



## ACTIVITY: Rubbish Bin Audit

### ACTIVITY OVERVIEW

Sustainability is a cross-curriculum priority of the Australian curriculum, concerned with maintaining all life on Earth - both now and in the future. There are many areas of sustainability that primary school students can have little impact on at this stage in their lives, including fossil fuel use, renewable energy, and house and car choices. However, students can take immediate action on the rubbish they produce in their daily lives - particularly what they contribute to school waste. All students can choose to put a piece of paper in the recycle bin, save a banana peel for the compost, rather than sending it to landfill, and put rubbish in the bins at school.

What does our school population throw out in our rubbish bins? This activity sits in the 'Data representation and interpretation' section of the Mathematics curriculum, with students collecting, presenting and analysing data that is directly linked to their own lives and choices.

Class discussion following the activity can give students ideas about positive action that can be taken to improve sustainability of your school and your local community.

**SYNOPSIS**

This activity sits in the 'Data representation and interpretation' section of the Mathematics curriculum, with students collecting, presenting and analysing data that is directly linked to their own lives and choices. Class discussion following the activity can give students ideas about positive action that can be taken to improve sustainability of your school and your local community.

**Foundation – Year 2**

- F: Compare, order and make correspondences between collections, initially to 20, and explain reasoning. (VCMNA072)
- Y1: Count collections to 100 by partitioning numbers using place value. (VCMNA088)
- Y2: Solve simple addition and subtraction problems using a range of efficient mental and written strategies. (VCMNA107)
- Y1: Represent data with objects and drawings, where one object or drawing represents one data value. Describe the displays. (VCMSP102)
- Y2: Identify a question of interest based on one categorical variable. Gather data relevant to the question. (VCMSP126)
- Y2: Collect, check and classify data. (VCMSP127)
- Y2: Create displays of data using lists, tables and picture graphs and then interpret them. (VCMSP128)

**Years three – four**

- Y3: Identify questions or issues for categorical variables. Identify data sources and plan methods of data collection and recording. (VCMSP148)
- Y3: Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies. (VCMSP149)
- Y3: Interpret and compare data displays. (VCMSP150)
- Y4: Select and trial methods for data collection, including survey questions and recording sheets. (VCMSP178)
- Y4: Construct suitable data displays, with and without the use of digital technologies, from given or collected data. Include tables, column graphs and picture graphs, where one picture can represent many data values. (VCMSP179)
- Y4: Evaluate the effectiveness of different displays in illustrating data features, including variability. (VCMSP180)

**Years five – six**

- Y5: Pose questions and collect categorical or numerical data by observation or survey. (VCMSP205)
- Y5: Construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies. (VCMSP206)
- Y5: Describe and interpret different data sets in context. (VCMSP207)
- Y6: Construct, interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables. (VCMSP235)
- Y6: Pose and refine questions to collect categorical or numerical data by observation or survey. (VCMSP237)

## ACTIVITY, MATERIALS AND INSTRUCTIONS

### Activity

This activity is best conducted after lunchtime, when the school rubbish bins are at their fullest for the day.

Try to choose a day with little wind, as this will make sorting rubbish outdoors easier.

### Materials for class of 30 students

- School rubbish bins x 5 – 10
- Tongs x 15 pairs
- Gloves (disposable or gardening) x 15 pairs
- Tarpaulin x 5 – 10 (not essential, but helpful)

### Instructions

1. Make a prediction.  
What type of rubbish do we expect to find the most of in our school bins?
2. Students work in groups of at least two. Each group is allocated the contents of one rubbish bin to count (this may determine the number of groups you split your class into). Record the location of your bin on your page (e.g. 5A, 3B, next to art room).

### Collecting data

3. Sort and count the rubbish found in your bin. Everyone touching the rubbish should wear gloves and/or use tongs to handle items.

One person in the group is nominated to record the rubbish counted (you may like to use the attached worksheet or make your own).

