litter in the school. Identify causes of litter (eg dropped, blown out of bins, not enough bins). Identify which causes of litter are most significant. Identify solutions and test your solutions using surveys.
- Design the best arrangement of rubbish bins in the school ground. Map the current placement of bins in the school. Map the litter hotspots. Are some bins filled beyond capacity? Arrange the bins so they provide the best coverage, keeping in mind that bins need to have lids and be prevented from being knocked over.
- How many books should individual students buy and how many should be purchased by the school as class sets? Find out if textbooks being purchased by each student could be replaced with class sets that can be used by several classes over a number of years. Students will need to develop a set of criteria of when students need their own copy of a text book.
- What is the best way to deal with the school's greenwaste? How much and what kind of greenwaste is produced by the school. How can different greenwaste be processed? How much of this processed material can be used at the school?

- How can the school deal with unwanted computers and old furniture? How many electronic items and pieces of furniture are becoming redundant each year? How can students measure this? What is happening to this waste? What alternatives are there? Should old computers go to poorer counties, or is this exporting toxic waste?
- Is it worth recycling glass and cans at the school? How much glass, aluminium and steel cans are in the waste stream at the school? What resources and processes are needed to recycle them? Identify the plusses and minuses for recycling each material. Use maths to compare the effort with savings in resources.
- What is the attitude of students to litter? How do students think the littering problem can be solved? Can surveys of student attitudes be used to find causes of littering? Can students use surveys to find solutions to littering? Is it easier to analyse surveys in which people have alternative answers to choose from or surveys in which people provide individual answers?

An initial step in the challenge would be to ask groups to explain how solving the aspect of waste that they have chosen can help the environment. They might think about:

- How is this kind of waste affecting the environment?
- What are the benefits when the problems are solved?

In designing their challenge, investigation groups will need to consider the gathering of data.

The data will need a unit of measurement. To be meaningful, the data will need to be related to a period of time. What measuring units will students use to investigate their waste challenge? Is there more than one measuring unit that can be used in their investigation?

Below are some questions that may help them decide on what units they might use.

- How many different ways is it possible to measure the problem chosen by the group?
- Is there a financial aspect to the problem?
- Can the issue be measured in terms of volume or weight?
- Are there equivalent methods of measurements, eg how many trees are used for the school photocopying?
- How will time be used as part of the measurement?
- Will students need to make estimates or can they make more accurate measurements? To develop solutions, do they need to be very accurate in their measurements? Provide some reasons for their thinking.
- What is the best method for recording data?
- Describe the mathematical or equivalent units that will be used with a reference to time.

Each group will need to choose a method for measuring the waste related to their challenge. Below are some questions that may help students:

- What methods are used for measuring the waste related to the challenge?
- Which methods are the most practical to do?
- Do the practical methods have any health or safety issues?
- How will the group measure the waste and what precautions will the group take to avoid health and safety problems?

Before students go any further in their planning, they will need to know if they have access to equipment they might need or staff who are willing to provide information. Important equipment questions groups need to consider include:

- Do we need measuring equipment? Does the school have the equipment? Can we have access to it?
- Do we need information from the school support or office staff? This may relate to costs involved in waste and the purchasing of consumable goods. At first students should discuss this with their teacher and discuss what is reasonable to request. Help students to make other arrangements.

Often students can make good estimates rather than asking office staff to find invoices, eg students use the information on photocopiers to find out how many copies are made per week. By observation they estimate what percentage or fraction of paper is double side copied. They find the cost of a ream of paper and estimate the cost of paper for the year.

Steps to designing an investigation include:

- clearly identify what data will be gathered
- explain how the data will be obtained
- make sure your investigation will obtain all the data required for analysis.

### Recording the data

Groups will need to consider the type of data they intend to collect and decide on the most appropriate method of recording the data.

If using a datasheet, the following advice may help students with their design:

- develop a datasheet to record the information that your group will obtain
- if the data is to be processed using a spreadsheet or other application, it will help to use the application to design the datasheet
- when designing the datasheet it helps to think in terms of database fields.

### Checking our design for safety

Teachers will need to check that student investigations will not place students at risk. The following points can help students build safety into their investigations:

- once your investigation has been designed, submit it to your teacher for feedback
- take very careful note of any response about health and safety
- be sure to make changes to your investigation depending on your teacher's response.

### Collecting the data

Prior to students beginning to collect their data, there is an opportunity for the teacher to review the following:

- use of equipment and datasheets to measure and record data.
- time allocated for collecting the data – this may be determined by the class or teacher
- all health and safety issues have been addressed.

### Analysing the data

Following the data collection phase, students analyse and discuss what they have found based on their data collection. Students may need help in analysing their data and different approaches can be discussed as a class to highlight possibilities. Some suggestions to start students off are:

- put your data into a software application
- present your data in the form of graphs or other methods that will assist you to interpret it
- interpret what your data tells you about waste in your school
- use the data to help you to design waste solutions for your school.

#### Safety

The web reference has information to help your students remain safe while completing litter and audit activities.

The last download provides guidelines for doing waste and litter audits in schools. [www.sustainability.vic.gov.au/www/html/1864-managing-a-waste-wise-school.asp](http://www.sustainability.vic.gov.au/www/html/1864-managing-a-waste-wise-school.asp)

#### Note

Refer to **TOOLS AND RESOURCES** for audits and visual assessments to assist with this aspect of the investigation.

## Drawing conclusions

Each group needs to generate a range of solutions and choose those solutions that have the best chance of working. Students can use the following steps to go from gathering ideas to choosing the solutions that they think will work best:

- make a list of all the possible solutions
- make a summary of how each solution could be implemented
- estimate how each of the possible solutions will impact on the waste issue
- describe how easy or difficult it might be to implement each of the possible solutions
- decide which solutions would be best to solve your waste issue.

Refer to the planning tools.

Reporting on the group's waste issue is the final phase of the challenge investigation. Groups will need to consider:

- How they will want to organise their report?
- What should be included their report?
- What evidence (data) will be included? How will it be presented?
- What presentation method is best for their report?

The class can discuss and agree on a key element of the report which may include:

- the nature of the waste issue the investigated
- benefits to the environment and school in solving the issue (use mathematical terms to describe benefits)
- the group's data and its analysis of the issue

- the group's decisions on which solutions would be best to implement to solve the issues (use mathematical thinking to explain the best solutions)
- a mathematical estimate of how the solutions will reduce the problems
- a more detailed description of how the solutions can be implemented, including the role your group would like to take and the role of other students.

The key elements could be used for the development of a peer assessment sheet. Groups could use this assessment sheet to provide constructive feedback to groups as they present their challenge investigation report.

### How does this relate to your whole-school approach?

From your school's point of view, how much data is needed for future planning?

What information has your school already gathered about its waste?

Is this information accessible to the whole school community?

What further information does the school need?

Can students be given the task of gathering this information?

How can the school make sure that any studies are repeatable for future comparison purposes?

## Considering social action

Before students present their report to a school body, they may like to have a trial run and obtain feedback from their fellow students. Students may wish to use the PMI tool to provide feedback. PMI stands for: *Plus*, *Minus* and *Interesting*. Students comment on what they felt worked well (plus), what did not work well (minus) and what they found most interesting (interesting).

Each group presents their report to an appropriate school body that is in the position to make decisions and implement solutions. Each group discusses with this school body how they can take their report to the next stage and the role that the group wants to take in implementing the recommended solutions.

## Reflection and evaluation

Groups list ways mathematics was important in helping them to work out and create a solution to their challenge investigation. As a class, share ideas and discuss the role of mathematics in working out and solving waste and sustainable living issues.

Groups choose a favourite media for communicating that they aspire to being a sustainable school or a

ResourceSmart school, or how a better environment is better for them. The media can include art, poetry, music, computer graphics, descriptive text, interview *etc.*

Students can also set personal goals to reduce their impact on the environment.



## Assessment

A range of aspects may be assessed in the challenge including:

- utilising the students methods for collecting data and its analysis
- the student's understandings in their report about developing solutions to sustainability and/or waste have developed
- how students have used maths in their report to explain their issue and solutions.

Develop a rubric with the class to assess other aspects of student learning such as a self assessment on how effective they were at working in a team and completing tasks on time.

## Links to PoLT

This unit has links to *Principle of Learning and Teaching* in particular *PoLT Principle 6*, learning that connects strongly with communities and practice beyond the classroom.

[www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm](http://www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm)

## Resources

### Books

Sustainability Victoria, 2006, *Our Environment Our Future*, Sustainability Victoria.

Winters, B & Vingerhoets, R, 2000, *Green Maths Level 4*, Gould League.

Winters, B & Vingerhoets, R, 2000, *Green Maths Level 5*, Gould League.

### CD-ROM

*Ollie Saves the Planet*, CD-ROM, Sustain-Ability.

### Equipment

School maths measuring equipment

Computers with a range of presentation applications

### Websites

Find out more about the Australia Sustainable Schools Initiative.

Department of Environment and Water Resources: [www.environment.gov.au/education/aussi/index.html](http://www.environment.gov.au/education/aussi/index.html)



Greening schools is a good starting point for students to find web information about waste reduction in schools. [www.greeningschools.org/resources/view\\_cat\\_teacher.cfm?id=189](http://www.greeningschools.org/resources/view_cat_teacher.cfm?id=189)

Guidelines for doing waste and litter audits in schools.

Sustainability Victoria  
[www.sustainability.vic.gov.au/www/html/1864-managing-a-waste-wise-school.asp](http://www.sustainability.vic.gov.au/www/html/1864-managing-a-waste-wise-school.asp)

The Victorian Environmental Protection Authority (EPA) has a footprint calculator.  
[www.epa.vic.gov.au/ecologicalfootprint/calculators/default.asp](http://www.epa.vic.gov.au/ecologicalfootprint/calculators/default.asp)

A USA-based EPA website to help children explore waste reduction opportunities in their community.  
[www.epa.gov/recyclecity](http://www.epa.gov/recyclecity)

*Wipe Out Waste (WOW)*  
South Australian website helping schools to reduce waste.  
[www.wow.sa.gov.au](http://www.wow.sa.gov.au)

## Victorian Essential Learning Standards

This unit addresses the following standards for students at Levels 4 and 5:

### Level 4

Strand	Domain	Dimension	Standards Students:
Discipline-based Learning	Mathematics	Measurement, chance and data	... use metric units to estimate and measure. ... recognise and give consideration to different data types in forming questionnaires and sampling.
		Working mathematically	... recognise and investigate the use of mathematics in real situations. ... explain their reasoning and procedures and interpret solutions.
	Science	Science at work	... explain how sustainable practices have been developed and/or are applied in their local environment.
Interdisciplinary Learning	Information and Communications Technology (ICT)	ICT for visualising thinking	... use ICT tools and techniques that support the organisation and analysis of concepts, issues and ideas.
		ICT for creating	... select relevant techniques for minimising the time taken to process data, and apply conventions and techniques that improve the appearance of the finished product.

**Level 5**

Strand	Domain	Dimension	Standards
<b>Discipline-based Learning</b>	<b>Mathematics</b>	<b>Measurement, chance and data</b>	... interpret and use measurement formulas. ... represent data in appropriate graphical forms including dot plots, stem and leaf plots, column graphs, bar charts and histograms.
		<b>Working mathematically</b>	... develop simple mathematical models for real situations using interpolation and extrapolation.
	<b>Science</b>	<b>Science knowledge and understanding</b>	... explain the relationships, past and present, in living and non-living systems, in particular ecosystems, and human impact.
		<b>Science at work</b>	... identify, analyse and ask their own questions in relation to scientific ideas or issues of interest.
<b>Interdisciplinary Learning</b>	<b>Information and Communications Technology (ICT)</b>	<b>ICT for visualising thinking</b>	... retrieve and modify successful approaches to visualising thinking for use in new situations.
		<b>ICT for creating</b>	... creating information products, students prepare designs that identify the structure and layout of the products.

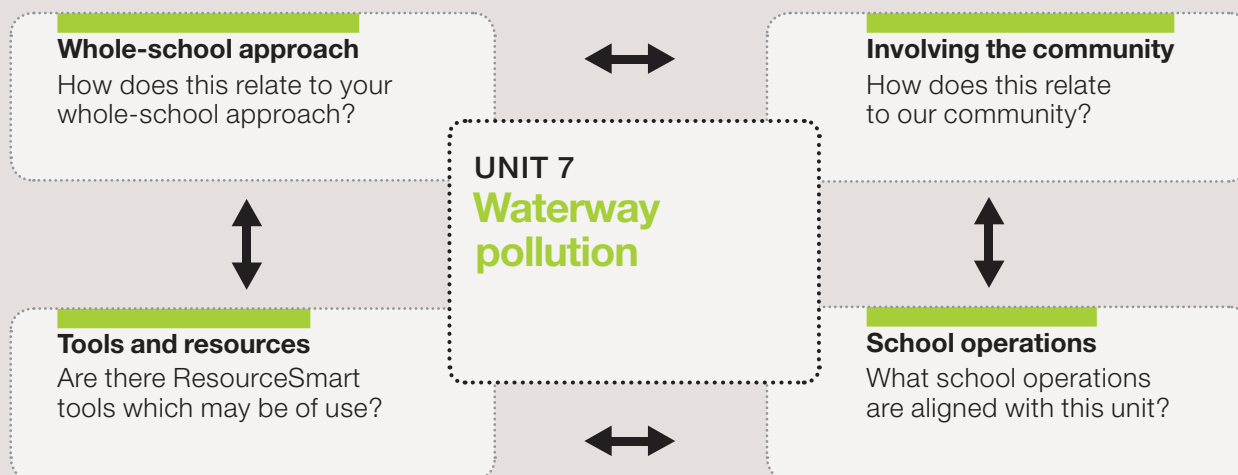
**Other possible VELS links could include:**

- English/Writing
- Humanities/Geography
- Communication/ Presenting

# UNIT 7 LEVELS 4–5

## Waterway pollution

### Considerations prior to commencing the unit



## Overview

This unit aims to make a link and find solutions between litter and other irresponsible waste disposal and the pollution in local waterways.

In this unit, students will identify and plan solutions for reducing the school's impact on local waterways. They will develop a communication project to support their solution.

### Key question:

- How can people reduce the pollution in the community's local waterways?

### Focus questions:

- Where does the school and community stormwater travel and what polluting materials does it carry with it?
- How can the school reduce the pollution being washed from the school into the local waterways?
- How can students present communication projects to change people's behaviour so they cause less pollution?

### Suggested unit elements

- Identify where local stormwater flows after it rains.
- Experiment to find the consequences of stormwater pollution.
- Identify and measure the types of polluting materials in their schools that can be washed by stormwater into waterways.
- Examine the causes of these problems.
- Develop plans to reduce these problems.
- Produce a communication project to bring about behaviour change.

### Victorian Essential Learning Standards

*The following strands, domains and dimensions are covered in this unit for Levels 4–5:*

#### Discipline-based Learning

- Humanities
  - ~ Geographical knowledge and understanding
  - ~ Geographical skills
- Science
  - ~ Science knowledge and understanding
  - ~ Science at work

#### Interdisciplinary Learning

- Communication
  - ~ Listening, viewing and responding
  - ~ Presenting



## Tuning in

What happens to rainwater? Brainstorm what can happen to rainwater after it rains.

Ask students to present a annotated diagram to explain the following:

- What happens to the school's stormwater?
- Is the water directed into stormwater drains?
- Where does the water flow once it is in stormwater drains?
- Does the water enter a stream, river, lake, dam or does it go directly into the sea?
- Is the stormwater treated in a stormwater pond or litter filter before it goes further into the environment?
- What kinds of drains are in the school?
- What are the differences between stormwater drains and the school sewerage connection?
- What materials go into the sewerage system?

Design an experiment that will show what happens to materials such as paper and plastic litter, food scraps, grass clippings, leaves, dirt and oil when mixed with water.

Organise students to work in groups and carry out a POE (Predict, Observe, Explain).

Make a list of materials students wish to test in water. Use cooking oil as it can be legally disposed of in small quantities with the rubbish.

The following procedure is a suggested approach that students may use:

- **PREDICT:** What will happen to the material after a week of sitting in water?
- **PREDICT:** How this will impact on the animals living in water, eg how would a plastic bag impact on a platypus?

Students decide on an appropriate way to record their predictions.

### Definition:

Rainwater that flows from roofs, paths, roads *etc* is called **STORMWATER**.

### Stormwater

**STORMWATER** drains are required in built up areas to avoid flooding after heavy rain. Grey water from showers, sinks, washing machines *etc* and black water from toilets cannot be released directly into the environment and must be treated. Most schools will be connected to a sewerage system. Some rural schools make have their own septic system.

Students design an experiment to test their predictions such as placing small quantities of materials in separate containers of water and labelling the containers.

- **OBSERVE:** What evidence are we going to gather? How will this be done? How will it be recorded and for how long?

Students use their observations plan to record their results.

- **EXPLAIN:** What has occurred? Was it what was expected?

As a result of this experiment, students discuss:

- How would this impact on the environment?

Dispose of the waste appropriately (solids and oil will need to go into the rubbish) and clean the containers for reuse.

Many platypuses carry injuries from rubbish they have encountered in their waterways.

## Finding out

Use the Internet to identify and produce a classroom display of the impact of stormwater pollution on the environment. Students could:

- brainstorm suitable key words to put into a search engine
- use a suitable search engine on the Internet
- from the Internet each student should identify three effects of stormwater pollution. Draw an image of each of these on a piece of card. Suspend the cards from the class's ceiling or make a montage on a board.

Students consider the health of their local waterway. If the class can't go to a local waterway, the teacher could collect a sample of water from the local waterway for the class to inspect. Digital images of the waterway and its environs could also be used.

By visiting a location or using the photographic evidence of pollution and environmental degradation, students can look for drains emptying into the waterway and identify the types of litter and other pollution present. Using a rating scale they can assess the degree to which the local waterway is polluted.

Using digital cameras, students produce a visual assessment of potential stormwater pollution problems at the school. Students may wish to go out and observe without any preconceived ideas or they may want to discuss what they might be looking for. Following is a range of ideas for students to consider when producing their visual assessment:

- Use a digital camera to produce a visual assessment of litter and other materials that can be washed into the waterways from the school ground.

