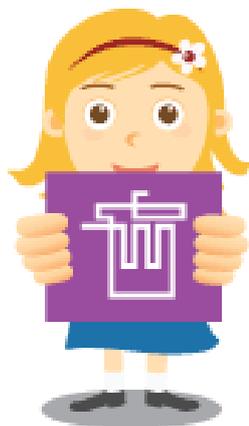


# AuSSI Waste Audit - Secondary

Note: For the most up-to-date digital version of this resource [click here](#).

## Activity Introduction

**Quick summary:** Students engage in a school waste audit to determine the quantities and makeup of the waste generated at their school. This baseline data is collected to calculate the total waste output of the school. Students investigate landfill, co-mingled recycling, paper and organic waste. Based on this data schools can explore how to reduce their waste.



This lesson can be used when working on the Waste Module of [ResourceSmart AuSSI Vic Certification](#). By completing this lesson you will have completed the following actions:

### Waste Checklist Compulsory Actions:

- A1.1 – Have you undertaken waste audits at your school?
- A1.3 – Has this data been entered as your baseline, and any anomalies explained?

### Checklist data goals:

- To find out how full the landfill and recycling bins/skips are when collected to measure actual waste output (in m<sup>3</sup>).
- To find out how much organic waste is processed by school (in m<sup>3</sup>) per year.

### Australian Curriculum Links:

<b>Cross curriculum priorities</b>	<p><u>Sustainability:</u> <b>OI.3</b> – Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems.</p> <p><b>OI.5</b> – World views are formed by experiences at personal, local, national and global levels, and are linked to individual and community actions for sustainability.</p> <p><b>OI.9</b> - Sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments.</p>
<b>General capabilities</b>	Numeracy, Critical and creative thinking

Explicit content description	<p><b>Year 7 Science</b></p> <ul style="list-style-type: none"> <li>Some of Earth's resources are renewable, but others are non-renewable (<a href="#">ACSSU116</a>)</li> </ul>
	<p><b>Year 7 Geography</b></p> <ul style="list-style-type: none"> <li>Collect, select and record relevant geographical data and information, using ethical protocols, from appropriate primary and secondary sources (<a href="#">ACHGS048</a>)</li> <li>Reflect on their learning to propose individual and collective action in response to a contemporary geographical challenge, taking account of environmental, economic and social considerations, and predict the expected outcomes of their proposal (<a href="#">ACHGS054</a>)</li> </ul>
	<p><b>Year 8 Science</b></p> <ul style="list-style-type: none"> <li>Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations (<a href="#">ACSHE135</a>)</li> </ul>
	<p><b>Year 8 Mathematics</b></p> <ul style="list-style-type: none"> <li>Choose appropriate units of measurement for area and volume and convert from one unit to another (<a href="#">ACMMG195</a>)</li> </ul>
	<p><b>Year 8 Geography</b></p> <ul style="list-style-type: none"> <li>Collect, select and record relevant geographical data and information, using ethical protocols, from appropriate primary and secondary sources (<a href="#">ACHGS056</a>)</li> <li>Reflect on their learning to propose individual and collective action in response to a contemporary geographical challenge, taking account of environmental, economic and social considerations, and predict the expected outcomes of their proposal (<a href="#">ACHGS062</a>)</li> </ul>
	<p><b>Year 9 Geography</b></p> <ul style="list-style-type: none"> <li>Collect, select, record and organise relevant geographical data and information, using ethical protocols, from a range of appropriate primary and secondary sources (<a href="#">ACHGS064</a>)</li> </ul>
	<p><b>Year 10 Geography</b></p> <ul style="list-style-type: none"> <li>Collect, select, record and organise relevant data and geographical information, using ethical protocols, from a range of appropriate primary and secondary sources (<a href="#">ACHGS073</a>)</li> </ul>

**Connecting lessons:** [Litter audit](#) – must be completed as a compulsory action.

**Resources required:** Writing materials, rubber gloves, camera or mobile phone with a camera or tablet device with a camera, access to a computer with a graphing program, map or plan of the school grounds, student worksheets, clip board (if using printed copies of worksheet).