Make a tally of items as you go (marking one line for each item found).

*Note* – A day without wind will be best for this activity, as rubbish can be sorted into piles on the ground, or onto tarpaulin. It is easier to do this on asphalt or concrete, rather than grass, as small pieces of rubbish can be more easily swept up at the end. Rather than sticking arms into the bin, it is easier to tip the rubbish out onto the ground.

4. Return all rubbish to the bin.
5. Wash your hands with soap.
6. Add up the tally lines to give you a total number of rubbish pieces for each of your categories, and an overall total. Optional – add together data to give results for.

### Displaying data

7. Use your data to produce a graph of the rubbish found in your bin.

Younger students produce a picture graph (e.g. use pictures of banana peels for food scraps, pictures of chip packets for plastic wrappers). Students can help decide what picture is best to use for each category.

To make this easier, teachers could print out pages of the different rubbish category pictures (copy and paste one image to fill a page), with students cutting out and sticking down as many as they need.

Older students produce a column graph, with one column for each type of rubbish. Students can also share data with another group and compare the rubbish from two classes (e.g. compare 6A and 6B bins), presenting this data in a side-by-side column graph.

## Interpreting data

8. Discuss results as a class. What can be learnt from this rubbish bin audit? Groups present their results to the class, so that a comparison can be made between the contents of different bins. What was the most common rubbish found in your school bins? Was it something that could be recycled or disposed of in another way? Were some class bins very different to others? For example, if you find a lot of paper scraps in your bins, students may need a reminder about using the recycling bins at school. If you find a lot of food scraps in the bins your school may consider starting a composting program.

## HOW TO USE THIS ACTIVITY WITH YOUR STUDENTS

This activity provides a real-world situation where data collection is required, allowing students to contribute to their school environment. How can we reduce our school waste? In order to reduce waste, we need to know what waste is being collected. We need to answer the question – ‘What is in our rubbish bins?’ – before we can begin to reduce our waste.

### Foundation – Year 2

Students in Foundation – Year two can be led through the beginning of this data activity, with the teacher providing data collection sheets and the question that we wish to answer. When counting rubbish items, students may choose to sort into piles of 10 to make counting easier.

Results are recorded in a table (see attached worksheet, or make your own), then made into a picture graph to display.

To extend students’ learning, challenge them to reduce the amount that goes into the classroom bin. Who can bring less wrappers to school?

Can we reuse that piece of paper instead of throwing it out? Is there food that is being thrown away that should have been eaten? You can surprise students with a rubbish bin audit any day, to see how they are progressing!

### Years 3/4

Year three and four students can help plan the data collection. Which bins should we collect? What time of day should we look in the bins? What day should we do this activity? What categories of rubbish are we expecting to find? These students can create their own categories, or use the attached worksheet if time is restricted.

After data has been collected in the table, students can present this data with or without digital technologies, as required. If presenting by hand, picture or column graphs are a good choice.

However, if presenting using digital technologies, entering data in a spreadsheet, and using chart options available will provide you with the ability to make column or pie charts. Note – spreadsheet programs (e.g. Excel, Google Sheets) usually refer to graphs as charts.

### Years 5/6

Students from Year five and six should plan the data collection. As a class (or year-level), you will need to agree on which bins will be audited, which day to do the count (maybe different classes can count on different days), and what time of day the count should be conducted.

Some students may already have ideas about how rubbish changes through the week, for example at a school that has ‘nude food’ on only some days.

Categories of rubbish (e.g. paper, food scraps) are suggested by students and one master list of categories is created.

When presenting data using digital technologies to create a side-by-side column graph, choose the 'clustered column' in Excel or 'column chart' in Google Sheets.

You will need to put the rubbish data for separate bins in separate columns of the spreadsheet, with the categories in the first column.