- Photograph the scene and then take more detailed photos. Record locations.
- Photograph the problems and any causes of the problems.
- Look at litter hotspots and problems with rubbish bins. Look for dirt, leaves and grass clippings in gutters. There may be cars leaking oil in the car park. How do contractors wash their paint brushes *etc*? Are hoses used to wash down paths *etc*?
- Divide up the school ground to be investigated by different groups.
- Groups use their images in a PowerPoint presentation to describe the problems.
- Share presentations and list the problems creating stormwater pollution in their school.

Students can use the information to clearly identify what is causing each of the problems. Some problems like litter may have several causes, eg students dropping litter, bins falling over, bins becoming full and spilling over, birds, foxes, cats and dogs going through bins, students missing bins when they throw their rubbish towards it *etc*. How will this information be collated and presented? How will it relate to the PowerPoint presentations?

In groups, choose an aspect of stormwater pollution that starts at the school and find out what if anything the school is doing. The following steps may be a useful start:

- Identify causes of particular stormwater pollution problems that start from the school.
- Find out if the school is doing anything to address the problem.
- If the school is doing something, document in detail what the school is doing.
- Who in the past has taken responsibility for solving these problems?

The students' perspective of what is currently being done is extremely valuable for the rest of the school community. Sometimes what the rest of the school community believes is being done does not gel with the students' understanding.

Students organise the information they have gathered and use an appropriate thinking tool or a bubble map in the following way to help them organise their ideas:

- Use a bubble map as a tool to help students explore solutions.
- Write a single problem in the central bubble.
- Around the central bubble write down the causes of the problems in new bubbles.
- Brainstorm solutions for each of the causes and write these in outer bubbles linking them to the causes.

Challenge students to design a solution to the problem. Organise students with similar interests in solving a particular problem into groups. The teacher may want to make sure that the most important litter problems

are being addressed. Some of the problems will already have programs in place. In these cases, students can also look at the current solutions and find ways to improve them. Students should keep in mind that most stormwater issues in schools require behaviour change by people in the school community for the problem to be solved. The following sequence may help groups develop their solutions. Students should also keep in mind that this section will help them prepare for their communication project.

- Explain why the chosen issue is a problem.
- How do people contribute to the problem?
- Will you need to conduct a survey to find out more about why students or others contribute to the problem? If so, you will need to plan and complete your survey as part of this design.
- What does the group want to change?
- Explain the solutions.
- If people need to change their behaviour, what behaviours need to change?
- What area of interest do these people (target audience) have that you can link to the problem?
- How can these people be asked/encouraged to change their behaviour? Why will they want to change their behaviour?
- What resources does the group need for the solutions to work?
- Who is needed to help implement the solution?
- Who will provide feedback on the group's design before it becomes part of the group's solution/communication project?
- How will the group know if your solution has worked when it has been implemented?

### How does this relate to your whole-school approach?

Schools have litter and rubbish collection programs in place. However, they may have not considered what happens to grass clipping, leaves and dirt that fall into gutters.

They may not have a policy about hosing down outdoor areas. They may not know that if their grass and ovals are over fertilised and over watered, fertiliser will be washed into drains.

Past experience has shown that students do not appreciate being pressured to reduce the school's litter. To reduce negative reactions to picking up litter, don't use picking up litter as a punishment.



What can students do to prevent stormwater from polluting waterways?

## Drawing conclusions

Students will be presenting their communication projects to a target audience to help solve the problem they wish to have an impact on. If their solution is not targeting behaviour change, then their communication project can focus on presenting their solutions to a school body that has the authority to implement change. The following ideas may help students to get started.

- In the tools, locate and use the communication tools to help students develop their communication projects.

- Depending on the problem students wish to solve, they will need to choose an appropriate communication method to which the target audience will respond.
- Students may need to look beyond the list of tools provided, eg the best method of communication could be organising a meeting and presenting information to a group in the school community.
- Students should design a monitoring method to judge the success of their communication projects.

Refer to the *Communication Tools*

## Considering social action

Students present their communication projects to their school community.

Students use some of their communication project materials on their local shopping strips to try and reduce stormwater pollution from these areas.





## Reflection and evaluation

Using a journal or similar learning log, ask students to respond to these personal questions :

- How am I able to influence other people to look after the environment?
- What will I do to reduce stormwater pollution?

- What did I like about working in a team?
- What did I learn from my communication project?
- What did I find out from monitoring our communication project?

## Assessment

As part of the assessment, students will have produced a number of items of work including:

- a powerpoint presentation of school ground stormwater issues
- a design for a stormwater solution
- a communication project
- monitoring of the implementation of their communication projects.

With your students, you can design a rubric that self assesses students learning throughout this unit of work.

Students can assess the other communication projects using a PMI tool. The P stands for plus (what they regard would work well in the project), M stands for minus (what may not work well in the project) and I stands for interesting (what the student found most interesting about the project).

### Teenage litterbugs?

Research has shown that teenagers are not the worst litterers. Teenagers litter more when they are in groups so it could be that students don't want to leave their social circle. The same research showed that while these children were honest about their littering behaviour adults tended to be dishonest.

### Litteracy?

In the USA extensive school surveys have repeatedly shown that students claim they have not received litter education, while teachers claim they have provided students with litter education. One suspects that what teachers have provided about litter, students have interpreted as nagging.





## Links to PoLT

This unit has links to *Principles of Learning and Teaching* in particular *PoLT Principle 6*, learning that connects strongly with communities and practice beyond the classroom.

[www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm](http://www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm)

## Resources

### Books

Environmental Education Resource, 2003, *Urban Stormwater*, North Central Catchment Management Authority.

*Living Water Literacy Kit*, Level 4, 2003, Gould League.

Winters, B, 2002, *Drains to our waterways*, Gould League and Melbourne Water.

### Equipment

Computers with a range of applications suitable for communication projects  
Digital cameras

### Websites

Australian Marine Environment Protection Association website contains student research information about the consequences of stormwater on the marine environment.  
[www.ausmepa.org.au](http://www.ausmepa.org.au)

Department of Environment and Water Resources  
[www.environment.gov.au/biodiversity/threatened/ktp/marine-debris.html](http://www.environment.gov.au/biodiversity/threatened/ktp/marine-debris.html)

EPA Victoria website – on the menu, click on *students* and then find *litter*:  
[www.epa.vic.gov.au](http://www.epa.vic.gov.au)

Keep Australia Beautiful has been the leader in community litter programs.  
[www.kabv.org.au](http://www.kabv.org.au)

Melbourne Water  
[www.education.melbournewater.com.au](http://www.education.melbournewater.com.au)

Platypuses are at serious risk from stormwater pollution. See Australian Platypus Conservancy  
[www.platypus.asn.au](http://www.platypus.asn.au)

Victorian Litter Action Alliance  
[www.litter.vic.gov.au](http://www.litter.vic.gov.au)

Waterwatch has a wealth of material for research and downloads.  
[www.waterwatch.org.au](http://www.waterwatch.org.au)

## Victorian Essential Learning Standards

This unit addresses the following standards for students at Levels 4 and 5:

### Level 4

Strand	Domain	Dimension	Standards Students:
Discipline-based Learning	Humanities	Geographical knowledge and understanding	... recommend ways of protecting environmentally sensitive areas in a sustainable way.
		Geographical skills	... research, collect, record and describe data obtained through field study surveys and measurements to form conclusions about the use of resources.
	Science	Science at work	... explain how sustainable practices have been developed and/or are applied in their local environment.
Interdisciplinary Learning	Communication	Listening, viewing and responding	... develop interpretations of the content and provide reasons for them.
		Presenting	... identify the features of an effective presentation and adapt elements of their own presentations to reflect them.

**Level 5**

Strand	Domain	Dimension	Standards Students:
<b>Discipline-based Learning</b>	<b>Humanities</b>	<b>Geographical knowledge and understanding</b>	... demonstrate understanding of environmental issues based on inquiry and propose ways of ensuring the sustainability of resources.
		<b>Geographical skills</b>	... identify and gather geographical information from fieldwork and organise, process and communicate it using a range of written, oral, visual and graphic forms.
	<b>Science</b>	<b>Science knowledge and understanding</b>	... explain the relationships, past and present, in living and non-living systems, in particular ecosystems, and human impact.
		<b>Science at work</b>	... identify, analyse and ask their own questions in relation to scientific ideas or issues of interest.
<b>Interdisciplinary Learning</b>	<b>Communication</b>	<b>Listening, viewing and responding</b>	... consider their own and others' points of view, apply prior knowledge to new situations.
		<b>Presenting</b>	... convey a clear message across a range of presentation forms to meet the needs of the context, purpose and audience.  ... provide and use constructive feedback and reflection to develop effective communication skills.

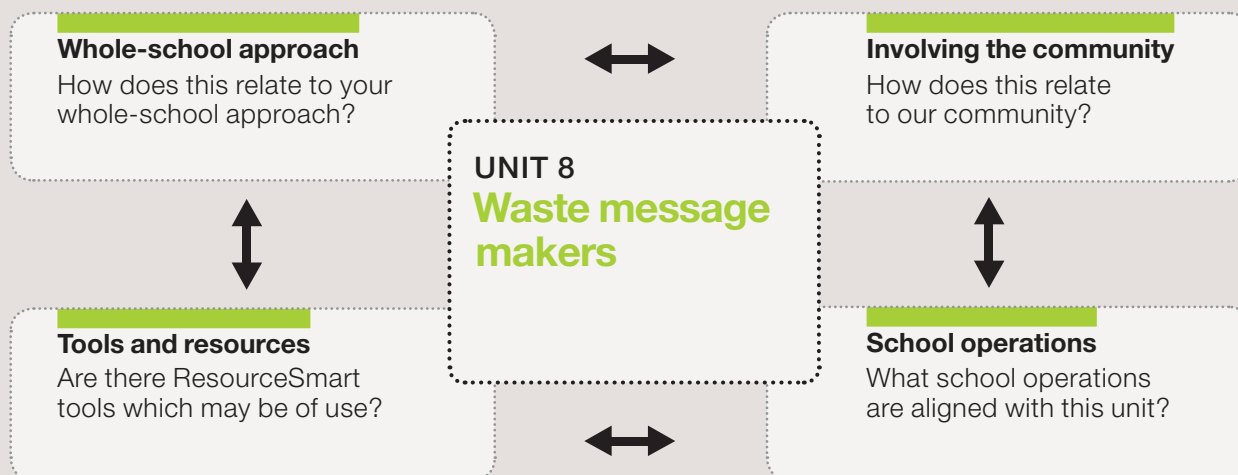
**Other possible VELs links could include:**

- English/Reading, Writing
- Information and Communications Technology (ICT)
  - ~ ICT for visualising thinking
  - ~ ICT for creating

# UNIT 8 LEVELS 4–5

## Waste message makers

### Considerations prior to commencing the unit



## Overview

Litter is waste of any type thrown where it doesn't belong and it has a major impact on the environment. In this unit students consider how litter issues impact on the environment and develop ways to communicate actions to reduce litter at school and in the broader community.

### Key question:

- Why communicate ideas to others?

### Focus questions:

- Why is litter a problem for the environment?
- What are possible solutions for litter issues in our school and local community?
- How can ideas for reducing litter be communicated to others?

### Suggested unit elements

- Investigate the current litter situation at school and the local area.
- Use the internet to find out update facts, figures and litter initiatives.
- Evaluate and organise litter information from a web search.
- Use thinking tools to plan a way to communicate an idea for reducing litter.
- Develop and present a litter reduction idea.

### Victorian Essential Learning Standards

*The following strands, domains and dimensions are covered in this unit for Levels 4–5:*

#### Physical, Personal and Social Learning

- Civics and Citizenship
  - ~ Community engagement

#### Interdisciplinary Learning

- Communication
  - ~ Listening, viewing and responding
  - ~ Presenting
- Information and Communications Technology (ICT)
  - ~ ICT for communicating
  - ~ Thinking Processes
  - ~ Reasoning, processing and inquiry



## Tuning in

As a class, walk the school grounds a number of times during the day. Observe and record the different types of litter at the different locations.

With the students, arrange a roster for surveying litter accumulation in the school grounds. Divide the class into groups of three or four. Divide a plan of the school into a number of areas. Allocate groups to the different areas so that the entire school ground is covered, and provide them with a map of the school. Students decide on different roles in the group such as recorder, spotter, classifier.

Students inspect their designated area, marking on the map the placement of bins, and making any notes about the bins such as Is there litter falling out of the bins? Are the bins smelly and dirty? If there are any areas that have a lot more litter than other areas, students can shade the area on the map. These areas are called litter hot spots. Students can note on the map any obvious reasons for the concentration of litter. Examples may include:

- next to seat where students have lunch
- seems to have been blown by the wind
- students missed the bin
- near the canteen
- among bushes where students find it difficult to pick up paper *etc.*

Students also use the visual assessment: *Litter and stormwater* to conduct a visual assessment of litter practices in the school and suggest actions.

Refer the TOOLS AND RESOURCES section for the visual assessment: *Litter and stormwater*

Review school safety procedures prior to students picking up litter. Reinforce that students must not touch syringes or broken glass – they should get a teacher to help.

Refer to the *Guidelines for conducting waste or litter assessments in schools*

Students use a computer spreadsheet program to consolidate all the data from each group and each class. Students analyse the data acquired by the groups. What conclusions can be drawn from the data? What is the extent of the litter problem? Is the information useful in identifying the cause of litter? What extra information is required.

Brainstorm ideas about possible causes of litter in the school. Record these ideas on either a board or an electronic whiteboard. Questions that may stimulate discussion are:

- Do birds pull garbage out of the bins?
- Does rubbish get blown out of the bins?
- Do people drop litter at weekends?
- Do some students drop litter a lot of the time?
- Is there any way of finding out when litter is dropped?
- Why do some students drop litter?

Students analyse the data obtained from the survey to see whether or not there is any relationship between the heavily littered areas and the location of the bins. Are there enough bins? Would changing the position of bins change the pattern of litter? Using the data, the students make recommendations.

Visit a busy local area such as the park or shopping strip and conduct a visual litter assessment. Encourage students to note any types of information relating to litter such as a sign or poster. What is it telling people? How has it been presented? Where is it located?

NOTE: Appropriate excursion permission documentation will be necessary for this activity.

Compare and contrast the school and local area litter information; for instance, is the litter type the same or different? Are the same things causing the litter to be there? What are possible causes for litter?

On a large chart, create a class version for the causes and effects of different types of litter.

As a class, decide on a definition of litter. Students may check dictionaries and other references as part of this process.



## Finding out

### Values

Does litter worry you? Why or why not? As a class brainstorm ideas as to why some people drop litter. From these ideas, students could design and conduct a survey to find out what others, including students and community members, think about why people drop litter.

Students analyse the results. What conclusions can be drawn? How can this information be useful? When can it be used? For instance, when developing actions, communicating ideas.

### Litter facts

Students conduct web searches for information about litter – definitions, different types of litter, facts, FAQs.

Discuss with students protocols for searching the web. Use the following questions from the Department of Education website:

- What is your research question? (I.e. what is it you are looking for?)
- What kind of information do you need?
- What tools are you going to use to find this information? (I.e. the Internet, the school library.) How are you going to find this information? (I.e. if you are using Internet search engines, what keywords are you going to use?)
- How much time are you going to spend researching? (I.e. you could go on forever finding information. What would be a reasonable time frame for finding the information you need?)

- How are you going to evaluate your information? (I.e. when you are finished your research, it is useful to reflect on the process. What things worked, what things didn't, what would you do next time?)

[www.sofweb.vic.edu.au/internet/research.htm](http://www.sofweb.vic.edu.au/internet/research.htm)

As a class, develop a tool to assist with evaluating a website accessed for litter information.

Discuss key headings for the research. Students create a reference recording document to assist with organising their research information.

Ask groups of students to create a list of key information they should be looking for when searching, such as:

- What are the most common types of litter?
- What is currently happening to reduce litter in schools?
- What is our local community doing about reducing litter?
- Does our local council have a policy on litter?
- What is happening on a national level, eg Clean up Australia Day?
- Are there signs and systems created specifically for litter?

Students note questions that may arise as they conduct their search. They can use these questions to help focus their search or ask others when clarifying their ideas.

A suggested list of websites can be found in the *Internet* section under *Resources* below.

At the conclusion of the research session ask students to evaluate their research tool for ease of use. A class file of useful tools could be created for use in future Internet researching.

## Drawing conclusions

Students summarise and organise the litter information into a logical and clear format. Inclusion of any specialised language or symbols should be considered within the context of this presentation.

A class litter forum could be a way of sharing presentations. The focus of the forum could include:

- different ways litter messages have been communicated

- useful information, facts and figures
- how facts have been used in communicating a message
- evaluation of sites – which are the most useful and why
- 'good ideas'.

At the conclusion of the forum the class could create a matrix of what they believe to be key things they have valued and learnt.

## Considering social action

Challenge students to plan and develop an idea for reducing litter in the school or local area based on the information gathered from the school/local area analysis and web search. This may include ideas such as a campaign, signage or system.

Once students have developed their idea they decide on the best way of communicating it to others. In doing this they will need to consider:

- what is the purpose of my idea/message
- the audience, eg school, local shops, local park
- the type of information

– how the message will be communicated, eg signs, website, letter to newspaper.

Encourage students to consider and justify the most appropriate form of communication for their message or idea and proposed audience, such as school intranet/website, newsletter, local newspaper, poster or flyer. Students may use the *Communications Tool* the help focus their ideas.

Refer the TOOLS AND RESOURCES section for the *Communications Tool*

Students generate their message/plan for reducing litter using their chosen communication format.

## Reflection and evaluation

Students present their message to the class.

As a class, discuss key aspects of presentations for evaluation. These may include organisation of information, appropriate language, use of data, audience appropriate or clarity of litter message. Collaboratively, develop an evaluation tool to be used by students during presentations. Students produce the tool and organise for copies to be made ready for the presentation session.

Organise a number of students to assess each presentation using the class developed tool. Highlight the importance of providing constructive feedback on the work.

Students use the evaluation tool to self assess their presentation and reflect on what others have said.

### Involving the community

Are there key people in the community who need to be involved in any community-based presentations, such as the local council, shopkeepers?

Are there local government/council procedures that need to be taken into account when planning?

