



Gutter Guardians



Teacher Resource Pack

Primary Years and Middle Years



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Acknowledgements

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Links to the S.A.C.S.A. Framework



Primary Years

Learning Area	Strand	Key Idea
Science	Life Systems	Students pose questions and seek explanations about the internal and external features of living things in order to better understand the supports of life in particular environments. In T C KC6
	Matter	Students study and report on the stability and changes that occur in materials in and around their homes and relate these to processes, attitudes and future needs. F C KC2
Society and Environment	Place, Space and Environment	Students consider sustainability and care of resources and places as they explore how people's attitudes and values affect their interactions with natural features and cycles. F In KC6
		Students use a range of resources and technologies to gather and present information. They develop mapping and graphing skills to represent observable features in the environment. T C KC1 KC2 KC5 KC7
	Social Systems	Students examine different kinds of decisions that are made by people. They analyse who makes these decisions, why they are made and what impacts they have on various groups in society, considering fairness to all. F In T C KC1
Mathematics	Exploring, Analysing and Modelling Data	Students draw conclusions from data they collect from diverse sources and perspectives, using descriptions of the spread of data and of relationships within it. They make predictions and informal inferences for larger populations or similar situations and communicate their conclusions and predictions to a variety of audiences. F Id T KC1 KC2 KC6

Middle Years

Learning Area	Strand	Key Idea
Science	Life Systems	Students develop a shared understanding of the characteristics and behaviour of living things and how they are interrelated and interdependent. They appreciate and report on the place of humans in the earth's ecology; and develop their understanding of, explore future possibilities for, and act to contribute to, sustainable environments. F In KC1 KC2 KC3
	Matter	Students communicate understandings about the properties and personal uses of materials. They research future availability of earth materials for human use, and explore possible sustainable alternatives to current patterns of use. F In T C KC1 KC2 KC6
		Students pose questions to investigate ways in which physical and chemical processes can be altered in order to achieve desirable outcomes, such as food preservation. T C KC1
Society and Environment	Place, Space and Environment	Students access, investigate, interpret and represent information from fieldwork, electronic systems and other research, in order to explain local and global interactions and relationships between people and environments. In T C KC1 KC2
		Students discuss environmental, conservation or resource issues, and individually and/or in teams collaboratively develop strategies to bring about positive change in the local community. F In T KC2 KC4 KC6
	Social Systems	Students work cooperatively to collect, analyse and describe information about particular issues which have social, economic and environmental dimensions. They identify Key Ideas, justify positions, predict outcomes and suggest enterprising solutions. In T C KC2 KC3 KC6

Introduction

Getting to know your Catchment

A catchment is an area of land that catches water and drains it to the lowest point, usually a creek or river.

- Use a map of the local area to locate your school and the surrounding streets.
- Locate the River Murray and calculate how far it is from your school to the river. (If there is a creek near your school, check the map to see if it flows to the River Murray.)
- Students create a list of land uses in the catchment area, between your school and the River Murray. (Housing, transport, business, industry, farming, recreation etc.)

The Stormwater System

- Discuss what happens to rain water, falling in different areas of the catchment. (ie. absorbed by the soil, waters gardens and crops, collected in rainwater tanks, floods and puddles, surface run-off transported by the stormwater system.)

The stormwater system helps to prevent flooding in urban areas, where water is collected on hard surfaces such as roofs, footpaths, car parks and roads. The stormwater system transports this water, via gutters, drains and channels, to the nearest river or creek.

- Take a walk around your school or local area to identify structures that are part of the stormwater system. Note any leaf litter and pollution HOT SPOTS along the way.
- Use the *Stormwater System* images in this pack to familiarise students with the name and function of different structures.

STORMWATER = RAIN WATER + POLLUTION

- Identify the types of pollution that can be transported, through the stormwater system to the River Murray. Using the *Stormwater System* images, list materials that can be washed off roofs (Image 1), footpaths (Image 2) and roads (Image 3).
- Generate a list of ways we can all help to reduce stormwater pollution.

Autumn in your Catchment

Students consider the positive and negative impacts of seasonal changes on the catchment area. **See Fact Sheet for more information.**

Autumn Leaf Fall

Deciduous trees drop all their leaves in Autumn.

- What happens to all those leaves?
- What problems can they cause?

Windy Days

The wind helps to blow all the leaves off the trees.

- What other things are blown by the wind?
- Where will all these things go?

First Rains after Summer

It may have been a long time since the last rainy day.

- Why do you think roads are so slippery after the first rain?
- Did you know that gutters and drains often carry more stormwater pollution during Autumn than at any other time? Why do you think that is?

Pollution Facts

In the Upper and Lower Murray Catchments there are over 75 sites where stormwater is discharged into the River Murray. Some of these stormwater outlets discharge as much as 9 tonnes of gross pollutants (leaves and rubbish) and 61 tonnes of suspended solids (soil & silt) into the river each year.