Some students in these year levels will be part of the school leadership group and may be able to use this data collected to instigate positive school-wide changes, like the introduction of composting, hard-to-recycle collection bins or nude food days.

**Note about being sensitive to different family situations:** Some students will be in situations where they have no input into food brought to school. Some students will have to pack their own lunchboxes and will be left to choose from packaged items. Some parents will not have extra time to make changes to contents of children's lunchboxes.

Please be mindful of these situations when trying to reduce the amount of waste brought to school. If you feel like this might be difficult for some of your students, change the focus of your sustainability challenge to just reducing classroom waste, not including recess and lunch waste. For example, making sure that paper waste goes in the recycle bin, or suggesting hard-to-recycle waste collection bins for other items, such as toothbrushes.

## DISCUSSION SECTION AND KEY THEMES

### KEY THEMES

#### How much rubbish do Australians make?

In the 2018/19 financial year, Australian households produced 12.4 million tonnes of waste. This included textiles, leather, and rubber (0.3 million tonnes), masonry materials (0.3 million tonnes), glass (0.8 million tonnes), metals (1.1 million tonnes), plastics (1.2 million tonnes), paper and cardboard (2.2 million tonnes) and food and garden organics (6.4 million tonnes). That is a lot of rubbish!

#### Refuse Reduce Reuse Recycle

Keep these in mind when you are trying to make less waste. When you analyse the contents of your rubbish bins, students can use these as a prompt for actions that can be taken by your school community.

- **Refuse** – Say no to something that you don't really need (e.g. straws, lids, plastic bags). This is not so helpful for school waste, as you are usually not purchasing or being given unnecessary items.
- **Reduce** – What could we stop using? Can we replace plastic wrap with lunch containers? Can we put less in the rubbish bin?
- **Reuse** – What could we reuse for another purpose? Can some things be saved for construction projects or the art room?
- **Recycle** – What should have gone in the recycle bin? Does our school have other bins for recycling these items?

## Collecting data

There are several different types of data that can be easily collected by primary school students:

- Counting items (e.g. type of rubbish in the bins, bins in the school grounds)
- Yes/No questions to other students (e.g. would you like to have a compost bin at school?)
- Open-ended questions to other students (e.g. what is your favourite food?)
- Multiple-choice questions to other students (e.g. which of the following items are in your lunchbox today? a) plastic wrap, b) juice box, c) chip packet, d) yoghurt pot)

Counting items is the easiest data collection to organise. You don't need to coordinate with other teachers, and it can be done any time of the day/week that suits your class.

## Presenting data

Types of graphs suitable for displaying rubbish audit data:

- *Picture graph* – uses symbols, icons or pictures to represent data (e.g. a picture of a banana represents one piece of fruit found in the bin).
- *Column graph* – one column is used for each category of data collected, with height of column showing the amount counted (e.g. one column for food scraps that is four squares high = four pieces of food).
- *Side-by-side column graph* – used to compare two sets of data presented in column graphs (e.g. 5A vs. 5B rubbish count), with each category of data collected having two coloured columns of data.
- *Pie chart* – a circle that is divided into slices, like a pie, with the whole circle representing the whole of the data collected (e.g. the whole circle represents all of the rubbish found in a class bin, with each slice of the pie representing the amount found in each category).

## Interpreting data

This is looking at the data we have collected and trying to work out what it is showing us. Often, we ask ourselves questions about the categories with the most and least, the highest or lowest bars in our column graph.

This leads us to 'why' questions. Why was there so much paper in 4B's bin? Why weren't there any food scraps in 5A's bin? Looking at our data can also lead us to questions about our data collection method.

If we audited 2C's bin tomorrow, would we get different results? Is there more rubbish on certain days of the week? Was today an icy-pole day at the canteen? It is ok if our data interpretation leads to more questions.

We don't always have time to conduct further investigations but if something comes to mind when we are analysing our data it is important to note it down.