## Assessment

Looking at the students' recordings in their research tool, assess their ability to gather information from the Internet and their evaluation of websites.

Use the class developed tool to assess student litter messages/plans, providing constructive feedback which students can compare with peer assessment.

## Links to PoLT

This unit has links to *Principles of Learning and Teaching* in particular *PoLT Principle 6*, learning that connects strongly with communities and practice beyond the classroom.

[www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm](http://www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm)

## Resources

### Websites

Environmental Protection Authority (EPA) Victoria  
[www.epa.vic.gov.au/students/litter/default.asp](http://www.epa.vic.gov.au/students/litter/default.asp)

Keep Australia Beautiful Network  
[www.kabq.org.au/](http://www.kabq.org.au/)

National Litter Index - at a glance 2007  
[www.environment.gov.au/minister/env/2007/pubs/mr19feb07.pdf](http://www.environment.gov.au/minister/env/2007/pubs/mr19feb07.pdf)

Sustainability Victoria  
[www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

Victorian Litter Action Alliance  
[www.litter.vic.gov.au](http://www.litter.vic.gov.au)

## Victorian Essential Learning Standards

This unit addresses the following standards for students at Levels 4 and 5:

### Level 4

Strand	Domain	Dimension	Standards Students:
Physical, Personal and Social Learning	Civics and Citizenship	Community engagement	... present a point of view on a significant current issue or issues and include recommendations about the actions that individuals and governments can take to resolve issues.
Interdisciplinary Learning	Communication	Listening, viewing and responding	... ask clarifying questions about ideas and information they listen to and view. ... develop interpretations of the content and provide reasons for them. ... describe the purpose of a range of communication strategies, including non-verbal strategies, and evaluate their effectiveness for different audiences.
		Presenting	... summarise and organise ideas and information, logically and clearly in a range of presentations. ... identify the features of an effective presentation. ... provided criteria, students evaluate the effectiveness of their own and others' presentations.
	Information and Communications Technology (ICT)	ICT for visualising communicating	... use email, websites and frequently asked question facilities to acquire from, or share information with, peers and known and unknown experts. ... use recommended search engines, students refine their search engines to locate information quickly. ... evaluate the integrity of the located information based on its accuracy and the reliability of the web host.
	Thinking Processes	Reasoning, processing and inquiry	... use the information they collect to develop concepts, solve problems or inform decision making.



**Level 5**

Strand	Domain	Dimension	Standards
			Students:
<b>Physical, Personal and Social Learning</b>	<b>Civics and Citizenship</b>	<b>Community engagement</b>	<p>... present points of view on contemporary issues and events using appropriate supporting evidence.</p> <p>... participate in activities to contribute to environmental sustainability or action on other community issues.</p>
<b>Interdisciplinary Learning</b>	<b>Communication</b>	<b>Listening, viewing and responding</b>	<p>... interpret complex information and evaluate the effectiveness of its presentation.</p> <p>... use specialised language and symbols as appropriate to the contexts in which they are working.</p> <p>... consider their own and others' points of view, apply prior knowledge to new situations, challenge assumptions and justify their own interpretations.</p>
		<b>Presenting</b>	<p>... use the communication conventions, forms and language appropriate to the subject to convey a clear message across a range of presentation forms to meet the needs of the context, purpose and audience.</p> <p>... provide and use constructive feedback and reflection to develop effective communication skills.</p>
	<b>Information and Communications Technology (ICT)</b>	<b>ICT for communicating</b>	<p>... select the most appropriate search engines to locate information on websites.</p> <p>... use complex search strategies to refine their searches.</p> <p>... judge the integrity of the located information based on its credibility, accuracy, reliability and comprehensiveness.</p>
	<b>Thinking Processes</b>	<b>Reasoning, processing and inquiry</b>	<p>... identifying and synthesising relevant information, students use a range of appropriate strategies of reasoning and analysis to evaluate evidence and consider their own and others' points of view.</p>

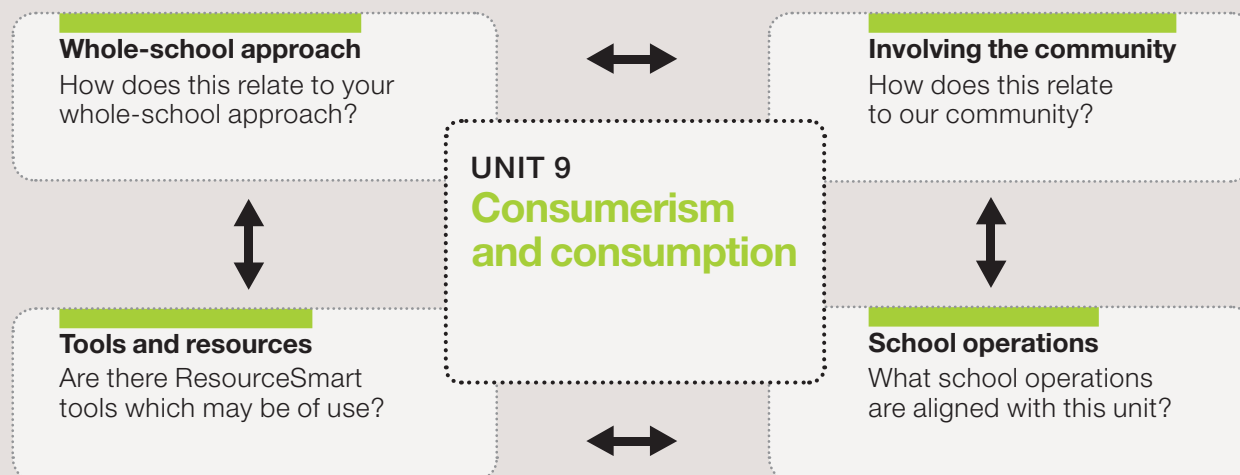
**Other possible VELS links could include:**

- English/Reading
- Interpersonal Development/Working in teams

# UNIT 9 LEVEL 6

## Consumerism and consumption

### Considerations prior to commencing the unit



### Overview

In this unit, students research the way in which consumerism is part of Australian society and its impact on waste. Students explore consumer decisions and debate the opportunities for adjusting their lifestyles to become more sustainable.

#### Key question:

- How sustainable is our lifestyle?

#### Focus questions:

- What is a consumer society?
- How is society conditioned to maintain high levels of consumption?
- What are the benefits/issues of a society that has increasingly high levels of consumption?
- How can people make better choices?

### Suggested unit elements

- Students consider their own lifestyles, their needs and wants and discuss consumerism and consumption.
- Students read about consumerism and consumption and write a piece of text in response to a question.
- Students create their own advertisement using persuasive strategies to promote and market a product that has environmental benefits over similar type products.
- Use inside/outside circles for students to discuss their ideas and draw conclusions.
- Students identify an area of their own lifestyle or that of their families which they can modify to reduce the impact on the environment.

### Victorian Essential Learning Standards

*The following strands, domains and dimensions are covered in this unit for Level 6:*

Physical, Personal and Social Learning

- Interpersonal Development
  - ~ Working in teams

Discipline-based Learning

- Science
  - ~ Science knowledge and understanding
- English
  - ~ Reading
  - ~ Writing
  - ~ Speaking and listening

Interdisciplinary Learning

- Thinking Processes
  - ~ Reasoning, processing and inquiry

## Tuning in

Ask students to consider their lifestyle and its sustainability. Students write a brief paragraph about what this means to them. Explain that the paragraph is for their personal reflection.

Ask students working in pairs to brainstorm a list of everything that is important to them. Have prompts such as: What do you like doing? What food/clothing do you like? How do you spend your time? What do you care most about? What's important about where you live? Once the list has been generated, students reorganise their list under needs and wants (this can be completed individually). Develop an agreed definition for the terms *needs* and *wants* as a class. Students discuss the lists and make statements about *needs* and *wants*. Introduce the terms *consumerism* and *consumption*.

Ask students to write a response to one of the following questions:

- What influences people to be part of a consumer society?
- What are the benefits/issues of a society that has increasingly high levels of consumption?
- Is consumerism and consumption a global phenomenon?

Before writing their response, provide students with articles about consumerism and consumption (refer to Resource section) to broaden their understanding and encourage them to consider various points of view. Explain the importance of using quotes from respected sources to back up claims.

Alternatively, students may be given the opportunity to write a comic strip style text for the purpose of making their peers aware of consumerism and consumption. Students create 6–8 cells with supporting text and use captions as required. Students may need to explore other comic strip style texts.

## Finding out

Review what students know about avoiding or reducing waste, reusing products for another purpose and recycling products to make them into new products. Provide articles about reducing waste, reusing, recycling to stimulate discussion (refer to Resources section).

Students work as a team to develop a coherent article that describes the issues and benefits of reducing, reusing and recycling in the context of consumerism and consumption. Use and adapt the following process:

- Students are provided with the following terms to include in their article: *reduce, reuse, recycle, avoid, consumer, choices and decisions, economy, landfill, environment, recycling symbols, 'buy recycled', green products*

- Students write brief statements about each term using the context of consumerism and consumption
- Students work as a group of three to combine their ideas and bundle statements about the terms together, and refine the ideas to an agreed set of statements or paragraph.
- Students develop a cohesive article adding in an introduction, paragraphs of main ideas and a conclusion including 'what it means to me'
- Students may further refine their article to access information to support their claims using appropriate Internet references or other texts.

Provide each group of students with a different product to briefly research using the Internet or suitable texts. For their product students list:

Product	Materials from which it is made	Purpose	What happens to it after its useful life is over	What information should be included on the product to help people choose
For example: Aluminium can, car lead battery, running shoe, rubber car tyre, PET bottles, clothing, computers, mobile phones				

**Introduce the phrases:**

- **CRADLE TO THE GRAVE:** Products that, when their useful life is over are disposed of in landfill
- **CRADLE-TO-CRADLE:** Products that, when their useful life is over, do not become useless waste and are sent to landfill, but either decompose or are high quality raw materials reprocessed into new products.

Refer to **RESOURCES** section for suggested websites

Students compare and contrast the two approaches using a graphic organiser such as a Venn Diagram, Lotus diagram or an issues map. Students discuss and share their ideas as a class.

**BUYING GREEN PRODUCTS:** When consumers make considered decisions to purchase the product that has least impact on the environment. Students compare the potential outcomes when people make considered green purchasing decisions to those when environmental consequences are not considered.

Advertising is a common form of influencing people to purchase products or services which they may or may not really need. View a range of magazine, television or newspaper advertisements. Students describe strategies the advertiser uses to convince the consumer to purchase the product or service. Points to consider may include inferred increased wealth and status, logic, facts, threats/fear, emotion, catchy jingle, powerful words or phrases, imagery. Introduce the term *persuasion* in relation to advertising. Develop a list of persuasive words used in advertising.

As a class, develop a common understanding of the term *persuasion* providing relevant examples. Students work in small teams to view an advertisement and analyse how the company uses persuasion in their advertisement.

Each team presents a 1 to 2 minute presentation to explain the strategies used.

Place yourselves in the role of an advertising management group. Your client has a product that has environmental benefits over similar types of products. It can be an existing product or a product that could be produced in the future. Your client is not sure how best to advertise their product. It's your role to identify the audience and to use persuasive strategies to promote and market the product. The client wants you to generate three advertisements using the following focuses:

- use evidence such as facts, statistics and examples to support your point
- use emotional words and phrases to strengthen your message
- present a logical, reasoned argument that takes opposing viewpoints into account.

Get feedback from other groups about which advertisement works best. Which advertisement would your group recommend to the client?

**Relevant questions**

Does the school have a green purchasing policy? Does the school purchase items containing recycled content? Has the school attempted green purchasing? If so, a staff member with this role could discuss the approach with students. Students may be interested in researching possibilities and raising the idea with the principal through appropriate communication.

**Drawing conclusions**

Review the key themes and ideas covered during the unit to date. Pose discussion questions for students to consider:

- Why is it so difficult for society to reduce consumption?
- What information is needed on products to help people make green purchasing choices?

- Why are some societies around the world affected/not affected by high levels of consumption?
- What areas of your lifestyle could you change to reduce your impact on the environment?

Use inside/outside circles or fishbowl strategy so students can discuss their ideas with a range of other students.

**Considering social action**

Ask students to identify an area of their own lifestyle or that of their families, which they can modify to reduce their impact on the environment.

- Students describe their initiative, the action they will take and a process to monitor their success.



## Reflection and evaluation

Ask students to think about what they learned about consumerism and consumption. What did they enjoy doing? What do they know now that they did not know before? Have they made a difference to their lifestyle that results in a reduced impact on the environment? Reflecting on their initial thoughts about whether their

lifestyle is sustainable, students write a personal reflection about their lifestyle and any changes in their thinking, attitudes or behaviour, and whether they have had any effect on someone else's behaviour. They may also set personal goals for implementing modified approaches to consumerism, which reflects their current views.

## Assessment

Keep students' work associated with the topic for evidence of learning and development of ideas related to consumerism and consumption, including:

- initial writing task about consumerism and consumption

- reduce, reuse and recycle article
- advertisement of a product promoting the environmental benefits.

Keep anecdotal records of class discussion to assess speaking and listening.

## Links to PoLT

This unit has links to *Principles of Learning and Teaching* in particular *PoLT Principle 6*, learning that connects strongly with communities and practice beyond the classroom.

[www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm](http://www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm)

## Resources

### Websites

ABC. Science/Features, Recycling reality,  
[www.abc.net.au/science/features/recyclingreality/default.htm](http://www.abc.net.au/science/features/recyclingreality/default.htm)

Cradle to the grave, cradle to cradle, life cycle assessment on Wikipedia, Life Cycle Assessment  
[http://en.wikipedia.org/wiki/Life\\_cycle\\_assessment](http://en.wikipedia.org/wiki/Life_cycle_assessment)

MBDC, cradle to the grave  
[www.mbdc.com/c2c\\_nir.htm](http://www.mbdc.com/c2c_nir.htm)

MBDC, Cradle to cradle  
[www.mbdc.com/c2c\\_ee.htm](http://www.mbdc.com/c2c_ee.htm)

The cradle-to-cradle alternative  
[www.mcdonough.com/writings/cradle\\_to\\_cradle-alt.htm](http://www.mcdonough.com/writings/cradle_to_cradle-alt.htm)

Cradle-to-cradle case studies  
[www.mcdonough.com/writings\\_c2c\\_case\\_studies.htm](http://www.mcdonough.com/writings_c2c_case_studies.htm)

Green Blue, cradle-to-cradle material flows  
[www.greenblue.org/cradle\\_flows.html](http://www.greenblue.org/cradle_flows.html)

Global Issues, Behind Consumption and Consumerism  
[www.globalissues.org/TradeRelated/Consumption.asp](http://www.globalissues.org/TradeRelated/Consumption.asp)

Information about consumerism and consumption on Wikipedia, Consumerism  
<http://en.wikipedia.org/wiki/Consumerism> (accessed 14 May 2007)

Sunshine Coast Environment Council, Eco News  
[http://econews.org.au/story4\\_10a.php](http://econews.org.au/story4_10a.php)

Sustainability Victoria  
[www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

Unicef, Needs and wants interactive game  
[www.unicef.org/uk/tz/games/index.asp#](http://www.unicef.org/uk/tz/games/index.asp#)

Teaching and learning strategies, including inside/outside circles, Venn Diagram, Issues Map and Lotus Diagram  
Victorian Curriculum and Assessment Authority (VCAA), Teaching and Learning Resource  
<http://vels.vcaa.vic.edu.au/support/teaching.html>

## Victorian Essential Learning Standards

This unit addresses the following standards for students at Level 6:

Strand	Domain	Dimension	Standards Students:
<b>Physical, Personal and Social Learning</b>	<b>Interpersonal Development</b>	<b>Working in teams</b>	... describe how they respect and build on ideas and opinions of team members and clearly articulate or record their reflections on effectiveness of learning in a team.
<b>Discipline-based Learning</b>	<b>English</b>	<b>Reading</b>	... read, view, analyse, critique, reflect on and discuss contemporary and classical imaginative texts that explore personal, social, cultural and political issues of significance to their own lives.  ... also read, view, analyse and discuss a wide range of informative and persuasive texts and identify the multiple purposes for which texts are created.
		<b>Writing</b>	... write persuasive texts dealing with complex ideas and issues and control the linguistic structures and features that support the presentation of different perspectives on complex themes and issues.  ... select subject matter and begin to use a range of language techniques to try to position readers to accept particular views of people, characters, events, ideas and information.  ... proofread and edit their own writing for accuracy, consistency and clarity.
		<b>Speaking and listening</b>	... engaged in discussion, they compare ideas, build on others' ideas, provide and justify other points of view, and reach conclusions that take account of aspects of an issue.  ... listen to and produce brief spoken texts that deal with familiar ideas and information.
	<b>Science</b>	<b>Science knowledge and understanding</b>	... identify and classify the sources of wastes generated, and describe their management, within the community and in industry.  ... use a specific example to explain the sustainable management of a resource.
<b>Interdisciplinary Learning</b>	<b>Thinking Processes</b>	<b>Reasoning, processing and inquiry</b>	... process and synthesise complex information and complete activities focusing on problem solving and decision making which involve a wide range and complexity of variables and solutions.  ... make informed decisions based on their analysis of various perspectives and, sometimes contradictory, information.

### Other possible VELs links could include:

- Physical, Personal and Social Learning/Civics and Citizenship
- The Arts/Media
- Information and Communications Technology (ICT) /ICT for communicating

# UNIT 10 LEVEL 6

## How to make biodiversity work for the community

### Considerations prior to commencing the unit

#### Whole-school approach

How does this relate to your whole-school approach?

#### Involving the community

How does this relate to our community?

### UNIT 10 How to make biodiversity work for the community

#### Tools and resources

Are there ResourceSmart tools which may be of use?

#### School operations

What school operations are aligned with this unit?

## Overview

In this unit, students will be involved in a long-term class project focussing on designing and creating a sustainable garden. They will use understandings of biodiversity as it relates to creating compost and varieties of suitable food plants. The garden needs to have a direct benefit to the community. Students will raise the community's awareness of the particular issue being addressed (social or environmental) and develop a report on how to manage resources sustainably.

### Key question:

- How do you design and operate a sustainable garden?

### Focus questions:

- Why develop a sustainable garden?
- What are the benefits of different types of gardens?
- What resources are required and what processes are involved in creating a sustainable garden?