**Digital technology opportunities:** Digital sharing capabilities.



**Keywords:** Litter, school, waste, rubbish, organic waste, recyclable waste.

**Need some more support? Click on these leading organisations**

[CERES](#)



[Greening Australia](#)

[Metropolitan Waste Management Group](#)

[PlanetSavers](#)



## Teacher worksheet

### Teacher preparation:

#### Overarching learning goal:

- Students collect data from a range of sources and calculate the total amount of solid waste produced by a school.
- Students understand that conducting a waste assessment is an easy and safe way to estimate the total amount of waste produced by a school, the number of bins around the school, the makeup of various types of bins and indications of contamination of recycling and food waste bins.
- Students learn that waste assessments can be repeated on a yearly basis, helping a school to track any changes. It is especially helpful in providing data that shows a reduction in solid waste following the introduction of a new waste system or education program.

**Teacher content information:** When we dump rubbish at the tip (landfill) polluting greenhouse gases (methane) are released. This happens when food and green waste rots under mountains of other rubbish. This puts more greenhouses into our atmosphere and is starting to affect our climate. For every wheelie bin we fill at school and home there are another 70 wheelie bins full of waste that we never see. It's already been tossed out before it gets to us. How can we create less waste?

Watch this video with your students to find out about waste and school systems.

[Cool Australia Presents Waste](http://vimeo.com/77933477) <http://vimeo.com/77933477>



#### Type of waste

- Landfill waste - rubbish that goes to the tip and is not recycled



- Co-mingled recycling waste - a mix of recyclables such as cans and bottles
- Paper waste - paper and cardboard of all sizes
- Organic waste - food and garden waste that can be put in a mulcher, chook pen, worm farm, compost or Bokashi bin.

### Hot tips:

**1.** In this activity students will need to gain information about waste from office staff, cleaners and grounds people. It might be useful to talk to staff members beforehand to work out the best way for students to gather the data.

**2.** In Activity 3 (What makes up our rubbish bins?) student are asked to photograph the contents of school rubbish bins by simply looking into the bins without touching any rubbish. Alternatively, if you want to a more in depth audit of the bins you could empty the bins onto a tarp and sort into types and then photograph these piles. You will need to provide students with rubber gloves and tongs for this option, and remind them to use caution when dealing with rubbish.

## Student and classroom organisation:

Your students will now be known as the 'Grime Scene Investigators' or GSI for short. Their job is to look at what's going on with waste at your school.

### Activity 1. How much waste does our school produce?

**Step 1.** In this first part of the waste investigation activities, GSI teams will be using the student worksheet to predict/estimate the total amount of solid waste produced by your school.

**Step 2.** Break the class into small groups. Each group is to find out the information for just one type of solid waste, for example, rubbish, paper and cardboard, other recyclables, food waste and green waste. The number of groups and the types of rubbish investigated will depend on what types of bin you already have at your school.

This will take some planning by the students, as the groups of students will need to go to different parts of the school to gather data. In the case of rubbish, paper and cardboard, recyclables and special rubbish collections, the students will need to find out the information from the office staff. It would be best if the class teacher discussed this with the office staff beforehand to work out the best way for students to gather the data. For example, the students could prepare their questions and then make an appointment with a member of the office staff. Alternatively, they could write to the office staff listing their questions. Part of the learning for this activity is about collecting information in a way that is respectful of other people's time.

**Step 3.** After the class has completed gathering all the data, ask students to graph the data, either with bar graphs or pie charts.



**Step 4.** Ask the students to work together as a class to answers the following questions:

- How much waste is generated by the school each year?
- How much waste is generated per student each year?
- How much rubbish does the school send to landfill each year?
- How much rubbish goes to landfill per student each year?
- What else did you learn from this activity?

### Activity 2. How many waste bins does our school have?

**Step 1.** Explain to your GSI teams that the next step in their waste investigation will be estimating the total number of waste bins in your school. Students will be using a map of the school and the Student Worksheet (for Activity 2) to help in their assessment.

**Step 2.** Students again work in small groups. Ask the groups decide which category of bin to investigate. Remind students to ask permission from teachers and office staff before entering a room to count bins. You may need to alert teachers and office staff when your students will be collecting data for this activity.

**Step 3.** Ask students to mark the number and location of the bins they are investigating on the map.

**Step 4.** After the class has completed gathering all the data, ask students to graph the data, either with bar graphs or pie charts.

**Step 4.** Ask the students to work together as a class to answers the following questions:

- How many separate containers are there in your school to collect waste?
- Did you notice anything interesting about any of the containers or bins?
- Which types of bins were missing and where could these bins be located?