## QUESTIONS AND ANSWERS

### Can we do a rubbish audit once and assume that we know all about our school's rubbish?

When collecting data, bigger is better. The more samples we can take, people we can ask, or items we can count, the closer we will be to the actual value.

Counting a few classroom rubbish bins on one day is unlikely to be representative of the whole rubbish picture of our school, but we can improve this. Time permitting, count rubbish on every day for a whole week or randomly choose days throughout the term. Count rubbish from different classrooms or playground areas, so that by the end of term you have collected data from different places and different students.

What might affect our data? Perhaps some kids are packing their own lunches, or choosing packets of food, because that is easiest.

Younger students probably all have lunches packed by parents. Are older students better at using the recycle bins? Do younger kids make more rubbish in the classroom? Are there certain days of the week that mean your school has more or less rubbish (e.g. nude food days, icy-pole days, lunch order days). When we discuss our data collection at the end, we should consider these factors.

## Who collects data as part of their job?

There are many jobs that involve data collection. Some examples include collecting data about medical treatments, traffic movement, financial information, and political views.

Sometimes an actual person doesn't even need to collect the data because it is already done for them by computers. Many aspects of our online activities are recorded and used by companies, including different words that we search for, goods that we browse on their websites, and music that we listen to.

## Where can I find some more graphs about rubbish?

The Australian Bureau of Statistics, one of the biggest data collectors in Australia, has information collected about rubbish produced by Australians in the 2018-19 financial year. You can see graphs about types of waste and recycling, for both industry and households. These column and line graphs could be shown to students as examples of data presentation: <https://www.abs.gov.au/statistics/environment/environmental-management/waste-account-australia-experimental-estimates/2018-19>

## What other data could I collect at my school?

There are lots of opportunities for data collection around your school. Some examples include bird species in the school grounds, where children play at lunchtime, students present on a particular day, different uniform items being worn, and favourite foods.

Some data collection can be done by observation, while other data collection includes asking people questions.

## Does anyone ever do an audit of my home rubbish bin?

Yes, local councils will periodically audit kerbside rubbish and recycling bins. Kerbside audits are most often done to see how much contamination is occurring, that is the amount of waste being placed in the incorrect bin. Sustainability Victoria has guidelines to assist local councils in conducting waste audits. <https://assets.sustainability.vic.gov.au/susvic/Guide-Kerbside-recycling-Guidelines-for-Auditing-Kerbside-Waste-in-Victoria.pdf>

There are suggested categories for counting, as well as advice on choosing a sampling area, and strengths and weaknesses of different audit approaches. We can't use the same categories to count our school rubbish, as they do for counting household rubbish, as we find different types of rubbish at these locations.

## What is an audit?

An audit is an independent examination of one aspect of an organisation. Usually, audits involve looking at financial records of an organisation. Audits are important because they check that company procedures and processes are working efficiently and correctly.

Audits are always completed by someone independent, someone who hasn't been doing the work or taking part in the activity.

So, strictly speaking, we should not be auditing our own classroom rubbish bin, as this is not independent. Our rubbish bin audit is a check of the process of waste disposal at a primary school.

### **What happens to schoolyard rubbish that doesn't get put in the bin?**

Schoolyard rubbish should always be put in the bin. Rubbish that doesn't get put in the bin will eventually be blown or washed into our drains, then creeks and then into the sea.

Animals can be harmed by rubbish, thinking that it is food, and can also be trapped in it. Here are some impactful photos of rubbish affecting sea creatures, taken by the World Wildlife Fund (WWF), Australia.

<https://www.wwf.org.au/news/blogs/in-photos-drowning-in-plastics#gs.2uagnp>

It doesn't matter if your school is close to the sea or far away, all the stormwater drains and gutters around your school will eventually join other drains and creeks and end up in the sea. Litter traps can help remove some rubbish from the waterways, but they cannot stop all items.