### Suggested unit elements

- Introduce the concept of a sustainable garden and biodiversity showing its relevance to the school's approach to waste management.
- In groups brainstorm ideas related to the possible community benefits of the garden.
- Access community expertise and support in the development of the sustainable garden.
- Investigate materials/plants that meet the design specifications. As a class, the final design is chosen using an agreed process.
- Roles and tasks are assigned to class members and the task is completed using appropriate safe practices.
- Develop a scientific report on how to manage resources sustainably.
- Develop an action plan to raise community awareness of the project and the issue it is targeting.

### Victorian Essential Learning Standards

*The following strands, domains and dimensions are covered in this unit for Level 6:*

Physical, Personal and Social Learning

- Civic and Citizenship
  - ~ Community engagement

Discipline-based Learning

- Science
  - ~ Science knowledge and understanding

Interdisciplinary Learning

- Design, Creativity and Technology
  - ~ Investigating and designing
  - ~ Producing
  - ~ Analysing and evaluating

## Tuning in

Refer to the school's current approach to greenwaste (garden waste and fruit/vegetable scraps).

- if the school has a compost or wormery, identify what happens to the by-products, eg compost, worm castings and liquid
- discuss the possible uses of these products and their benefits
- if possible, organise students to experience first hand how the compost or wormery operates
- look at the soil biodiversity worksheet. which of the figures are the most surprising? Explain why people are not aware of the large number and types of soil organisms.

Refer to the *Soil biodiversity* worksheet

Introduce the design brief, outlining the task with constraints and considerations. For example:

Our school has several areas of existing gardens that can be better utilised.

Our class has been selected to plan, design and create a sustainable garden for the school that benefits the community and addresses a particular relevant environmental or social issue. Species of food plants will be chosen to help conserve their genetic diversity.

**CONSTRAINTS:** The garden design must incorporate waterwise principles and use reused/recycled/composted materials where possible.

As a class brainstorm what a sustainable garden is and develop a common idea. A possible approach is to draw

and label two diagrams – one being a sustainable garden the other not a sustainable garden. Students draw what it may look like and what they expect to see.

In small groups, students brainstorm a list of ten ideas related to possible purposes of the garden. They consider how it could directly benefit the community. They identify possible environmental/social benefits. As a group, they rank their ten ideas. Negotiate a process to combine the ideas to select an agreed purpose for the garden.

### Whole-school approach

Is there a whole-school approach to using greenwaste? If there isn't, this project may promote student interest in starting up a composting program and using green waste for the school gardens.

### Daffodil Day

A section of the garden may be used to plant out daffodil bulbs. When in bloom, flowers can be cut and sold in the community to raise money and awareness about a particular health issue. This is an example of how a social issue can be incorporated into the design.

[www.daffodilday.com.au](http://www.daffodilday.com.au)

## Finding out

To find out about the diversity of life in a compost bin:

- Obtain samples of compost that has obvious life crawling over it. (Be cautious that the samples have no red-back spiders in them.) Sampling techniques can include building pitfall traps made from PET bottles and making fly paper.
- Use a Berlese funnel to extract animals from a sample of compost. (Funnel with a light over it that encourages the soil or compost creatures to move away from the light and heat by escaping through the bottom of the funnel.)
- Use flex cams, stereo microscopes and hand lenses to investigate what animals live in the compost bin.
- Classify the animals in the compost bin.
- Suggest how a foodweb may be linked.
- What are the key items to feed the organisms?

- Suggest how the following factors might affect the organisms in a compost bin:
  - ~ warm temperatures compared to cold temperatures
  - ~ allowed to dry out
  - ~ meat and fat products placed in the compost bin
  - ~ aerated compared to compacted with no air flow.
  - ~ large volumes of lawn clippings inside.

Investigate how compost can help a vegetable garden.

### Compost

Bacteria and fungus break down greenwaste to produce compost. The compost will be an excellent soil conditioner and help to retain water, but will probably be a poor contributor to soil fertility because the bacteria and fungus have consumed many of the nutrients.



Develop a definition for a sustainable food garden. Explain how protecting the genetic diversity of food plants helps the sustainable future of all people.

Investigate garden designs that are based on sustainable principles and use reused/recycled materials. Use a range of approaches, eg refer to relevant websites, local gardens or parks, heritage seed distributors, videos of gardening segments and community experts. How can home and community gardens help protect the genetic diversity of our food plants? What is different about heritage food plants and the fruit and vegetables available in shops?

Use an agreed process for students to design the sustainable garden and come up with an agreed final design. Students investigate the particular requirements of the plants for their garden and organise the information using a suitable approach. The final design may be developed in consultation with a community member with a horticultural background.

The agreed process could include the following elements.

Brainstorm ideas about the garden design. As the ideas are brainstormed, place them into categories such as:

- structures and construction taking into account using the most sustainable materials
- processing and utilisation of greenwaste
- watering the garden
- sustainable methods for fertilising the garden
- choices of fruit and vegetable varieties that conserves the genetic diversity of food plants
- propagation of young plants
- use and storage of garden tools, composting systems *etc.*

Decide on which ideas you wish to include in the plan. Make a list of criteria that will help to decide. The criteria could include:

- practical and achievable
- meets the sustainable and biodiversity objectives
- essential for the project to be successful
- suits the design.

### Monitoring

Students involved in monitoring composting may need advice when the compost process is not working effectively.

Refer to *Greenwaste, composting and wormeries* in the SCHOOL OPERATIONS section.

### Design

- What method will be used to make the design?
- What scale will be used?
- Will a key, legend or labels be used?
- What additional information will be used to explain the design

### Planning

After agreeing on the final design, list the resources required and discuss options to access the resources through community support, seeking funding, school council buildings and grounds budget, fundraising *etc.* Plan the production, showing the steps to be followed and the team members that will be responsible for each task. Identify safety risks and ways of reducing these risks through a risk assessment.

Follow the class production plan referring back to agreed roles and tasks. Ensure students are trained in safety aspects when using tools. Implement a process where only students that have been awarded a garden tool operating certificate use the garden tools.

## Drawing conclusions

In small groups, students develop a scientific report describing the approach to managing waste and how the sustainable garden contributes to reducing waste to landfill. In the report they include a detailed description of

the process used to breakdown greenwaste. They also describe how home and community gardeners can help safeguard the genetic diversity of food plants by growing heritage varieties.

## Considering social action

Students develop an action plan to communicate and promote the outcomes of the project to the school community, describing what they set out to achieve.

They consider appropriate ways to raise community awareness of the issues they have addressed.

## Reflection and evaluation

Students evaluate the completed garden based on community feedback, meeting the specifications of the design brief and their own appraisal. Students evaluate how they worked as part of the team to achieve the completed garden, identifying any skills they developed or refined that have direct application to their employability.

Ask students to think about what they learned about caring for the environment. What did they enjoy doing? What do they know now that they did not know before?

– use a beliefs continuum for students to indicate their response to particular questions about how well they are caring for the environment, their level of enjoyment of the unit, whether they believe they now know more about caring for the environment.

## Assessment

Use an assessment rubric with student input. Students can be assessed against some or all of the following pieces of evidence:

1. Information related to the choice of garden, its purpose, the types of plants/materials required.
2. 'Production plan' that includes risk assessment and environmental considerations.

3. Design drawings.
4. Log of their input into the project.
5. Evaluation of the completed garden.
6. Scientific report.
7. Action plan to raise community awareness.

## Links to PoLT

This unit has links to *Principles of Learning and Teaching* in particular *PoLT Principle 6*, learning that connects strongly with communities and practice beyond the classroom.

[www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm](http://www.sofweb.vic.edu.au/blueprint/fs1/polt/principles.htm)

## Resources

### Books

- Blazey, C, 1999, *The Australian Vegetable Garden*, New Holland.
- Gilbert, A, 2001, *No-Dig Gardening*, ABC Books.
- Marshall, T, 2003, *Recycle Your Garden*, ABC Books.
- McFarlane, A, 2002, *Organic Vegetable Gardening*, ABC Books.
- Pears, P (ed), 2003, *Organic Gardening Australia*, Dorling Kindersley.
- Toogood, A (ed), 2004, *Propagating Plants*, Dorling Kindersley.

Woodrow, L, 1996, *The Permaculture Home Garden*, Viking.

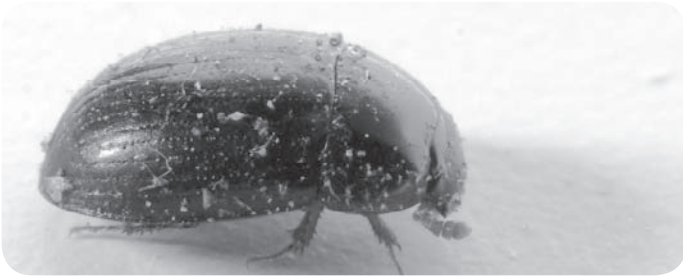
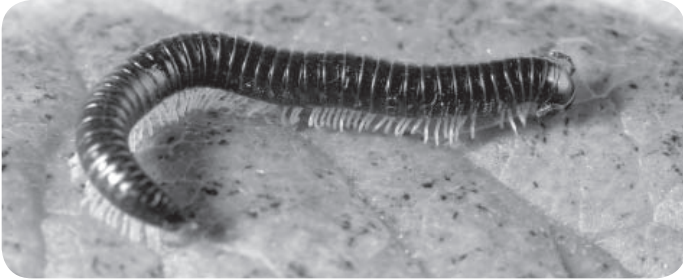
Woodward, P, 2000, *Asian Herbs and Vegetables, How to identify, grow and use them in Australia*, Hyland House.

### Websites

Sustainability Victoria  
[www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

The Stephanie Alexander Kitchen Garden Foundation  
[www.kitchengardenfoundation.org.au](http://www.kitchengardenfoundation.org.au)

Purchase heritage seeds and plants through mail order, printed catalogues, membership, venues for excursions and published information.  
<http://diggers.com.au>



Who lives in your compost bin?



How can the genetic diversity of our food be protected?



## Victorian Essential Learning Standards

This unit addresses the following standards for students at Level 6:

Strand	Domain	Dimension	Standards Students:
<b>Physical, Personal and Social Learning</b>	<b>Civics and Citizenship</b>	<b>Community engagement</b>	... develop an action plan which demonstrates their knowledge of a social or environmental issue and suggest strategies to raise community awareness of it.
<b>Discipline-based Learning</b>	<b>Science</b>	<b>Science knowledge and understanding</b>	... explain how the action of micro-organisms can be both beneficial and detrimental to society. ... identify and classify the sources of wastes generated, and describe their management, within the community and in industry. ... use a specific example to explain the sustainable management of a resource.
<b>Interdisciplinary Learning</b>	<b>Design, Creativity and Technology</b>	<b>Investigating and designing</b>	... designing, students generate a range of alternative possibilities, use appropriate technical language, and justify their preferred option, explaining how it provides a solution to the problem, need or opportunity.
		<b>Producing</b>	... implement a range of production processes accurately, consistently, safely/hygienically and responsibly, and select and use personal protective clothing and equipment when necessary.
		<b>Analysing and evaluating</b>	... synthesise data, analyse trends and draw conclusions about the social, cultural, legal and environmental impacts of their own and others' designs and the products/systems, and evaluate innovative new technology in the manufacturing industry.

### Other possible VELS links could include:

- Thinking Processes/ Creativity
- Communication/Presenting



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# WORKSHEET

## Soil biodiversity

These are some of the estimates that scientists have presented regarding soil biodiversity. Some recent research suggests there may be even more bacteria and fungus.

### Per gram of soil

Bacteria	1,000,000,000
fungus (actinomycetes)	5,000,000
Protozoa	500,000
Algae	200,000
Moulds	200,000

### Per square metre (m<sup>2</sup>) of soil

Round worms	20,000,000
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### Per hectare of land

Snails and slugs	150,000
Millipedes and centipedes	2,000,000
Earthworms	2,000,000
Insects, mites, spiders <i>etc</i>	2,000,000

# Tools and Resources

## Introduction

The tools and resources used throughout this manual are designed to provide your school with useful support and help guide you to become ResourceSmart.

It is intended that the tools be a useful resource for all members of the school community, including students. Consider the tools as samples, which may be used as presented or modified to meet the specific needs of your school.

# Tools and resources matrix

The types of tools listed in this matrix are used throughout the *ResourceSmart Schools* resource. Shaded areas indicate where each type of tool is used. Tools are organised into types in the TOOLS AND RESOURCES section.

Type of tool	Reduce, reuse and recycle	Greenwaste, composting and worms	Litter and stormwater	Green purchasing	Waste disposal	Planning process	Curriculum
Surveys							
Checklist/ action							
Gathering ideas							
Sorting + deciding + goals							
Targets							
Planning							
Audit							
Visual assesment							
Pro forma							
Communication							
Values							
Resources							

# SURVEY

## How ResourceSmart is your school?

Complete this survey at the start of your journey and then annually to identify change and progress you have made.

### PART A Rate your school

This survey will give you an overview of how your school is performing in waste and litter education. Give yourself a score out of five for each area.

1 = Poor 2 = Fair 3 = Good 4 = Very good 5 = Excellent

**How would you rate your school's efforts in:**

	score	Ideas for improvement
1 preparing a written waste and litter education policy?	<input type="text"/>	
2 preparing a written waste and litter education strategy?	<input type="text"/>	
3 including waste and litter in all levels of the curriculum?	<input type="text"/>	
4 recycling paper and cardboard?	<input type="text"/>	
5 recycling other materials?	<input type="text"/>	
6 encouraging waste reduction and reuse practices?	<input type="text"/>	
7 composting or wormery processing food scraps?	<input type="text"/>	
8 composting garden waste?	<input type="text"/>	
9 applying mulch to the school gardens?	<input type="text"/>	
10 involving the whole school community in decision making about school waste and litter management?	<input type="text"/>	



## PART B Quantities and costs

You may need to refer to your school records for this information.

1 What volume of waste is sent by your school to landfill each year?  
(Calculate from the number of full wheelie bins or hoppers collected each week, extrapolated over forty weeks of the school year.)

2 How is this waste collected, stored, and transported?

3 What is the cost of this waste disposal for a year?

4 What arrangements are there for the recycling of bottles, cans and paper, etc in the school?

5 Does the school earn any money from the sale of recyclables, eg cans? ☐ Yes ☐ No  
If yes, how much per year?

6 Does the school have to pay to have certain recyclables collected from the school?  
☐ Yes ☐ No If yes, how much per year?

7 How are food scraps and garden waste disposed of in your school?

# CHECKLIST

## Sustainability policy checklist

This checklist can be used when developing a new sustainability policy or as a tool for reviewing an existing policy. If you are reviewing a policy, it is recommended that any questions answered with a *no* be reviewed.

**Does the policy provide some background information or a rationale?  
(ie does the policy reflect current views about sustainability?)** ☐ Yes ☐ No

**Does the policy clearly state its intended outcomes/goals/aims/objectives relating to each of the following areas?**

Sustainability	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Waste minimisation	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Litter reduction	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Reduce Reuse Recycle	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Composting	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Green purchasing	<input type="checkbox"/> Yes	<input type="checkbox"/> No

**Is the policy presented in language that is easily understood by the whole school community?** ☐ Yes ☐ No

**Are procedures, practices or plans stated clearly and unambiguously?** ☐ Yes ☐ No

**Does the policy incorporate/recognise the role of principal and leadership team?**

teachers	<input type="checkbox"/> Yes	<input type="checkbox"/> No
ancillary staff (eg administration, cleaners and canteen staff)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
parents	<input type="checkbox"/> Yes	<input type="checkbox"/> No
school council	<input type="checkbox"/> Yes	<input type="checkbox"/> No
students	<input type="checkbox"/> Yes	<input type="checkbox"/> No
support staff (eg teacher aides, volunteers)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
school community (eg partnerships)	<input type="checkbox"/> Yes	<input type="checkbox"/> No

**Is the policy consistent with Department of Education policy/guidelines?** ☐ Yes ☐ No

**Does the policy make explicit links between school operations and curriculum?** ☐ Yes ☐ No

**Has the policy been reviewed recently (ie within the past school review cycle)?** ☐ Yes ☐ No

**Was the school community involved in the development of the policy?** ☐ Yes ☐ No

# CHECKLIST

## ResourceSmart actions for your school

Place a letter beside each suggestion according to the following code:

- |   |   |
|---|---|
| <input type="checkbox"/> <b>A</b> Doing now   | <input type="checkbox"/> <b>C</b> Could be a long-term goal<br>(eg by the end of two years) |
| <input type="checkbox"/> <b>B</b> Could be a short-term goal<br>(eg by the end of the year) | <input type="checkbox"/> <b>D</b> Not practical for our school                              |

### General

#### Reduce

- ☐ Do not use disposable cups, plates, serviettes for any school functions.
- ☐ Encourage the use of non-disposable items, eg hankies rather than tissues, (This may not be acceptable for health reasons with some parents and teachers.)
- ☐ Encourage students to use recycled paper products.
- ☐ Encourage all members of the school community to contribute suggestions to continuously improve the school's efforts to minimise waste and reduce litter.
- ☐ Provide feedback on the school's successes in minimising waste. Include this information in family newsletters.
- ☐ Give spot prizes for good practices, eg having a hankie, picking up litter unprompted
- ☐ Have regular 'rubbish-free lunch days'. Promote the day to parents and seek their support.

#### Reuse

- ☐ Have a reuse bin in all work places (offices, classrooms, staffroom, library, etc) for paper that can be used for scrap, drafts, etc. Organise a system for collecting this paper so that the boxes do not overflow.
- ☐ Encourage the use of clean waste materials in the art rooms and classrooms – materials from Reverse Garbage Truck, used margarine and icecream containers, etc.

#### Recycle

- ☐ Have separate containers in all rooms for materials to be recycled, eg cans, plastic milk bottles, glass. Have a system for regularly emptying these containers and returning the materials for recycling.
- ☐ Have a bin in all rooms for clean white paper that has no further use and can be recycled. Organise a system for collecting this paper.

#### Compost

- ☐ Have a container in all rooms for fruit and vegetable scraps. Organise a system for collecting these scraps and placing them into the compost bin. Link this system to the curriculum.