Fact Sheet

Autumn in your Catchment

Autumn Leaf Fall

Leaves and grass clippings enter the stormwater system throughout the year but during Autumn, when deciduous trees drop all their leaves at once, this creates problems for the stormwater system, such as:

- Gutters and drains become blocked which can cause flooding.

The stormwater system transports all those leaves to the nearest waterway, which can impact on the environment and life in the waterway, for example:

- Leaves can choke our waterways, slowing or stopping the natural flow.
This can cause a waterway to become stagnant and smelly like a big compost bin!
- Organic matter increases the nutrient levels in rivers, which can lead to algal blooms.
- Leaves floating in water can block out the sun, making it hard for plants to grow.
Sometimes they create a blanket on the water, which increases the water temperature.
- When leaves decompose (rot) they don't create oxygen anymore, they use up oxygen.
So when leaves are rotting in a waterway they reduce the amount of oxygen available for the animals that live there such as; fish, frogs, turtles and macroinvertebrates.
- The leaves break down into smaller pieces and can make the water dark. This makes it hard for some aquatic animals to find food and shelter.

What about the trees that grow near the river?

Generally, the leaves of Australian native plants don't break down (decompose) as quickly as the leaves of introduced plant species. In a natural river environment leaf litter has a number of important functions such as:

- Providing shelter for birds and animals on the river banks
- Natural mulch and compost, providing nutrients for plants
- A food source for small fish, invertebrates and micro-organisms

Windy Days

The leaves that fall from trees in Autumn can be blown by the wind onto roofs, across gardens and over footpaths, car parks and roads. If they are not cleaned up they will make their way into the River Murray via the stormwater system. Some local councils have Street Sweepers that sweep road gutters to remove leaves and other litter. Contact your local council to find out what it does about street litter, see the *Contact your Council* page.

If we haven't had rain for a while the Autumn winds will remove top soil from gardens, parks, paddocks and farmland. Some of this soil will land on sealed surfaces such as roads and buildings then, when it rains, all that soil and dirt will be washed into the river through the stormwater system.

First Rains after Summer

During the Summer months when there is little rain, any pollution on the roads (such as oil, petrol, detergent and rubber) will stick to the road or partially evaporate. Once rain falls these materials are washed across the surface of the road into the gutters and drains. This can make the roads slippery and dangerous.

There are many kilometres of stormwater gutters, channels and underground drains within your catchment area. Any pollution that has been washed, blown or swept into the drains during Summer will sit there until there is enough rainwater flow to transport it through the system. The first Autumn rains will carry an extra load of stormwater pollution into the River Murray (mixing the old and the new).

Stormwater System Images



Image 1



Image 2



Image 3



Image 4

Gutter Guardians to the Rescue

Getting Started

Once students have an understanding of stormwater pollution issues and the impacts of leaf litter, soil and rubbish on our precious River Murray, the Gutter Guardians program can be introduced as a way of taking action to reduce the amount of stormwater pollution entering the river.

Selecting your Sweep Zone

Select a street near the school or an area in the school grounds that would be a suitable Sweep Zone (50 metres). Alternatively ask students to identify a street or car park in the local community that could do with a clean up.

- Choose a leafy street and avoid major roads.
- Your Sweep Zone should include the roadside gutter, verge and footpath.

Community Involvement

You will probably need parental consent if you are taking students outside the school grounds. Why not invite parents, friends and local residents to join your Gutter Guardian team?

Find out what the community knows about stormwater pollution by conducting a survey.

See: *Welcome to the Gutter Guardians Program* page for Consent Form, Invitation and Community Survey.

Some councils will bring a Street Sweeper to your school for a demonstration or they may be able to give you advice on what to do with your sweepings. See the *Contact your Council* page.

Let's get Sweeping

1. Measure a 50 metre length of gutter and mark your Sweep Zone using witches hats. For safety, have a teacher or parent supervise the boundaries.
2. Sweep and/or rake the gutter, verge and footpath. Use spades and dustpans to collect the sweepings.
3. Sort the sweepings into three different categories. Remember to wear gloves. **Organic material** (leaves, grass & twigs)
Rubbish / Litter
Soil / Silt
4. Place the sorted sweepings into separate shopping bags. Count the total number of bags and the number of bags in each category and record them on your Results Sheet.
5. Use scales to measure the total weight of each waste category.
6. Complete the **Gutter Sweep Results Sheet**.
7. Please fax back a completed Gutter Sweep Results Sheet to your Waterwatch Regional Coordinator (Don't forget to tally up Survey Responses). Your results will be entered into a data base and you will receive a feedback poster showing your results and those of other Gutter Guardian groups in your catchment.
8. Now that you have prevented all that leaf litter, rubbish and soil from entering the stormwater system, what will you do with your sweepings? Not all litter needs to go in the bin. Can some of your sweepings be mulched, composted or recycled? Ask students to suggest uses or disposal methods for your sweepings.
9. Remember to take photos of the event. Students can write reports, on their Gutter Guardian activity, for the school newsletter or local press.