### Activity 3. What stuff makes up our rubbish bins?

**Step 1.** Explain to your students that the final step for the GSI teams will be analysing the contents of the bins at their school. Students don't need to look at all the bins at your school; instead they can just look at the contents of three inside bins and three outside bins. Discuss with your students why they will be sampling just three bins inside and outside and not all the bins at your school. Why is one bin not enough and all the bins is not necessary? (*Suggested answer: One bin may be biased, looking in all bins would take a long time. Sampling gives a good idea about what is really happening.*)

**Step 2.** Using the worksheets (for Activity 3), the class needs to estimate the make-up of the rubbish bins in classroom rubbish bins and outside rubbish bins. As an added precaution, remind students to follow the class safety code for waste and that all students should wear rubber gloves for this activity, as they may be opening and closing the bins.

**Step 3.** Break the class into small groups again, and ask each group to decide which bins to investigate. Remind students to ask permission from teachers and office staff before entering a room to gather data. You may need to inform teachers and office staff that your students will be collecting data for this activity.

**Step 4.** Once groups have decided which bins to investigate and have received the necessary permission to look in those bins, groups should start taking photographs of the contents of their three classroom bins and three outside bins. For each bin, they open the lid and take a photograph of the contents, from a position directly above the bin. They should check the lighting. If there is insufficient natural light, then they may need to use a flash. They should not touch the rubbish or poke at it with anything.

Alternatively, if you are interested in doing a more in depth audit of the bins you could empty the bins onto a tarp and sort the rubbish into types and then photograph these types and record this information on the Student Worksheet.

**Step 5.** Students download their photos to a computer and count the number of different types of rubbish that they can see in the top layer of the rubbish in each photo. Ask students to use the student worksheet for Activity 3 to record their observations .

**Step 6.** After the class has completed gathering all the data, ask students to graph the data, either with bar graphs or pie charts.



**Step 7.** Ask the students to work together as a class to answers the following questions:

- What were the five most common items in rubbish bins in the classrooms?
- What were the five most common items in rubbish bins outside?
- Was there a difference between the two sets of results? If so, why might this be the case?
- Were there any items in the bins that could have been recycled or composted? What could the school do to prevent this from happening?
- What else did you notice that was interesting about the contents of the bins?
- What are some ideas for improving the waste management system in the school?

## Take action

Let your school community know what you're doing to create less waste at your school. Ask students to write articles or learning stories that celebrate your waste and litter achievements. These can be published on the school websites, or students can create a presentation to share with the school community at an assembly, open day, school council meeting, fete or with other schools in your area.

The learning stories could include:

- Waste goals and achievements (where you started, how far you have come);
- The steps in meeting these goals and achievements;
- Inspiration, help and advice; and
- Supporting images.

In addition, students should compare the waste recorded in their audit to their waste bills data. Was there a difference? If so, why?



## Ideas for cutting waste at your school

Project	Description	Resources
Spread the word	Create interpretive signage for the school about cutting waste.	<a href="#">Cool Australia Waste factsheet</a>
Take it home	Create 3R booklets or brochures for the school community.	<a href="#">Cool Australia Waste factsheet</a>
Engage an expert	Contact a local waste expert to arrange an incursion or an excursion.	Your local Council or waste management company.
Waste free lunch	Hold a 'Nude Food Day' at your school	<a href="#">Nude Food Day</a>

## Assessment/reflection

Ask students to reflect on their experiences of this activity by completing the KWHL worksheet ([click here to download](#)). What did the Grime Scene Investigators find the most interesting in their assessment of school waste?

## Extension/homework opportunities

Students could use the data collected in Activity 3 to calculate the percentage of each type of item in the inside and outside bins.

### Have you recorded your annual baseline data?

For this audit you will need to record:

- To find out how full the landfill and recycling bins/skips are when collected to measure actual waste output (in m<sup>3</sup>).
- To find out how much organic waste is processed by school (in m<sup>3</sup>) per year.

## Student worksheet

### Thought starter: What are the 4Rs?

#### Activity 1. How much waste does our school produce?

**NOTE:** You will be calculating the amount of waste produced by your school over the course of one year. In our demonstration calculations we have counted one year as being 52 weeks or 12 months. You will need to work out how many weeks/months your school is open for during the year to get an accurate measurement for your school.