### **Who can help me set up a composting program at our school?**

There are many organisations that can help you set up a school composting program. Here are some helpful links: Planet Ark, with Costa Georgiadis <https://www.youtube.com/watch?v=bU6kULOUAsw>

### **What materials can be collected for recycling from schools?**

Different states and territories have their own resources for waste management in schools. Check the links in the section below to find the one for your state or territory.

There are also options for collecting hard-to-recycle materials from your school. Check out TerraCycle for options that may suit your school (<https://www.terracycle.com/en-AU/>).

If you do not have the time to manage a TerraCycle service at your school, you can search their website to find other local drop-off points for things like dental waste, contact lenses, toys, pens, and pencils.

These local drop-off points could easily be publicised to your school community in newsletters or posters made by students.

### **Are there schools that have no rubbish bins?**

Most schools still have rubbish bins, although some do not have any bins in the playground.

However, there are a couple of schools that have publicised taking away their rubbish bins, including Melbourne Girls' College and Blacksmiths Public School.

All schools should be working towards reducing waste, as this benefits the environment and saves money.



## OUTSIDE OR SUPPLEMENTARY READING

### ResourceSmart Schools (VIC)

- <https://www.sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/resourcesmart-schools/about-resourcesmart-schools>

### Compost Curriculum Guide (WA)

- [https://www.wasteauthority.wa.gov.au/images/resources/wss/Files/2019/10/Curriculum\\_-\\_Primary\\_School\\_-\\_Compost.pdf](https://www.wasteauthority.wa.gov.au/images/resources/wss/Files/2019/10/Curriculum_-_Primary_School_-_Compost.pdf)
- [https://www.wasteauthority.wa.gov.au/images/resources/wss/Files/2019/10/fact\\_sheet\\_Compost.pdf](https://www.wasteauthority.wa.gov.au/images/resources/wss/Files/2019/10/fact_sheet_Compost.pdf)

### Gardening Australia, Food Scrap Friday

- <https://www.abc.net.au/gardening/factsheets/food-scrap-friday/10766488>

### Halve our Waste, Schools Toolkit (VIC)

- <https://www.mwrrg.vic.gov.au/assets/resource-files/Halve-our-Waste-Schools-Toolkit-Frankston.pdf>

### ResourceSmart Schools (VIC)

- <https://assets.sustainability.vic.gov.au/susvic/Guide-ResourceSmart-Schools-Waste-A-how-to-guide.pdf>

### Sustainable Schools (NSW)

- <https://www.sustainable-schools.nsw.org.au/teach/waste>

### Actsmart Schools (ACT)

- <https://www.actsmart.act.gov.au/what-can-i-do/schools/actsmart-schools/waste/resources>

### Rethink Waste (TAS)

- <https://rethinkwaste.com.au/schools-program/>

### WasteSorted Schools (WA)

- <https://www.wasteauthority.wa.gov.au/wss/>

### Waste Education (QLD)

- <https://wasteeducation-qld.org/>

### Wipe Out Waste (SA)

- <https://www.wow.sa.gov.au/>

### Australian Data Science Education Institute

- <https://adsei.org/>

## TOPIC WORDS

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|--------------|----------|-----------|
| • Recycle    | • Litter | • Data    |
| • Collection | • Refuse | • Audit   |
| • Compost    | • Reduce | • Waste   |
| • Landfill   | • Reuse  | • Rubbish |

# RUBBISH AUDIT OF OUR SCHOOL

BIN: \_\_\_\_\_

<b>Items Found</b>	<b>Tally</b>	<b>Total</b>
Food wrappers (chip packets, snack bars, lollies, party food)		
Cling wrap		
Plastic bags (zip-lock bags and shopping bags)		
Plastic bottles		
Juice boxes		
Plastic containers (yoghurt tubs, takeaway containers)		
Paper / cardboard / paper bags		
Food scraps (bread, fruit peels, uneaten items)		
Other items		
<b>OVERALL TOTAL:</b>		



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