## School administration/office procedures and purchases

### Reduce

- ☐ Design newsletters or other materials to be posted that do not use envelopes. Use the back of the newsletter for postage details. Simply fold the sheet(s) and tape or staple closed.
- ☐ Encourage the bookshop to stock refillable pens and pencils.
- ☐ Photocopy double sided/two pages to a page.
- ☐ Tailor the size of the paper to the size of the message.
- ☐ Send home one notice per family.
- ☐ Review school newsletter, magazines and course description booklets. Do they make efficient use of paper?
- ☐ Set targets to reduce the amount of paper use.
- ☐ Market your waste minimisation program to the school community. Provide regular feedback on successes and progress.

### Reuse

- ☐ Reuse envelopes.
- ☐ Make note pads from used paper.
- ☐ Only use new white paper for final copies. Use pre-used paper for drafts and rough copies.

### Recycle

- ☐ Encourage the bookshop to stock recycled paper.
- ☐ Use recycled stationery only. If there is no recycled paper at the school, urge suppliers to provide recycled paper at a competitive price.
- ☐ Purchase recycled products when available, eg stationery, plastic containers and toilet paper towels.

## Classroom procedures/work requirements

### Reduce

- ☐ Use the chalkboard/whiteboard more often to reduce paper use.
- ☐ Use Interactive whiteboards / smartboards, overhead projectors (or a computer and a computer projection screen if the school can afford one) to save paper.
- ☐ Encourage all students to use both sides of a sheet of paper.
- ☐ Place more emphasis on oral work.
- ☐ Make sure that handouts make best use of a sheet of paper, ie double-sided, single-spaced and paper of a size to match the length of the information provided.
- ☐ Don't provide additional copies of handouts. Encourage students to value the copies they are given.
- ☐ Where possible, encourage students to share handout sheets. Collect these at the end of the class/unit for reuse for another class. Appoint monitors to collect and check numbers of handouts.
- ☐ Encourage students to complete a sheet of paper before starting a new one.

### Reuse

- ☐ Laminate commonly-used worksheets. Have the students use water soluble felt pens and clean the worksheets after use. Alternatively, use clear plastic envelopes.
- ☐ Have a 'swap box' for the class to deposit items that they no longer want, but are not broken or damaged.

### Compost

- ☐ Have a wormery in each classroom for students' fruit scraps.

## Staffroom practices – work and social

### Reduce

- ☐ Use a staffroom noticeboard/whiteboard for messages/notices rather than provide individual copies.
- ☐ Introduce a system of coloured folders for distribution of information/notices around year levels/department staff. (The folders help keep things together and prevent things being lost.)
- ☐ Buy in bulk, eg tea, coffee, milk, sugar.

### Reuse

- ☐ Fill one tray of the photocopier with used paper and run off single-sided copies and drafts using that tray.
- ☐ Have a box near the photocopier to place paper for reuse.

## Department practices

### Reduce

- ☐ Develop and implement a system for filing class sets of materials.
- ☐ Encourage more sharing of materials among staff and teachers.

- ☐ Offer unwanted class set books to other schools or to students, rather than throwing them out.
- ☐ Set a goal of 10 per cent reduction in paper use over a year and see if you can reach the goal, even exceed it.

## Cleaning staff practices and purchases

### Reduce

- ☐ Encourage staff to review their work practices and products to see whether they can cut down on waste/use of resources and use more environmentally friendly products.
- ☐ Involve cleaning staff in the setting up of composting and recycling programs.

## Garden/maintenance staff

### Compost

- ☐ Involve staff in the design, construction and management of the school's composting system.
- ☐ Investigate ways to either mulch or compost all greenwaste produced in the school.
- ☐ Encourage the staff to use the mulch produced from the school's greenwaste, rather than buy in mulch.
- ☐ Encourage the staff to use the compost produced from the school's food waste on the school's gardens.
- ☐ Provide opportunities for staff to attend seminars/workshops on the correct ways to prepare mulch and compost.



## Canteen purchases and procedures

### Reduce

- ☐ Examine ways to reduce packaging of food and drinks sold at the canteen.
- ☐ Examine possibilities of selling more foods that have been purchased in bulk, rather than foods that are individually wrapped.
- ☐ Develop and implement a plan to educate canteen users about the changes to the canteen, the reasons for these changes and to seek their support.
- ☐ Review types of drinks sold in containers at the canteen. Consider the nutritional value of contents and the attributes of the containers: safety, recyclability of materials, and lifespan in the environment should they become litter.

### Reuse

- ☐ Encourage students to bring their own mugs for soups and drinks.
- ☐ Encourage staff to bring plates and mugs from the staffroom.
- ☐ Encourage students to provide a lunch box for their canteen lunch orders.

### Recycle

- ☐ Develop a system for the return of paper and cardboard, and drink containers for recycling.

### Compost

- ☐ Develop a system for the collection of fruit and vegetable scraps for composting.

## Other school activities – excursions, fetes, open days, parent–teacher nights

### Reduce

- ☐ Rationalise use of paper, notices and decorations for special events: produce or purchase reusable, quality materials instead of creating waste.
- ☐ Take students on excursions to landfill sites, recycling depots and education centres teaching waste minimisation so that they can learn new ways to minimise waste.

### Reuse

- ☐ Raise money with a 'trash and treasure' stall.
- ☐ Encourage sale or exchange of unwanted uniforms.

### Recycle

- ☐ Encourage students to bring home all rubbish generated on excursions, separating out the recyclables. Take two bags on excursion: one for rubbish, one for recyclables.

# CHECKLIST

## Disposal versus reusing, recycling and composting

Approximately what percentage of your school's waste is...

TYPE OF WASTE	REUSED AT SCHOOL	COLLECTED FOR RECYCLING	COMPOSTED OR USED IN WORMERY AT SCHOOL	SENT TO LANDFILL VIA BINS OR SCHOOL HOPPERS	DISPOSED OF AS HAZARDOUS WASTE
Garden					
Canteen/tuckshop					
Other food					
Aluminium, glass and plastic containers					
Paper (eg newspaper, office and photocopy)					
Cardboard					
Infotech and office (eg ribbons, cartridges, equipment)					
Cleaning and maintenance (eg solvents, paints, detergents, offcuts)					
Non-recyclables (eg plastic wrapping, contaminated items, science equipment)					
Other (describe):					

# CHECKLIST

## Reduce, Reuse Recycle

Use this checklist to help guide and inform the review and evaluation of the school's 3Rs program.

	No / Not attempted	Started / do sometimes	Yes / working consistently	Proposed school action
School has a reduce, reuse and recycle (3Rs) policy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has adopted a whole-school approach to 3Rs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
An adequate budget is allocated to 3Rs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a process for collecting and storing materials to be recycled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a structure of responsibility that ensures recycling tasks are completed and problems solved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Student leadership is encouraged to improve recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
OH&S issues have been identified and solutions are in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a monitoring system so their recycling program is on track	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Recycling program contributes to a positive school culture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Paper is collected and picked up for recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Plastic and metal is picked up for recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Unwanted computers are recycled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Old and broken furniture is recycled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

	No/Not attempted	Started / do sometimes	Yes/working consistently	Proposed school action
Students can buy and sell second-hand books	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Students can buy and sell second-hand clothes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Waste from technology rooms is recycled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Large recycling bin is beside each photocopier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Instructions on how to copy double-sided by photocopier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Box to stack scrap one-sided paper for further copying by copier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Waste reduction instructions given to all those using copier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
All staff provided with a budget for photocopying	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Photocopier requires budget pin number to operate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Each room in the school has a paper recycling container	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Each room in the school has a paper reuse container	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
There are containers to collect beverage bottles etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Students have had deep learning experiences about recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Staff and students understand the properties of different materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

	No/Not attempted	Started / do sometimes	Yes/working consistently	Proposed school action
Staff and students understand how recycling materials can be contaminated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School regularly communicates about its recycling progress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School communicates to the wider community about how it can improve recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School stays up to date about recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a relationship with its municipal council	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School community shares responsibility for recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
All staff and students provided with recycling instructions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



# CHECKLIST

## Greenwaste, composting and wormeries

Use this checklist to help guide and inform the review of the school's greenwaste program.

	No/Not attempted	Started/do sometimes	Yes/working consistently	Proposed school action
School has a greenwaste policy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has adopted a whole-school approach to collecting, processing and using greenwaste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
An adequate budget is allocated to greenwaste collecting and processing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a process and location for collecting and storing greenwaste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a structure of responsibility that ensures composting, wormery maintenance and mulching tasks are completed and problems that may arise are solved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Students as leaders are involved in the composting, wormery and mulch activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
OH&S issues have been identified and solutions are in place and closely monitored	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Those handling greenwaste or compost have access to gloves and washing facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Composting, wormery and mulch programs contribute to a positive school culture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Children, staff and canteen fruit/vegetable scraps are collected for composting or for the wormery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a composting system that can process all of the school's garden waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Those working on the school grounds and garden know what to do with the greenwaste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

	No / Not attempted	Started / do sometimes	Yes / working consistently	Proposed school action
If lawn clippings are gathered they are processed so they don't make the compost slimy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
All students and staff understand what can go into the compost and what can't go into the compost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Greenwaste from the food technology room is composted or used as worm food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Classrooms have access to wormeries for their own use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School had or has access to a mulcher that can shred thick sticks and leaves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has in place volunteers who during holidays will keep the compost bins and wormeries damp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a student vegetable garden to use worm and compost products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has solutions to deal with vermin if the need arises	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Curriculum programs support students to learn about composting, wormeries and mulching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School regularly communicates its progress on composting, wormeries and mulch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a relationship with its municipal council	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School community shares responsibility for composting, wormeries and mulching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

# CHECKLIST

## Litter and stormwater

Use this checklist to help guide and inform the review and evaluation of the school's litter and stormwater program.

	NO / NOT ATTEMPTED	STARTED/DO SOMETIMES	YES/WORKING CONSISTENTLY	PROPOSED SCHOOL ACTION
School has a litter prevention policy that includes a litter education policy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has adopted a whole-school approach to litter reduction and litter behaviour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
An adequate budget is allocated to litter prevention and reduction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a process for collecting and storing rubbish so it does not become litter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a structure of responsibility that ensures litter prevention tasks are completed and problems solved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Student leadership is encouraged to improve litter prevention and reduction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
OH&S issues have been identified and solutions are in place. When students pick up litter it is done using tongs and they wash their hands afterwards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
All students and staff understand the process in place if syringes are found	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a monitoring system to ensure its program is on track	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Picking up litter is not used as a punishment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Rubbish bins are clean and kept in good condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Outdoor rubbish bins have lids that can't fall off the bin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
There are adequate rubbish bins around the school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School community has made a link between packaging and littering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has reduced the packaging of goods being sold in their canteen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

	NO / NOT ATTEMPTED	STARTED/DO SOMETIMES	YES/WORKING CONSISTENTLY	PROPOSED SCHOOL ACTION
Students able to eat their lunch indoors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If needed the outdoor cleaners have access to blower/leaf vacuum so waste is not swept or washed down drains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Litter and stormwater is part of the curriculum and at least one year level is responsible for developing and presenting communication projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The school has made a link between stormwater and pollution and the litter in the school ground	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School is addressing all its stormwater issues, preventing leaves, lawn clipping, litter, fertiliser, oil and other chemicals from entering into the stormwater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

# CHECKLIST

## Green purchasing

Use this checklist to help guide and inform the review and evaluation of the school's green purchasing program.

	Beginner	Experienced	Advanced	Proposed school action
School has a green purchasing policy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has adopted a whole-school approach to green purchasing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The school budget reflects the need for green purchasing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
When budgets are being presented, they show where green purchasing occurs and where to obtain the products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a process for assessing purchase choices so where appropriate they are green	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a structure of responsibility that ensures green purchasing procedures are followed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Student leadership is encouraged to improve green purchasing, eg students are asked to do research and evaluate choices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Possible OH&S issues have been identified to make sure products are safe to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a monitoring system to ensure the green purchasing program is on track	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Green purchasing program contributes to a positive school culture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a criteria list and pro formas to help evaluate the most sustainable purchase. This includes whether the product is actually needed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
To keep it simple, school has decided on major consumables for green purchase eg copy paper, toilet paper, stationery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



	Beginner	Experienced	Advanced	Proposed school action
School ordering procedures includes green purchasing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Class sets of books are used when practical instead of each student purchasing their own book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The school community understands what criteria makes a particular product greener	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
A monitoring program ensures that the program is supportive of all members of the school community, the program works as it was envisaged and modifications are made if required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School community shares responsibility for green purchasing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

# CHECKLIST

## Disposal

Use this checklist to help guide and inform the review and evaluation of the school's disposal program.

	Beginner	Experienced	Advanced	Proposed school action
School has a waste disposal policy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has adopted a whole-school approach to waste disposal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
An adequate budget is allocated to the disposal of waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a process for collecting and storing different kinds of waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a structure of responsibility that ensures waste disposal tasks are completed and problems solved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Student leadership is encouraged to improve waste disposal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
OH&S issues have been identified and solutions are in place. Students are not exposed to hazardous waste or responsible for collecting hazardous waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
School has a monitoring system so that hazardous waste is stored safely before being transferred to the appropriate waste disposal facility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The appropriate disposal of waste contributes to a positive school culture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The skip or hopper that collects the school waste is in a safe area and student access is restricted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Garbage truck access to the skip or hopper is in an area where student access is restricted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cats, dogs, possum, birds <i>etc</i> can't access the skip or hopper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The skip or hopper can be locked overnight to prevent dumping of rubbish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The school community understands the difference between normal rubbish that goes to landfill and hazardous waste that must be either processed or stored in special ways	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

	Beginner	Experienced	Advanced	Proposed school action
The school has a simple and safe process for collecting unwanted materials that require disposal, but can't be sent to landfill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The school has a comprehensive plan for disposing of waste that can't be reused or recycled from technology rooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The school has OH&S procedures for gathering waste from bins and dumping it into the skip or hopper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The school has OH&S procedures for gathering hazardous waste and sending it to the appropriate facility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The school has in place an OH&S procedure for handling all toner cartridges including safe storage before disposal or recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The school locks away all hazardous materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hazardous materials are not stored in classrooms or working areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hazardous waste is never poured down drains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The school has a policy and procedure for the disposal of computer and other electronic equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The school directs its unwanted and broken furniture for a new life in a poorer school overseas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

---

# GATHERING IDEAS

## Coordinating a ResourceSmart program

---

**What are the first things I will need to do to begin a ResourceSmart journey?**

---

**What support will I need for implementing a ResourceSmart waste program?**

---

**Who do you need to talk to? How can they help me?**

School leadership

Facilities and operations

Curriculum

---

**How can I get others to work with me on this?**

School leadership

School council

Teachers

Ancillary staff

Students

School community

---

**How does ResourceSmart link with school strategic and implementation plans and other initiatives/priorities?**

# Deciding and goals tool

Goal .....

gathering ideas to achieve the goal	Highest priority	Medium priority	Practical & achievable	Possible blockers	Does it relate to the goal?



# What have we decided?

Use this tool to decide which key ideas will help the group to progress and achieve the identified goals.

IDEAS TO HELP THE GROUP TO PROGRESS	HOW WILL THIS IDEA HELP ACHIEVE THE GOALS?	RANK IN ORDER OF PRIORITY

# Set targets

Set targets and work towards these. Use the table below to chart your progress.

TARGET OUTCOMES	YEAR 1	YEAR 2	YEAR 3	NOT AT THIS STAGE
Planning group formed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waste and litter education included in the curriculum at all levels in the school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wormery in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liquid paperboard (drink boxes) recycling in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Composting system in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cork recycling in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Glass bottle recycling in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aluminium can recycling in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cardboard recycling in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paper recycling in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waste reduction of 25% achieved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waste reduction of 50% achieved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waste reduction of 75% achieved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whole-school approach to sustainability in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Litter education strategy in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waste minimisation strategy in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waste minimisation and litter reduction policy written	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Desired targets

Identify targets you hope to achieve in each year such as date of completion, percentage of waste reduction, percentage of green purchasing.

TARGET OUTCOMES	WHAT DO YOU HOPE TO ACHIEVE IN YEAR 1?	WHAT DO YOU HOPE TO ACHIEVE IN YEAR 2?	WHAT DO YOU HOPE TO ACHIEVE IN YEAR 3?
Whole-school approach to managing waste			
Rubbish disposal reduction			
Litter reduction			
Greenwaste processing			
Recycling of paper			
Recycling of other materials			
Green purchasing procedures			
Operational changes in place			
ResourceSmart curriculum initiatives in place			
Other			
Other			
Other			

# Planning a ResourceSmart waste program

Use this pro forma to help the team plan the ResourceSmart waste program.

## Get started

What is the focus for our school's ResourceSmart program? Please tick your focus area

- ☐ Reduce, reuse, recycle
 ☐ Compost, wormery and greenwaste
 ☐ Disposal  
☐ Litter and stormwater
 ☐ Green purchasing

What will be done to get started?

## Plan

What is involved in planning the program?

Possible strategies

Who will be involved?

Links to operations, whole-school and curriculum

What budget is needed?

Timeline

What will be monitored? How will this happen?

**Implementing**

How will the program be implemented?

What organisational processes need to be put in place? eg a roster, monitors

What will I do to ensure implementation is on track?

**Monitor**

How will the program be monitored? How will program progress be communicated?

How will I maintain momentum?

**Review, evaluate and report**

How will the program be reviewed?

What evaluation strategies will be used?

What can be done to improve the program and what can be done next?



## Project implementation planner

School ..... ☐ Year 1 ☐ Year 2 ☐ Year 3 (tick the relevant year level)

**List your goals. Highlight the months it will take your school to fulfil your goals.**

# Conducting a school waste assessment

## Introduction

The following form will guide you through the process of conducting a simple waste assessment for your school. The process is designed to be quick and easy and you do not need to touch or sort the waste or recycling. Please note touching the waste or recycling in a waste assessment is not recommended.

The information below will help you to plan ResourceSmart actions for your school, provide benchmarking data so that you can reflect on your successes and move your school towards ResourceSmart Schools certification.

## Collecting Information

To collect the information below, you may need to speak to office staff, other teachers or cleaning staff. You will also need to schedule a visit to your external waste and recycling bins the day before they are due for collection. Please note 'contamination' means that placing the wrong thing in the wrong recycling or compost bin can affect the material being recycled.