#### *Landfill Rubbish*

- 1. How big is your skip?** To measure the volume of the school's skip bin, get a 1 metre ruler or a measuring tape. Measure the length, the height and the depth in metres (  $L \times H \times D = \text{Volume m}^3$  ). If you have more than one landfill skip multiply the volume by the number of bins. Be sure to check that all the skips are the same size and adjust figures accordingly.
- 2. How often is it collected?** Ask the office when your skips are emptied. It is most likely to be every week or fortnight.
- 3. How full is the skip when it's collected?** Estimate how full the skip is just before it is being emptied. Convert your estimate to a volume.
- 4. How many cubic metres of landfill waste are collected per month?** Calculate how many cubic metres of waste are being collected per week and then work out the monthly volume.

Total volume of rubbish x how often it's collected per month = \_\_\_\_  $\text{m}^3$  per month

- 5. How many cubic metres of landfill waste are collected per year?** Multiply your monthly volume by 12 = \_\_\_\_\_  $\text{m}^3$  landfill waste per year.
- 6. How many kilograms of waste is collected per year?** Multiply your annual volume by 131 = \_\_\_\_\_ kg's of waste per year.



Conversion factors - 1 cubic metre of mixed waste (not compacted) weighs 131 kg.

1. Total volume of skip	2. How often is it collected?	3. How full is the skip when it's collected? (cubic metres)	4. Total volume of waste collected per month (cubic metres)	5. Total volume of waste collected per year? (Total usage)	6. Total weight of waste collected per year?
Example: 3 m <sup>3</sup>	1 per week	1.5 m <sup>3</sup>	6 m <sup>3</sup>	72 m <sup>3</sup>	9,432 kg

If the total volume of the MCG is 1,700,000 cubic metres, what percentage of the MCG does one year of waste at your school represent?

---

### Paper and cardboard

**1. What is the total volume of your paper recycling bins or skips?** Measure the length, the height and the depth in metres (  $L \times H \times D = \text{Volume m}^3$  ). If you have more than one recycling bin or skip multiply the volume by the number of bins.

**2. How often are the paper bins/skips emptied?** Find out when the bins are emptied. Most bins are collected every week or two weeks.

**3. Check out how full the bins or skips are when they are being collected.** If it's not near collection time, ask the school cleaner how full the bins usually are.

**4. What is the volume of paper being collected per month?** Volume in bins/skip x how often it's collected per month = \_\_\_\_ m<sup>3</sup> per month

**5. How many cubic metres of paper is collected per year?** Multiply your monthly amount by the number of monthly collections per year e.g. 12 = \_\_\_\_ m<sup>3</sup> per year.

**6. How many kilograms of paper and cardboard is collected per year?** Multiply your annual amount by 240 = \_\_\_\_\_ kg's per year.

TIP - Another way to measure volume is in litres. 1 cubic metre = 1000 litres.



Conversion factors - 1 cubic metre of paper and cardboard waste weighs 240 kg

1. Total volume of bins or skip	2. How often are the paper bins/skips emptied?	3. How full are the bins or skips are when they are being collected.	4. Total volume of paper and cardboard collected (cubic metres) per month	5. Total volume of paper and cardboard collect (cubic metres) per year	6. Total weight of paper and cardboard (kg) collected per year
Example: 1 skip = 3m <sup>3</sup>	1 per fortnight	full = 3m <sup>3</sup>	6m <sup>2</sup>	72m <sup>2</sup>	17,280 kg

**Other recyclables**

Conversion factors

- 1 cubic metre of mixed waste (not compacted) weighs 131 kg
- A wheelie bin holds either 120 or 240 litres (or 0.12 or 0.240 cubic metres) - check your bins before making your calculations.

Number of wheelie bins or skips collected each week	Volume of each bin or skip (cubic metres)	Total volume of recyclables collected (cubic metres)	Total weight of other recyclables collected (kg) per week (multiply number of cubic metres by 131)	Total weight of other recyclables collected (kg) per year (multiply your weekly amount by 52)
Example: 2	0.24	0.48	63	3,276

## Food waste

### Conversion factors

- 1 cubic metre of food waste weighs 200 kg
- One bucket holds about 10 litres or 0.01 cubic metres

Number of wheelie bins or buckets collected each week	Volume of each bin or bucket (cubic metres)	Total volume of food waste collected (cubic metres)	Total weight of food waste collected (kg) per week (multiply number of cubic metres by 200)	Total weight of food waste collected (kg) per year (multiply your weekly amount by 52)
Example: 20 buckets	0.01	0.4	40	2,080

## Green waste

Green waste includes leaves, grass clippings, light prunings etc.