## 1. General school information

Name of your school

Date of assessment

Number of students

Number of staff

## 2. Waste information

	Skips	Bins
Number of skips or wheelie bins (waste only) that are collected from the school	<input type="text"/> skips	<input type="text"/> bins
Skip or wheelie bin size HINT: use a tape measure for height, depth and width	<input type="text"/> m <sup>3</sup>	<input type="text"/> Litres
How many school days pass between collections?	<input type="text"/> days	<input type="text"/> days
The day before the bins/skips are emptied, how full are they overall?	<input type="text"/> % full	<input type="text"/> % full
By looking inside the bins/skips (without touching the waste), what percentage do you think is recyclable?	<input type="text"/> % recyclable	<input type="text"/> % recyclable
Cost per year for collection	\$ <input type="text"/>	\$ <input type="text"/>
Annual waste to landfill	<input type="text"/> m <sup>3</sup>	<input type="text"/> m <sup>3</sup>

Note: 1m<sup>3</sup> = one cubic metre = 1,000 litres

### 3. Mixed or co-mingled recycling (bottles, cans, paper, cardboard etc)

Mixed or Co-mingled Recycling bins are available in (tick as appropriate):

☐ Classrooms ☐ School Yard ☐ Canteen ☐ Staffroom

☐ Other, please list.....

No. of wheelie bins of mixed recycling that are collected from the school .....

Size of wheelie bins ..... Litres

The day before the bins are emptied, how full are they overall? ..... % Full

How many school days pass between collections? .....

Look inside the bins (without touching), what % is contamination? ..... %\*

Cost per year for collection \$.....

### 4. Paper/cardboard recycling

Paper or Cardboard Recycling bins are available in (tick as appropriate):

☐ Classrooms ☐ School Yard ☐ Canteen ☐ Staffroom ☐ Other, please list:

If your school paper and cardboard goes in the mixed bins mentioned above, please go to question 5. If not, please respond below.

	Skips	Bins
Number of skips or wheelie bins for paper and cardboard recycling that are collected from the school	.....	
Skip or wheelie bin size HINT: use a tape measure for height, depth and width)	..... m3	..... Litres
How many school days pass between collections?	.....	
The day before the bins/skips are emptied, how full are they overall?	..... % full	..... % full
By looking inside the bins/skips (without touching the waste), what % do you think is recyclable? This is contamination.	..... %*	
Cost per year for collection	\$.....	

## 5. Composting

Compost buckets or bins are available in (tick as appropriate):

☐ Classrooms ☐ School Yard ☐ Canteen ☐ Staffroom ☐ Other, please list:

Type of compost bins	Number of compost bins
Type of wormeries	Number of wormeries
Volume of food or garden waste collected by the school for composting / worm composting during typical week	.....%* contamination (visual inspection)

## 6. Paper use

Number of reams of A4 and A3 paper purchased in one year ..... reams

Cost of purchasing A4 and A3 paper in one year \$....../year

Total number of reams of A4 and A3 paper purchased with recycled content ..... reams

### Annual Waste and Recycling Figures

Using the information you have collected above, calculate your annual waste and recycling figures. Below are some hints for conducting the calculations.

One cubic metre = 1,000 litres

In 2007, there were approximately 200 school days excluding public and school holidays.

#### To calculate:

$$\frac{\text{Number of bins} \times \text{size of bins in litres} \times \% \text{ full} \times \text{Total number of school days in a year (approx 200)}}{\text{Number of school days that pass between collections}}$$

	Annual volume	Contamination	Annual Cost
<b>Rubbish</b>	..... Tonnes or m3	..... %	\$......
<b>Mixed Recycling</b>	..... Tonnes or m3	..... %	\$......
<b>Paper/Cardboard Recycling</b>	..... Tonnes or m3	..... %	\$......
<b>Compost</b>	..... Tonnes or m3	..... %	\$......

### Using Your Data

*Congratulations!* You have now completed a waste assessment for your school.

Now it is time to think about whether there are any ways you can improve your current systems. The next step in your ResourceSmart waste program is to complete a Waste Action Plan (WAP). The plan is on our website (schools section) or contact CERES: [www.ceres.org.au](http://www.ceres.org.au)

# VISUAL ASSESSMENT

## Sustainability

Date..... Carried out by .....

What is being assessed?	Is it happening?	Idea for action or comment
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	
	<input type="checkbox"/> yes <input type="checkbox"/> no	



# VISUAL ASSESSMENT

## Reduce, Reuse Recycle

Date..... Carried out by .....

Assessment	needs improvement	sometimes working well	consistently working well	Action or comment
Strategies to reduce waste are in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Items sold in the canteen have reduced packaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Items sold in the canteen have recyclable packaging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Recycling containers in correct locations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Correct materials in recycling containers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Paper reuse boxes are being appropriately used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Photocopy procedures are being observed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Recyclable materials are not in rubbish bins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Recycling containers are clean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Recycling materials being collected and stored	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Stored materials are being put out for collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Area where stored materials are collected is clean and safe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
There is less rubbish going into the hopper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
There has been current communication about recycling to the school community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

# VISUAL ASSESSMENT

## Composting and wormery

Date..... Carried out by .....

Assessment	needs improvement	sometimes working well	consistently working well	Action or comment
Composting containers in correct locations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Correct materials in composting containers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Compost buckets are picked up daily	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
All lunch waste is processed the day it's collected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Compostable materials are not in rubbish bins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Composting containers are clean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The contents of the compost bins and wormeries is damp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Compost bin and wormery area is clean and safe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The contents of the compost bins and wormeries is being used, for example on the school garden	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
There is less rubbish going into the hopper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
There is current communication about composting and wormeries being received by the school community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

# VISUAL ASSESSMENT

## Litter and stormwater

Date ..... Conducted by .....

Assessment	needs improvement	sometimes working well	consistently working well	Action or comment
Outdoor rubbish bins are placed in correct locations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
There is an alternative bin for non-disposables, eg recyclables/compostable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Appropriate materials in all rubbish bins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Outdoor rubbish bins have lids and have not fallen over	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
All areas have no or minimal litter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
There is less litter being generated through items purchased at the canteen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Students' lunch waste is not part of the litter stream	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Bins are regularly emptied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Bins are cleaned and repaired	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The school gutters are free of litter, grass clippings and leaves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
There is less rubbish going into the hopper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hoses are not used outdoors to clean hard surfaces, and leaves, grass etc are never swept into drains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
There is current communication about litter to the school community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Students are observed putting litter in the bin without being asked	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Picking up litter is not used as a punishment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Students have developed effective communication projects to change littering behaviour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

# VISUAL ASSESSMENT

## Green purchasing

Date..... Carried out by .....

Assessment	needs improvement	sometimes working well	consistently working well	Action or comment
Budgets have green purchasing recommendations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Green consumable alternatives are purchased when they are cost competitive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Staff have easy to use pro formas to help them with green purchasing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Staff can obtain help when they have difficulty deciding on green products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Regular suppliers have been asked to provide green purchasing choices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Office staff have access to the green purchasing coordinator to revise procedures when they need to be simplified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Staff and students are using equipment as intended as part of the green purchasing choice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Staff and students are using consumables as intended as part of the green purchasing choice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Green cleaning products are being used as intended	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

# VISUAL ASSESSMENT

## Disposal

Date..... Carried out by .....

Assessment	needs improvement	sometimes working well	consistently working well	Action or comment
Rubbish bins are emptied daily by the cleaners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Correct OH&S procedures are followed when emptying bins into the hopper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The hopper remains locked when not being filled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The area around the hopper is kept clean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The bins are cleaned on a grassy area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No hazardous waste is placed into the hopper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
There is little material that can be recycled in the hopper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
There is no greenwaste in the hopper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The area designated for hazardous waste is tidy and does not present OHS problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hazardous waste is regularly collected for appropriate disposal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



# PRO FORMA

## Green purchasing

This sample green purchasing checklist can be used to compare a non-green product with a green purchasing alternative. Some criteria may not be relevant or possible to compare. Choose the criteria most relevant to making a decision and see if there is a clear recommendation.

### SAMPLE CHECKLIST: consumables

Criteria	Non-green Product		Green product	
Suitable quality	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Suitable cost	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Made from high percentage of recycled content	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Can be reused or recycled after use	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Contains minimal/no toxic chemicals	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Energy and resource efficient	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Packaging is recyclable	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Reduce packaging by bulk ordering	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no

Conclusion .....

### SAMPLE CHECKLIST: capital and equipment purchases

Criteria	Non-green Product		Green product	
Suitable quality	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Suitable cost	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Minimum use of virgin materials	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Can be reused or recycled after use	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Contains minimal/no toxic chemicals	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Energy and resource efficient	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Packaging is recyclable	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no
Durable/repairable	<input type="checkbox"/> yes	<input type="checkbox"/> no	<input type="checkbox"/> yes	<input type="checkbox"/> no

Conclusion .....

# COMMUNICATION TOOL

## Communication media

This tool is designed to help you identify the audience for communicating information about your ResourceSmart initiative. Considering the information most appropriate for your initiative together with the type of media is integral to the communication process. The examples are designed to help you in the decision-making process.

**Only fill in those rows that apply to your program.**

Audience	What do they need to know?	How often?	Media to be used (see media)
Teaching staff			
Administration staff			
Ancillary staff			
Principal and leadership team			
School council			
Curriculum committee			
Buildings and grounds committee			
..... Committee			
..... Committee			
Students			
Student committee			
Wider school community			
Wider community			
Municipal council			
Local newspaper			
Local Member of Parliament			
other			
other			
other			

# COMMUNICATION TOOL

## Communication media (CONTINUED)

**The following are examples of types of media to consider when communicating waste actions and information:**

- email a newsletter to a database of involved and/or interested people
- email staff, committees and school council about progress with the school's waste smart actions
- write articles for the school newsletter
- include messages in daily school bulletins
- create a ResourceSmart Schools noticeboard for displaying notices, highlights, photos *etc*
- students design posters for display around the school
- place student created instructions next to locations informing people of waste minimisation actions
- students to create and perform a drama about changes to waste management
- students create individualised waste minimisation message postcards for distribution to home or other identified places
- create and send media releases to local media
- hold an event in which students are responsible for communicating a message
- students develop PowerPoint presentations to present their ideas to the wider community
- use a buddy system to introduce the school's waste system to younger students
- students develop and take a guided tour of their waste reduction system for members of the community
- place the highlights of the school waste system on the school home page
- have weekly announcements about the waste reduction program
- develop a scheme to recognise individual and group effort and achievement
- write brief reports for the local Member of Parliament and municipal council
- make a photo library on the school intranet of the progress of ResourceSmart actions
- create an item of artwork in the school ground that communicates the school's commitment to waste reduction
- create a large graph in a central location that shows how far the school has progressed with its waste program.

---

# COMMUNICATION TOOL

## Communication content

**This tool is designed to assist you to plan the content of media communication, including potential actions the target audience can participate in and benefits of those actions.**

---

Who is the audience or target group?

---

What information does the audience need to know?  
What is the important information?

---

What would you like your audience to do?

---

How could your audience do it? Will they need resources?

---

What are the benefits for the individual, school and environment?

---

## Values tool

**Choose the five statements that *best* express your view about the importance of being part of a waste and sustainability program. Use the results to discuss and prioritise values and beliefs for informing policy and planning.**

- |  |   |
|--|---|
| <input type="checkbox"/> Our school needs to look good to attract enrolments.  | <input type="checkbox"/> To live sustainably students need to learn how to be ResourceSmart in their everyday living and school is a good place to start. |
| <input type="checkbox"/> By conserving resources we are protecting the quality of life for future generations.                                       | <input type="checkbox"/> Initiatives focusing on waste are excellent at providing stimulating, engaging and authentic learning for students.              |
| <input type="checkbox"/> By reducing waste, the school saves money that can be spent on student education.   | <input type="checkbox"/> Initiatives and actions focussing on waste are a good way to keep the school looking tidy.                                       |
| <input type="checkbox"/> As individuals we will not make much of a difference.   | <input type="checkbox"/> It is already too late to save the environment so why try.   |
| <input type="checkbox"/> As educators we can create a generation who has the capacity to solve many of the world's problems and injustices.          | <input type="checkbox"/> Each individual has a responsibility to only use the resources they need.  |
| <input type="checkbox"/> Sustainability is not going to happen while there are so many people in powerful positions concerned about financial gains. | <input type="checkbox"/> We must do everything we can to reduce pollution for the health of our children.   |
| <input type="checkbox"/> If we don't start doing something soon we will all be in a serious situation.   | <input type="checkbox"/> New government school policy means we have sustainability targets to achieve and report on.                                      |



---

## Personal reflection

---

What do you know about waste minimisation?

---

How do you feel about current waste practices at school?

---

How could current waste practices be changed so that they would be as you wished them to be?

---

How might these changes come about? Name as many ways as possible.

---

How do current waste practices affect the school community?

---

What would you like to do that might be useful in bringing about these changes?

# Glossary of terms

**COMPOST:** an organic plant material that has been changed by biological processes and will be used to improve soils

**COMPOST BIN:** an enclosure for the storage of greenwaste to assist in the biological decomposition process

**FOOTPRINT:** an approximate per capita measure of land area required for a group of people's total lifestyle and environmental impact to remain sustainable

**GREENWASTE:** organic plant material that no longer serves its original purpose (includes kitchen scraps and garden waste)

**HAZARDOUS WASTE:** waste that must be specifically treated and/or stored so as not to pollute the environment or harm people.

**LANDFILL:** an area of land set aside for the safe permanent storage of large volumes of rubbish

**LIVING MORE SUSTAINABLY:** modifying lifestyle activities to reduce the accelerating unsustainable impact people are causing. The term is a qualifying term and does not imply the lifestyle activities are sustainable, just less unsustainable. The need for this concept is that as educators we need to encourage people to have a lower impact, but we know that in the shorter term the changes they make will not be enough to live sustainably

**LITTER:** rubbish that has been allowed to escape into the environment where it can cause pollution

**MULCH:** a loose material used to cover soil; it can be made from organic greenwaste, other organic materials or non-organic material like pebbles

**OH&S (OCCUPATIONAL HEALTH AND SAFETY):** actions, both structural and behavioural that need to be taken to avoid harm to people

**PACKAGING:** materials used to store products including solids and liquids

**RE-THINK:** a questioning process to evaluate the need for consuming particular products

**RECYCLE:** collected waste that will be processed to be made into a new material

**RECYCLING CRATE:** a crate provided by council to assist in the pick up of recyclable materials

**REUSE:** a material that is used again after it has served its initial function

**RUBBISH:** material that is going to be disposed of in landfill or by another method

**RUBBISH BIN:** a smaller purpose made container for holding rubbish

**SKIP:** a large independent metal container for the collection and/or transport of rubbish or other waste

**STORMWATER:** the rainwater that drains from streets, homes, gardens *etc* and passes through a constructed drainage system with the purpose of avoiding local flooding

**SUSTAINABILITY (DEFINITION FROM EDUCATING FOR A SUSTAINABLE FUTURE)** the quest for a sustainable society, one that can persist over generations without destroying the social and life-supporting systems that current and future generations of humans (and all other species on Earth) depend on

**THE DIFFERENCE BETWEEN ENVIRONMENTAL AND SUSTAINABILITY:** *Environmental* takes a narrower focus the impact of human activity and other impacts on the environment. *Sustainability* takes into account related economic and social issues in a long-term context

**WASTE:** a material no longer needed for its original purpose

**WHEELIE BIN:** standard bins on wheels that are supplied by council and recyclers for storing and collecting rubbish, greenwaste or recyclables

**WORMERY:** containers of various sophistication used to breed and feed greenwaste to segmented earthworms which turn it into soil improving products

# FAQS

## Composting and greenwaste

Common questions	Suggested response
<b>Why bother composting?</b>	Composting has many benefits which include: <ul style="list-style-type: none"> <li>– composting greenwaste (fruit, vegetable and garden waste) saves valuable landfill space</li> <li>– compost can be used as a soil conditioner on your garden</li> <li>– compost improves the moisture holding properties of soils</li> <li>– compost saves money and water, as you will use less water on your garden and have less need to buy fertilisers.</li> </ul>
<b>Apart from composting, what can you do with greenwaste?</b>	Greenwaste such as garden waste (leaves and branches) can be mulched and used on garden beds.
<b>Are there safety precautions should you follow when handling compost?</b>	For health reasons, it is <i>very important</i> to take the following precautions when handling compost or soil: <ul style="list-style-type: none"> <li>– wash your hands after handling compost or soil materials</li> <li>– protect broken skin by wearing gloves</li> <li>– avoid confined spaces for handling compost or soil materials</li> <li>– keep compost moist to prevent the spores or bacteria in compost from becoming airborne</li> <li>– gently wet dry compost to allow dust-free handling and avoid direct inhalation of dry compost.</li> </ul>
<b>Is it true that composting produces methane – a greenhouse gas?</b>	Methane is a by-product from the anaerobic breakdown of un-aerated composting systems. This can be avoided or reduced by either turning the heap regularly or inserting devices that will increase air flow into the heap, eg agricultural pipes with slits in the sides.
<b>Can runoff of nutrient rich liquid from compost heaps affect the quality of nearby waterways?</b>	To avoid runoff entering waterways: <ul style="list-style-type: none"> <li>– the material in a compost bin should be damp, not wet. If it becomes wet, mix with shredded paper or sawdust</li> <li>– place the compost bin away from areas that may drain into waterways, ie not on steep slopes, especially on clay soils</li> <li>– cover the heap to reduce the leaching of nutrients during rain.</li> </ul>
<b>Where should you place a compost bin?</b>	The compost bin or heap should be placed in the shade to reduce the chance of it drying out.
<b>What should be composted?</b>	For effective compost you need to add a mix of ‘greens’ and ‘browns’ preferably in layers. <p>Greens: fruit and vegetable scraps, tea leaves and bags, coffee grounds, green leaves, dead flowers, garden weeds</p> <p>Browns: straw, dry brown seedless weeds, aged fallen leaves, wood chips, sawdust and shredded newspaper.</p>
<b>What should not be composted?</b>	Do not add meat, dairy products, bread or cake (may attract mice), sawdust from treated pine, pet droppings, magazines or other glossy paper, noxious weeds, diseased plants or large branches.

Common questions	Suggested response
<b>What enclosures are best for composting?</b>	Large brick, timber or plastic enclosures are suitable for garden waste. An enclosed compost bin is suggested for food scraps.
<b>How do you reduce the risk of vermin?</b>	Ensure only appropriate materials (greens and browns) are added to the compost. Bread and meat can attract vermin. Regularly turn and monitor the heap, vermin are attracted to the heat. Remember when vermin are in your area, they often go to a compost bin before venturing inside. This will give you extra time to exterminate the vermin.
<b>Should we compost or have a wormery or both?</b>	Compost bins can be used to break down food waste and garden waste whereas a wormery is used to breakdown food waste. Worm products are better for fertilising the soil. Some schools use a combined approach.

## Questions related to wormeries

<b>How do you know what size wormery to get?</b>	A class of 30 students produces about 2 to 4 kg of fruit and vegetable scraps a week which would require a wormery that contains about 2000 to 4,500 compost worms. A suitable bin would need to be about 30 cm deep with a surface area of $\frac{1}{2}$ a square metre. A school with 300 students would produce 20 to 40 kg of food scraps a week. The size the wormery would need to have a surface area of 2 square metres.
<b>Do you need to do anything to the food scraps?</b>	It helps if the food scraps are chopped up before adding them to the wormery.
<b>What do you do with excess worms?</b>	The worm population will increase over time. Excess worms can be added to the compost heap or provided to others to start a wormery. However, when a wormery reaches its maximum capacity for worms, they will stop increasing in number if none are removed.
<b>Is there anything that will kill my worms?</b>	You can't starve worms, but they will die if their home is allowed to dry out.  Also make sure you limit citrus and do not add sugary cakes, bread, fats, meat or dairy products.

# TROUBLE SHOOTING

## Composting

What do I do if...	Diagnose the problem	How to fix it...
<b>My compost pile smells bad!</b>	If the pile smells like sulphur (rotten eggs), it is too wet.	Mix in dry ingredients such as soil, dried leaves and shredded newspaper.
	If the pile smells like ammonia (acidic), it has too much nitrogen from too much greenwaste.	Add materials containing carbon such as wood ash, sawdust or newspaper.
	If the pile still smells bad, it may need air through the heap.	Turn the pile to push air through the heap. Also mix in materials that do not compact, such as green twigs and plant stems to create air spaces.
<b>My compost pile will not heat up.</b>	Check the moisture level of the pile.	It should be about as moist as a well-wrung sponge.
	The heap is made up of <i>browns</i> .	Add high nitrogen materials (eg fresh grass or vegetable scraps).
	The heap is too small.	Increase the size of your pile. The pile should be at least 1m <sup>3</sup> in size. Smaller heaps will not heat up.
<b>My compost pile attracts unwanted animals and flies.</b>	Most flies in a compost heap are small, harmless vinegar flies that actually indicate that your compost is working properly.	No action required.
	Dogs, cats, rodents or blowflies are attracted to your pile	Remove any unsuitable materials which have been added. Cover each addition of food with a layer of browns. or place the bin on a layer of wire mesh. If possible set rodent traps around the bin and monitor.
<b>My compost pile attracts ants and is dry to touch.</b>	The pile may be drying out, particularly likely to happen in summer.	Gently moisten the pile, adding water until it is as wet as a wrung-out sponge and add moisture-rich ingredients. Make sure rotts have not grown into the compost heap.
<b>My compost pile takes too long to break down.</b>	The pile might be too dry.	Moisten the pile with water until it is as wet as a wrung-out sponge.
	The pile might not have the right mixture of <i>browns</i> and <i>greens</i> .	Add moisture-rich and nitrogen-rich fruit and vegetable scraps to speed up the process.
	The pile might not have enough air.	Turn the pile to push air through the heap. Mix in materials that do not compact.



# Recycling at a glance

Materials recycled from schools	Common items	Options for collection/storage	Considerations and advice
<b>Paper/Cardboard</b>	Office paper, newspapers, cardboard packaging, phonebooks	<ul style="list-style-type: none"> <li>– office paper only (paper and cardboard separated)</li> <li>– mixed paper and cardboard collected</li> </ul>	One bin for both paper and cardboard simplifies storage and collection.
<b>Aluminium</b>	Soft drink cans	<ul style="list-style-type: none"> <li>– stored in a mesh cage or wool bale for pick up and payment</li> <li>– council kerbside collection (school collects no payment)</li> </ul>	<p>Arrange for pick up and payment with a local aluminium can collection station.</p> <p>Contact local council to be part of kerbside collection.</p> <p>Reduce volume by crushing, address safety issues.</p> <p>Rinsing reduces attraction of wasps.</p>
<b>Glass</b>	Assorted glass jars and bottles	<ul style="list-style-type: none"> <li>– commingled bins and collected from school*</li> <li>– council kerbside collection</li> </ul>	<p>Some recycling collection companies are moving towards commingled recycling collection.</p> <p>(Many schools for safety reasons ban consumable glass products.)</p>
<b>Steel</b>	Steel cans, scrap steel	<ul style="list-style-type: none"> <li>– commingled bins collected from school</li> <li>– council kerbside collection</li> </ul>	<p>Steel cans are usually only part of waste in staffroom or in school canteen.</p> <p>Scrap steel can be stored and collection arranged with a local scrap metal merchant.</p>
<b>Plastic</b>	Assorted plastic bottles and jars	<ul style="list-style-type: none"> <li>– commingled bins collected from school</li> <li>– council kerbside collection</li> </ul>	Plastic commonly recycled are 1 PET, 2 HDPE, 3 PVC. Some collection may include hard plastics from 1 to 7. Need to check with your recycling collector.
<b>Liquid paperboard</b>	Milk and juice containers	<ul style="list-style-type: none"> <li>– commingled bins collected from school</li> <li>– council kerbside collection</li> </ul>	Milk and juice containers need to be rinsed to reduce odour during storage. Rinsing and opening out is suggested if you choose to recycle these items.
<b>Cork</b>	Wine corks, cork products	large cardboard boxes to enable easy transportation.	Local girl guides or scouts often collect corks.
	Toner/Printer ink cartridges	identify local supplier that recycles suitable toner and ink cartridges.	Arrange with relevant company to pick up/drop off and replace. Apart from reducing waste there is also a cost benefit. Make sure toner residue is controlled.

\* commingled recyclables: mixed recyclables made up of glass bottles, plastic bottles (usually 1 PET, 2 HDPE, 3 PVC), aluminium and steel cans, liquid paperboard cartons

# FACT SHEET

## Guidelines to assessing your waste

Undertaking a waste assessment is a useful way to determine waste generation and costs. It is also an opportunity to identify issues, set benchmarks and improve on current practices to input into the development of your action plan. You can determine how much waste your organisation produces via a desktop audit, a visual waste assessment or a physical waste audit.

### Desktop audit

Desktop audits are useful to get an estimate of what is being wasted without having to trawl through a bin. Simply review purchasing records and receipts from your waste or recycling contractors to find out how much waste your organisation generates and the cost.

For example, office paper purchasing records will indicate number of reams and cost per annum. Estimate the amount of paper retained in archived or distributed

documents. Subtract this amount from the amount purchased to get an indication of your waste paper generation per year.

The accuracy of results is dependent on the availability and detail presented in your records, and does not include items purchased outside of administrative processes.

### Visual waste assessment

A visual waste assessment involves inspecting waste bins and skips to estimate the volume of each waste type in the bin (eg 30% cardboard, 40% plastic, 10% timber and 20% general waste). Most offices have standard waste streams and this method is usually sufficient to determine waste generation and waste type.

A visual inspection will also identify the success of any existing recycling programs. For example, it is easy to

identify any cardboard and paper in the general waste that could be recovered through the recycling system.

One of the limitations of a visual assessment is that it doesn't allow for compaction of the waste, which impacts on the accuracy of results. However, it is less time consuming than a physical waste audit where everything is weighed.

### Physical waste audit

A physical waste audit requires physically sorting, weighing and recording contents of bins/skips into categories. This audit is applicable for organisations needing accurate information or where waste streams are diverse and hard to visually separate.

Either audit all bins, or a representative sample, depending on time and labour constraints. Usually audits

represent a 'snapshot in time' therefore care needs to be taken in extrapolating this information to a yearly basis. Plan to do your audit at the same time each year and use a sample that is a true representation of types and quantities of waste generated by your business. Take into account any factors that mean the amount or type is different from the norm.

### Occupational health and safety precautions

Do not undertake a physical waste audit unless you have the appropriate protective equipment such as protective clothing, gloves and glasses. Be aware of needle stick injuries or glass cuts when handling waste, especially health care sector waste. However, sharps can be

present in any waste stream. It is also recommended to check immunisations are up to date before undertaking any activity that requires physical handling of waste. Seek medical advice if required.

# Physical Audit Checklist

## Plan

- |   |   |
|---|---|
| <input type="checkbox"/> Determine which and how many bins are to be audited                    | <input type="checkbox"/> To get a true idea of waste generation, audit waste and recycling bins where possible (this will also help determine the success of any recycling program) |
| <input type="checkbox"/> Decide the best time period, eg daily or weekly accumulation           | <input type="checkbox"/> Ensure you have a clean, safe site to conduct the audit  |
| <input type="checkbox"/> Talk to cleaning staff and waste/recycling contractors about the audit | <input type="checkbox"/> Communicate audit time and place to all participants   |
|   | <input type="checkbox"/> Don't tell general staff the time of the audit as they may change their normal behaviour   |

## Equipment

- |   |  |
|---|--|
| <input type="checkbox"/> First aid kit and access to phone in case of emergency                               | <input type="checkbox"/> Paper and pens to label containers                                |
| <input type="checkbox"/> Recording sheets and pens (1 per bin/skip) and a folder to keep them safe            | <input type="checkbox"/> Scales to weigh sorted waste categories                           |
| <input type="checkbox"/> Camera to record interesting visuals   | <input type="checkbox"/> Groundsheet   |
| <input type="checkbox"/> Safety glasses, protective clothing, water resistance footwear and heavy duty gloves | <input type="checkbox"/> Stick and tongs to rummage through waste. Do not handle the waste |
| <input type="checkbox"/> Sharps container   | <input type="checkbox"/> Broom, mop and shovel for cleaning up                             |
| <input type="checkbox"/> Bin liners or containers for sorting waste   | <input type="checkbox"/> Disinfectant and water for cleaning                               |

## The audit

- |   |   |
|---|---|
| <input type="checkbox"/> Nominate lead auditor  | <input type="checkbox"/> Have one person who doesn't handle waste to be note taker/photographer           |
| <input type="checkbox"/> Make sure every one is aware of OH&S risks and first aid kit | <input type="checkbox"/> Make sure units (kg/litres/volumes) and any other interesting factors are listed |
| <input type="checkbox"/> No smoking on site   | <input type="checkbox"/> Collate results on the <i>Waste Assessment Sheet</i>                             |
| <input type="checkbox"/> Audit one bin at a time                                      |   |

# TEACHER INFORMATION

## Focus on sustainable actions

### Paper

#### Using trees

What items in the classroom come from trees? In this activity, students have three minutes to write down on scrap paper as many things that they can see in the classroom that have been made from trees. Review the students' lists. Be sure that students understand that paper products are made from trees. Ask students to draw the room and to use one specific colour to draw all items that were made from trees and a different colour for those materials that were not made from trees.

#### Paper and paper recycling

Working in small groups, brainstorm the many different uses for paper, not forgetting tissues and toilet paper. Ask students to record the type of paper used during the day, how long this paper is used before being discarded and the fate of the paper after use.

#### What is paper?

Discuss where paper comes from. What has paper got to do with trees? What part of the tree is used to make paper? Students can look at paper under a hand lens or digital microscope. Soak some paper until the fibres are loose and view the pulp under a lens *etc.* Explain that paper is made by processing the trunks of trees to extract fibres. Wet pulp, which is made up of these fibres, is laid flat and dried to make paper.

#### Paper making

This activity enables students to understand how paper is made and the simple process required to recycle it. Undertake this activity in an area that can get a little wet, such as an art room. When finished, the paper can be used for making artworks and/or developing arts ideas.

- You will need a mould and deckle, large tub, small bucket, electric food processor, two flat boards (about 600 mm square), two bricks, sponge, newspaper for soaking up water while papermaking and some blue perforated cleaning cloths.

There is always a danger when using electrical appliances, especially near water. This danger can be minimised by the use of safety switches. It is

recommended that the food processor is connected via a safety switch to the power (these safety switches are often called Residual Current Devices (RCD) or Earth Leakage Circuit Breakers (ELCB)). These can be permanently fitted to switchboards or individual powerboards by qualified electricians. Alternatively, a portable unit can provide protection at the power outlet or if using an extension cord. These can be purchased from most supermarkets or hardware stores.

- Rip up (don't cut) used office paper (don't use glossy paper) and soak in warm water in a small bucket overnight.
- Place one of the flat boards on a table, covering it with a whole newspaper and a sheet of clean cloth.
- Place wet paper pulp in a food processor and process until it is a smooth mush.

do NOT let the food processor stand in water on the bench. Mop up any spilled water immediately.

- On a second bench, place a large container half filled with water. Add a cup full of processed mush.
- Holding the mould and deckle vertically, sweep them to a horizontal position on the bottom of the tub.
- Slowly pull up the mould and deckle so that there is an even layer of paper fibre on the deckle.
- Remove the deckle (the frame) and place the mould and the paper upside down on the cloth.
- Gently press and rock the mould, using the sponge to mop up the water squeezed through it. Carefully remove the mould.
- Cover the sheet of recycled paper with another piece of cloth. (You could build up a stack of paper and cloths in this way.) Cover with more newspaper, then place a second board over the newspaper. Place some bricks on top of the board to press the paper.
- Allow the newspaper to soak up the excess water. Remove the damp, recycled paper (at this stage, it's easier to keep it attached to the cloth) from the newspaper and either hang out to dry or dry flat on a bench.

### The challenge

**Identify how much paper the class uses on a normal day How much paper goes in the bin, is reused or recycled at school or sent home? How can this be measured?**

Students can experiment to find the most convenient and accurate units, *eg* weight, volume, number of sheets of paper *etc.* Develop a system for recording the daily consumption (a computer could be used) and disposal of classroom paper. With the results, create appropriate graphs to show the amount of paper used and how it is disposed.

#### How can we reduce, reuse and recycle?

Less paper can be used by:

- Reducing the amount of paper we use, *eg* the photocopier could be used less often, double-sided photocopying, using overhead projector transparencies, *etc.*
- Reusing all paper that has a blank unused side as scrap paper.
- Recycling all suitable paper that cannot be reused.

If the school recycles paper, students can inspect the recycling system in the school. They can look at the photocopy area to see if there is a reuse box for mistakes *etc.* and a recycle box. They can find out how the paper is collected around the school and picked up by the recyclers. Make a class reuse and recycling system. Label boxes for reuse and recycle. Make reuse and recycle symbols to go on the boxes. Describe influences on the symbols they have made. Identify purposes for which symbols are used in the community.

As an extension activity, ask each student to bring in two suitable boxes to start a reuse and recycle system for home. They can place their own symbols on these boxes. Form small groups and ask students to workshop ideas to save paper using the 'Reduce', 'Reuse' and 'Recycle' concepts. Ideas should be practical so that they should not disrupt the students' learning environment. Discuss and use the best ideas to reduce classroom paper consumption. If possible, encourage the students to take care of the school's paper recycling system. They will need to make a timetable and roster to share the work around. They may want to measure the entire amount of paper going into the recycling system and where the paper comes from. To extend this activity, they could find out how much paper each class consumes, reuses, recycles, throws into the garbage and sends home. A table or simple spreadsheet could be done using a computer.

## Reduce, Reuse, Recycle

Ask students to visualise what happens to waste/rubbish at home and school.

Encourage students to expand their visual images by asking questions such as:

- What types of things do you dispose of regularly in your rubbish?
- Is there a system for disposing of waste?
- Are there similarities between home and school?
- Where does our waste end up?

Invite students to share some of what they visualised.

Ask students to draw and describe the steps involved in the waste process from people first disposing of the waste to where they think the waste ends up. Share the ideas and decide on the most accurate.

The quantity of waste to landfill can be reduced by sorting waste into categories for reusing, recycling and composting. Conducting a basic classroom waste audit to examine the waste produced over the course of a typical day is a simple way for students to see the different types of waste and how much is produced.

The waste and recycling information sheets, *The 3Rs – Reduce, reuse, recycle* and *Composting* on the Sustainability Victoria website provide useful information about what types of materials can be reused, recycled

### Paper-free day

On a paper-free day, the whole class can avoid using classroom paper products that might be used for less than a year. Items such as textbooks and notebooks are fine because they have a longer period of use. As a class, decide which paper products are acceptable and which are not (eg worksheets). While students might suggest handkerchiefs rather than tissues, explain that health issues remain a personal choice. How would the class have to modify its activities to have a 'paper-free day'? How will this impact on paper consumption?

### Measuring success

Ask students to repeat their measurements to find out the impact of their paper activities. Make graphs to explain the changes in paper consumption, use and disposal. Using this information, evaluate whether or not the program has been successful at reducing consumption and /or waste.

### Trees are important

Discuss why students think trees are important. How do the 3Rs (Reduce, Reuse and Recycle) help to save trees?

and composted. Sorting waste into the categories of reusable, recyclable, compost and rubbish helps students understand how much waste can potentially be diverted from landfill.

### Sorting the waste

Label three boxes or plastic tubs with *reusable*, *recyclable*, *compost* and a bin with *rubbish*.

Discuss with students the sorts of things that could go in each container.

Over the day, ask students to sort what they would normally put in the bin into one of the containers or the bin, depending on the category, including classroom materials, paper, personal items, food waste and packaging.

At the end of the day, conduct a visual assessment of each container and record this on a chart. Estimate how much waste is in each; for instance, how far up the container the waste is, estimate weight, or weigh the container using bathroom scales or similar.

Discuss actions for reducing the waste in each container. Implement these actions and repeat the sorting and weighing process. Has there been a change? Is there less waste? How is this good for the environment?