### Conversion factors - 1 cubic metre of mixed green waste weighs 64 kg

Number of containers collected each week	Volume of each container (cubic metres)	Total volume of green waste collected (cubic metres)	Total weight of green waste collected (kg) per week (multiply number of cubic metres by 64)	Total weight of green waste collected (kg) per year (multiply number of cubic metres by 52)
Example: 1	0.24	0.24	15	780

### Special rubbish collections

Many schools have a hard rubbish collection once or twice year. Check with your rubbish collector whether this rubbish ends up in landfill or is sorted for recycling.

Conversion factors - 1 cubic metre of mixed waste (not compacted) weighs 150 kg

Number of skips of rubbish collected each year	Volume of each skip (cubic metres)	Volume of each skip (cubic metres)	Total weight of special rubbish collected (kg) per year (multiply number of cubic metres by 150)
Example: 2	10	20	3,000

### What is the combined total waste your school produces over one year?

- Calculate the weekly totals for rubbish, paper and cardboard, other recyclables, food waste and green waste
- Calculate the yearly total for special rubbish collections

	Amount per week (kg)	Amount per year (kg) (i.e. for 40 school weeks, multiply amount per week by 40)
Rubbish		
Paper		
Other recyclables		
Food waste		
Green waste		
Special rubbish collections		
<b>Total</b>		

If the total volume of the MCG is 1,700,000 cubic metres, what percentage of the MCG does the combined total waste for one year at your school represent?

---

## Activity 2. How many waste bins does our school have?

You'll need to check all the rooms in the school, and look at bins in hallways and corridors.

Location of bin	Number of rubbish bins	Number of bins for recycling paper and cardboard	Number of bins for recycling bottles and cans	Number of bins for food scraps
Outside bins				
Classrooms				
Main office				
Principal's office				
Assistant Principal's office				
Teachers' office				
Staffroom				
Library				
Sports room				
Sick room				
Canteen				
Toilets				
Other rooms				
<b>Total</b>				

### Activity 3. What makes up our rubbish bins?

**Inside bins** - Record only what you can see in the top layer of the rubbish. Don't touch the rubbish.

Item in the bin	Bin 1	Bin 2	Bin 3	Average
Sheets of paper				
Small pieces of paper and paper wrappers (such as icy pole wrappers)				
Paper bags				
Cardboard boxes and cartons (such as drink cartons or take away food containers)				
Paper sandwich wrap				
Paper tissues or towel				
Plastic drink bottles				
Plastic cartons or containers (such as yogurt containers)				
Plastic straws				
Plastic lolly wrappers				
Plastic chip packets				
Plastic wrap				
Plastic bags				
Small items of plastic				
Whole or partly eaten pieces of raw fruit or vegetable				
Pieces of cake, bread and pastries				
Other food items				
Metal cans				
Metal tins				
Aluminium foil				
Foil chip packets				
Pens, pencils				
Erasers				
Batteries				
Clothing				
Icy pole sticks				
Other items				
<b>Total</b>				

**Outside bins** - Record only what you can see in the top layer of the rubbish. Don't touch the rubbish.



Item in the bin	Bin 1	Bin 2	Bin 3	Average
Sheets of paper				
Small pieces of paper and paper wrappers (such as icy pole wrappers)				
Paper bags				
Cardboard boxes and cartons (such as drink cartons or take away food containers)				
Paper sandwich wrap				
Paper tissues or towel				
Plastic drink bottles				
Plastic cartons or containers (such as yogurt containers)				
Plastic straws				
Plastic lolly wrappers				
Plastic chip packets				
Plastic wrap				
Plastic bags				
Small items of plastic				
Whole or partly eaten pieces of raw fruit or vegetable				
Pieces of cake, bread and pastries				
Other food items				
Metal cans				
Metal tins				
Aluminium foil				
Foil chip packets				
Pens, pencils				
Erasers				
Batteries				
Clothing				
Icy pole sticks				
Other items				
<b>Total</b>				