# Guidelines for conducting waste or litter assessments in schools

These guidelines have been developed in response to concerns from a number of people regarding the safety of conducting waste and litter activities in schools.

**This document has two objectives:**

- to raise awareness that it is possible to gather valid information about waste and litter without having to handle the waste or litter; and

- to promote awareness of the need to consider health and safety issues associated with waste and litter activities.

## 1. Gathering information about waste

Effective information gathering about waste and litter can occur in a number of ways.

The most rigorous and involved process is a waste/litter audit. A *Waste/litter Audit* is a process which seeks to obtain accurate quantification of all aspects of waste or litter. The usual process can include counting all pieces of waste/litter, weighing items, measuring volumes, and classifying items into groups.

This method can allow for a more comprehensive study of the composition of the waste/litter stream, but does pose greater health and safety risks due to its labour-intensive approach, excessive handling of the waste/litter, and the detailed analysis required. It is also a more costly activity due to the expertise required in quantifying the composition of materials.

While there is a view that a waste/litter audit is necessary to properly manage waste or litter, less rigorous assessment processes, which reduce the necessity to handle the waste or litter have proven to be just as valid.

Two examples follow:

### (i) Waste/litter assessment

Waste/litter assessments are less rigorous than an audit, in that each item is not counted or weighed. Waste/litter assessment relies on the process of observation and estimation to classify the percentage of each type of waste/litter under main categories. Assessments can be completed with no handling of actual waste/litter.

Examples of assessment methods are:

- Waste composition is calculated by regularly checking bins or skips at the same time every day throughout a collection cycle to estimate the composition of the top layer.
- The composition of waste in a bin can be estimated by observing the contents of bin as it is being emptied into a skip by cleaning staff. The results of the assessments are recorded and a greater understanding of waste/litter patterns is obtained.

### (ii) Desktop audits

A desktop audit is a useful method to gain an insight into how waste is managed in the school and is an excellent tool to be used within a waste assessment process.

The desktop audit does not identify waste composition or amount (weight or volume), but it does assist in understanding what the cost of waste is to the school and identifying areas of high waste generation.

Generally, a desktop audit would identify the number of rubbish bins and skips in the school, how often the different types of waste are collected and the collection costs. It can also include gathering data on purchasing practices and identifying 'hot spot' areas of waste generation.

This data, in conjunction with waste assessment of volumes and composition, combine to provide clear environmental and financial information in order to justify implementing new waste management strategies.

Due to the increased health and safety risks associated with waste/litter audits, it is recommended that the school only employs waste or litter assessments and desktop audits while gathering information about its waste or litter, and that during these procedures, students and teachers do not handle the waste or litter.

## 2. Health and safety

All schools are strongly encouraged to consider all relevant Health and Safety issues while conducting their waste and litter programs, or any activity with the ResourceSmart programs.

The following is a non-exhaustive list of what each school might do to assist them to implement good health and safety procedures:

Review and consider two documents in particular; *Compliance Guidelines for Schools* and *Support Materials for Schools* (available from the Department of Education and Training), which have been developed to assist schools to meet OH&S legislation requirements and to manage the health, safety and wellbeing of staff and students within the school.

No direct reference is made in these documents to issues surrounding risks associated with waste/litter auditing within schools; however, it is recommended that sections on *Manual Handling* and *Hazardous Substances* be included in resources for staff undertaking waste management initiatives.

Address health and safety at the beginning of the waste/litter assessment process, and identify any potential risks relating to a particular school before staff and students engage in any activities, so a plan can be prepared to combat these risks. In particular, pay attention to bacterial contamination, personal safety (being alone away from main school buildings), rats and mice, needles and sharps, and trips over obstacles.

The questionnaire below can be modified and used to assist this process.

Follow best practice risk management consistent with AS4360 risk management, and comply with the *Victorian Occupational Health and Safety Act 1985* and all subsequent regulations, codes of practice and guidelines; and ensure compliance with any federal, state and local government building and environmental regulations.

## Teachers

Teachers can take an active role in this process by:

- investigating waste storage areas to identify any potential hazards such as:
  - slippery surfaces
  - evidence of public access to bins, *eg* dumped household waste
  - spilt waste rubbish, syringes *etc*
  - broken bottles
  - height of skips or bins.
- Becoming familiar with new Waste/litter assessment guidelines and methods of observation and estimating waste/litter rather than handling.
- Closing off waste and bin areas to public access as far as possible and not allowing students to work unsupervised in rubbish areas that are open to the public.
- Supervising students when conducting waste/litter assessments. The urge to climb into a bin to get 'something interesting' can often outweigh clear directions not to do so.

- Educating students so they fully understand, as appropriate per year level, methods of waste/litter assessment and concepts of observation and estimation, emphasising 'there is no need to touch'.
- Educating students about the risks associated with waste and litter activities, and appropriate risk management strategies.
- When waste/litter activities are included as a classroom activity, allowing students to identify the main hazards associated with conducting waste/litter assessments and design posters for display.

This process will create greater understanding of the issues, and visuals could be placed within the classroom and in storage areas to remind students of appropriate methods.

# Occupational health & safety Risk assessment questionnaire

**Before beginning any assessment of waste or litter, ask yourself the following questions:**

- 1 What contact with waste or litter will the students have in each planned activity?
- 2 Have you recently visited the area to be assessed? ☐ Yes ☐ No
- 3 What risks are associated with the area where the waste or litter is found?
  - vehicle movement, including trucks collecting waste
  - non-school waste dumped by members of the public
  - mechanical equipment such as compactors
  - poorly stacked items that may fall
  - any other risks? (*Eg bacterial contamination, personal safety (eg being alone away from main school buildings), rats and mice, needles and sharps, and trips over obstacles.*)
- 4 Are there any hazardous materials in the area in which you will be working?  
If so, should you be working in this area? ☐ Yes ☐ No
- 5 What equipment are you going to need?  
Has it been cleaned following previous waste/litter activities?
- 6 What OH&S issues do your students need to be aware of prior to engaging in these activities?
- 7 Are your students aware of OH&S risks and how these are to be managed? ☐ Yes ☐ No
- 8 Are your students really capable of managing these risks? ☐ Yes ☐ No
- 9 Who will be supervising the activities?
- 10 Are your students aware that they must not handle waste or litter, or climb into bins/skips/hoppers?  
☐ Yes ☐ No
- 11 What equipment is needed to clean up after the activity?
- 12 Has this equipment been organised to be ready on the day? ☐ Yes ☐ No
- 13 Where will the students wash their hands after each waste/litter activity?  
This will need to occur after all activities, not just those that involve handling of waste/litter.
- 14 Has time been allowed for clean up? ☐ Yes ☐ No
- 15 What risks are there that you haven't planned for? How will these risks be managed?

## FAQs on disposal

Common questions	Suggested response
<b>Why bother reducing waste?</b>	<p>Reducing waste has many environmental benefits:</p> <ul style="list-style-type: none"> <li>– there is a reduction in the use of energy in producing products and generation of methane (from landfill sites) and therefore less greenhouse gases</li> <li>– there is a reduction in the use of other resources</li> <li>– landfill sites will last longer</li> <li>– there will be less pollution.</li> </ul>
<b>How can it help our school?</b>	<p>When less waste needs to be disposed of into landfill, the school will need to spend less money for disposal services.</p>
<b>Are there safety precautions when disposing of rubbish and hazardous waste?</b>	<p>For health reasons, it is very important to take the following precautions:</p> <ul style="list-style-type: none"> <li>– students must not lift rubbish bins into the hopper</li> <li>– students must not get into the hopper</li> <li>– the pickup truck must be able to access the hopper in a way that they avoid students in the playground</li> <li>– only adults should handle hazardous waste</li> <li>– hazardous waste must be stored in an area where students don't have access</li> <li>– Hazardous waste must not be placed in the hopper or poured down drains.</li> </ul>
<b>What do we do with dirty rubbish bins?</b>	<p>Depending on water restrictions, choose a method for cleaning the bins. Clean them on a patch of grass where the dirty water will not run into a gutter.</p>
<b>How do we dispose of hazardous waste?</b>	<p>Sustainability Victoria conducts free collections of hazardous waste. They have a drop off location and there may only be one opportunity a year at the weekend to use this service. Find out more from Sustainability Victoria or your municipal council.</p> <p>Use the <i>Yellow Pages</i> to locate a private hazardous waste disposal service. You will need to drop off the materials and pay a fee.</p> <p>Some transfer stations will accept some types of hazardous wastes for a fee. Telephone your local transfer station to find out what they will accept.</p>
<b>What do we do with unwanted computers and other electronic equipment?</b>	<p>There is an environmental dilemma when trying to give computers a new home. When the computer is eventually disposed of, it contains many materials which are hazardous to the environment and the health of people. Some people argue we should not send old computers to third world countries for this reason. People in third world countries may appreciate these free computers.</p> <p>Some groups refurbish old computers and give them to financially struggling families.</p> <p>There are now businesses that can strip old computers and recycle the different materials avoiding the problem of them becoming hazardous waste.</p>
<b>What can we do with old school furniture?</b>	<p>The Department of Education packs old and broken furniture into shipping containers. They are sent to poorer countries where local people refurbish the furniture which is then used in their schools.</p>

Common questions	Suggested response
<b>What should not go into the school hopper?</b>	<p>Hazardous waste must never be placed in the school hopper.</p> <p>Materials that can be recycled or reused should not be placed in the hopper.</p> <p>An easy alternative is to use greenwaste on your school garden rather than putting it into the hopper.</p>
<b>What should go into the school hopper?</b>	<p>Much of what should be in the school hopper is waste associated with food that can't be recycled or composted. All paper waste from toilets. There will be some packaging that can't be reused or recycled. Some weeds will remain a problem when composted, so they are better in the hopper. It may be unavoidable to put some building wastes into the hopper.</p>
<b>What enclosures are best for the school hopper?</b>	<p>Any robust fence that separates students from the hopper and the truck that must access the hopper. From a visual perspective many schools choose a high wooden fence. The fence has an extra bonus in that it contains most of the rubbish that may spill from the hopper.</p>
<b>How do we know when a material is classified as hazardous waste?</b>	<p>Refer to the contractor that removes the rubbish from your hopper. Your local municipal council will also be able to help.</p>



# TROUBLE SHOOTING

## Disposal

What do I do if...	Diagnose the problem...	How to fix it...
<b>Hopper is filling faster than expected</b>	Household waste is in the hopper.	Lock the lid on the hopper, report to police any stranger accessing the hopper
	Large volumes of greenwaste in the hopper	Speak with those doing garden maintenance
	Lots of old books and education materials	Get old books placed into the paper recycling
	Old furniture is in the hopper	Review school procedures on the disposal of furniture
	Building rubble in the hopper	Find out if contractors have been using the hopper
<b>The school hazardous waste is confusing</b>	Don't know what constitutes hazardous waste	Find out from your rubbish contractor and local council what can't be placed into the rubbish
	Not at all sure what is in our collection of hazardous waste	Classify the material and place different types of hazardous wastes into labelled open crates
	Confused about handling the waste	Unless it is a waste created in or from the science room it will probably be safe to carry to your hazardous waste storage location
<b>You suspect there is asbestos in a building</b>	A material in the school has the appearance of asbestos	All government schools have had asbestos audits. If you think there is asbestos, you must not disturb it. Government schools should contact their local region. Non-government schools should immediately inform their school council

# References

## References and CD ROMs

The following publications were in print in May 2007. More specific reference are included at the end of each unit. Bookshops may have a variety of new publications dealing with sustainability actions, recycling and composting. These books usually have a single print run and are available for a short time. Check the school's library and resource areas where you might find other valuable references that are out of print.

### Curriculum

Winters B, 2002, *Drains to our Bays*, Melbourne Water.

Winters B et al. 2003, *Living Water Literacy Kit*, Gould League. (Eighteen reading titles and four activity books).

Marshal T, 2003 *Recycling Your Garden*, ABC Books.

*Ollie Saves the Planet* CD ROM, 2002, Sustain Ability International.

*Ollie's Island* CD ROM, 2007, Sustain Ability International.

### Government documents

Department of Sustainability and Environment, Victorian Government, *Our Environment Our Future*, Sustainability Action Statement, 2005.

Department of the Environment and Heritage, Australian Government, *Education for a Sustainable Future*, 2005.

## Excursions, assistance and guest speakers

### Waste Management Groups

Victoria is divided into 13 waste regions and each has one or more Regional Educational Officers (REO) that can provide advice on local resources, guest speakers and excursion venues. Access the following to find the schools local REO:

[www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

Click on *Who are we > Our partners > Regional Waste management group > Find your Waste Management Group*

### The Department of Education

They list organisations providing support to schools in science.

[www.education.vic.gov.au](http://www.education.vic.gov.au)

Click on *student learning > primary and secondary (under teachers and training) > student learning > learning and teaching resources > prep to year ten > learning and teaching support* (a good search word is *excursions*)

### The Department of Education strategic partnership program

Strategic partnership program is comprised of a large number of organisations in partnership with the Department of Education to provide learning services to schools

[www.sofweb.vic.edu.au/SPP/](http://www.sofweb.vic.edu.au/SPP/)

### CERES

Conducts a full range of waste excursion activities at their Brunswick centre and incursions.

[www.ceres.org.au](http://www.ceres.org.au)

### Rethink Centre

The Rethink Centre located in Bellfield/Heidelberg has displays and offers a range of education sessions, including theatre performances.

[www.rethink.vic.gov.au](http://www.rethink.vic.gov.au)

### The Barwon Waste Wise Education Centre

The Centre in North Geelong delivers sustainability education for schools and can tailor programs to suit a range of Key Learning Areas and age groups to provide valuable learning outcomes for primary and secondary students.

[www.brwmg.vic.gov.au](http://www.brwmg.vic.gov.au)

### Local council waste service

Get a direct Internet link to your school's local council waste service:

[www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

On the main bar go down the menu *find and service* and click on *Council Waste and Recycling Services*

## Major Waste Internet addresses

Most information about waste minimisation can be found on the Internet. The local municipal council website will have current information about waste minimisation in the school's community. Also check with the local council for brochures and other printed information including reports.

### VICTORIA

#### Sustainability Victoria (SV)

This State Government authority is responsible for waste minimisation along with the other areas of sustainability. Sustainability Victoria now has responsibility for waste having taken over from *EcoRecycle*. Material that was previously available on the *EcoRecycle* website can now be accessed through SV. On the home page, find the program button and look down to find the ResourceSmart button.

[www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

#### Council recycling weblinks

Direct link to all Victoria's recycling locations on council websites.

[www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

On the main bar go down the menu *find and service* and click on *Council Waste and Recycling Services*

#### Environment Protection Authority Victoria (EPA)

This body has many responsibilities in the area of waste including the disposal of hazardous waste and the impact of litter and other pollutants on waterways.

[www.epa.vic.gov.au](http://www.epa.vic.gov.au)

#### Municipal Association of Victoria (MAV)

This website will help access your school's local council. It has maps with boundaries and a comprehensive list of council web addresses. Using the menu: *Council information > Council contacts > Council websites*.

[www.mav.asn.au](http://www.mav.asn.au)

#### Department of Education

Search Knowledge Bank for the most innovative programs in Victorian schools.

[www.sofweb.vic.edu.au/knowledgebank](http://www.sofweb.vic.edu.au/knowledgebank)

#### Gould Group

Non-government sustainability education organisation. They produce and sell sustainability education publications and provide consultancy services concerning waste.

[www.gould.org.au](http://www.gould.org.au)

#### CERES Community Environment Park

Their headquarters in Brunswick East is home to dynamic educational programs covering all aspects of sustainability. Their extensive park is filled with practical working demonstrations. They also offer a wide range of off-site education programs.

[www.ceres.org.au](http://www.ceres.org.au)

#### Victorian Litter Action Alliance

Leaders in community litter education programs.

[www.litter.vic.gov.au](http://www.litter.vic.gov.au)

#### Consumer Affairs Victoria

On the website download the publication: *Consuming Planet Earth Resource Book for Teachers*. Go to the home page and click on *Publications > Teacher* and the title you want.

[www.consumer.vic.gov.au](http://www.consumer.vic.gov.au)

#### Munchy the Worm

An site for primary students about worms. Yarra Ranges Council demonstrates that councils can produce excellent resources.

[www.yarraranges.vic.gov.au/upload/munchy/index.htm](http://www.yarraranges.vic.gov.au/upload/munchy/index.htm)

#### INTERSTATE Zero Waste WA

Obtain further ideas from the WA waste education program.

[www.zerowastewa.com.au](http://www.zerowastewa.com.au)

#### Wipe out Waste – WOW

Designed for students and includes good interactive exploration of waste issues.

[www.wow.sa.gov.au](http://www.wow.sa.gov.au)

**AUSTRALIA****Australian Sustainable Schools Initiative**

This is a national framework working with schools to initiate sustainability programs. From the home page find *Resources* and below click on *Education > AuSSI*

[www.environment.gov.au](http://www.environment.gov.au)

**Planet Ark**

These sustainability activists have a range of campaigns that are very suitable for student involvement.

[www.planetark.org.au](http://www.planetark.org.au)

**Ollie**

The educational *Ollie* CD-ROMs have their own website with many additional interactive activities.

[www.olliesworld.com](http://www.olliesworld.com)

**Clean up Australia**

Clean up Australia has become much more than removing litter from the environment. They are becoming more involved in sustainability issues, so a hands-on group like this may provide campaigns and ideas for students.

[www.cleanup.com.au](http://www.cleanup.com.au)

**Eco-buy**

ECO-Buy works with local government and business to encourage these organisations to buy products that are less damaging to our environment and human health.

[www.sustainability.vic.gov.au/www/html/1804-what-is-green-purchasing.asp](http://www.sustainability.vic.gov.au/www/html/1804-what-is-green-purchasing.asp)

**INTERNATIONAL****EPA USA**

This USA website needs to be explored to discover its full potential. It has more about waste for students than any other website.

[www.epa.gov/recyclecity](http://www.epa.gov/recyclecity)

**Greening Schools**

This website has extensive resources and ideas for schools wanting to develop sustainably programs.

[www.greeningschools.org](http://www.greeningschools.org)

**Learning Through Landscapes (UK)**

These are the leaders in using school grounds for learning experiences. The website is extensive and the organisation is inspiring.

[www.ltl.org.uk](http://www.ltl.org.uk)