You will need

50 metre tape measure
Brooms / Rakes / Spades / Dust Pans
Witches hats
Used shopping bags
Gardening or Rubber Gloves
Kitchen or Bathroom Scales
Gutter Sweep Results Sheet

Welcome to the Gutter Guardians Program



Invitation

Dear Parent / Resident,

This Autumn our class will be involved in the 'Gutter Guardians' Program to help reduce the amount of leaf litter entering the River Murray. As part of this program students will be investigating the different types of street waste that enter our stormwater system.

The _____ class will be conducting a 'Gutter Sweep' activity and would like to invite parents and residents to help.

The activity will be conducted on ____ _ at ____ _ am/pm

We will be sweeping along _____ Road / Street

The meeting place is _____

If you would like to join in, or help to supervise, please meet our 'Gutter Guardians' group at the time and place above. Bring along a broom, shovel, gloves and/or used shopping bags if you can.

Thank You



Please complete this section and return to the Class Teacher

Gutter Guardians Consent Form



I _____ give permission for _____ to participate in the Gutter Guardian 'Gutter Sweep' activity.

Signed: _____

I will be able unable to assist during the sweep.

I can provide a broom dustpan rake gloves shopping bags

Gutter Guardians Community Survey

Dear Parent / Resident,

We would like to find out what the community knows about Autumn leaf fall and the impact it can have on our rivers and creeks. Can you please take a minute to fill out the following survey and return it to the school?

	YES	NO
1. Did you know that water washed into stormwater drains/systems will eventually be released into local creeks, rivers and wetlands?	<input type="checkbox"/>	<input type="checkbox"/>
2. Did you know that leaf litter (organic waste) is a serious pollutant when washed into our waterways during Autumn?	<input type="checkbox"/>	<input type="checkbox"/>
3. Did you know that, when in water, rotting leaves use up valuable oxygen that aquatic animals need to survive?	<input type="checkbox"/>	<input type="checkbox"/>
4. Did you know that you can stop pollutants from entering our waterways by simply collecting leaf litter from the streets and composting during Autumn?	<input type="checkbox"/>	<input type="checkbox"/>

Gutter Sweep Results Sheet



PLEASE FAX BACK TO YOUR
REGIONAL COORDINATOR BY 31st
MAY

Who, Where, When

School: _____

Teacher: _____

Gutter Guardians Group Name: _____

Date of Sweep: _____

Sweep Zone (street/s): _____

How many bags did you collect?

- bags of  **Organic Material** (leaves, grass and twigs)
- bags of  **Rubbish / Litter**
- bags of  **Soil / Silt**

How many bags all together?

How heavy are your bags?

- _____ kilograms of **Organic Material** 
- _____ kilograms of **Rubbish / Litter** 
- _____ kilograms of **Soil / Silt** 

Add them together to get the total weight.

Did you find any unusual things?

Working out Percentages

1. **% Leaves** $\frac{\text{Number of bags of leaves}}{\text{Total number of bags}} \times 100 = \%$
2. **% Litter** $\frac{\text{Number of bags of leaves}}{\text{Total number of bags}} \times 100 = \%$
3. **% Soil** $\frac{\text{Number of bags of leaves}}{\text{Total number of bags}} \times 100 = \%$

Community Survey Responses

How many people answered YES and how many people answered NO to each survey question.

	YES	NO
Question 1	_____	_____
Question 2	_____	_____
Question 3	_____	_____
Question 4	_____	_____

Contact your Council

Please contact your council's Works Manager to request a demonstration of their street sweeping machinery. The Council may also have a "Sharps container" for you to borrow, in the interest of your students' safety. They may also be able to help by disposing of the waste you collect during your Gutter Sweep.

Upper Murray

RENMARK PARINGA DISTRICT COUNCIL

Ral Ral Avenue
RENMARK SA 5341
Ph: 8586 6609

BERRI BARMERA COUNCIL

Tony Pollard
19 Wilson Street
BERRI SA 5343
Ph: 8582 1922

DISTRICT COUNCIL OF LOXTON WAIKERIE

Tom Avery

Loxton Office

East Terrace
LOXTON SA 5333
Ph: 8584 7221

Waikerie Office

Strangman Road
WAIKERIE SA 5330
Ph: 8541 2077

SOUTHERN MALLEE DISTRICT COUNCIL

Pinnaroo Office

Day Street
PINNAROO SA 5304
Ph: 8577 8002

Peter Broughill

Lameroo Office

Railway Terrace Nth
LAMEROO SA 5302
Ph: 8576 3002

MID MURRAY COUNCIL

Greg Hill

Morgan Office

10 Fourth Street
MORGAN SA 5320
Ph: 8540 2013

Lower Murray

RURAL CITY OF MURRAY BRIDGE

2 Seventh Street
MURRAY BRIDGE SA 5253
Ph: 8532 1288

MID MURRAY COUNCIL

49 Adelaide Rd
MANNUM SA 5238
Ph: 8569 1600

ALEXANDRINA COUNCIL

Dawson Street
GOOLWA SA 5214
Ph: 8555 7000

COORONG DISTRICT COUNCIL

Meningie Office

49 Princes Highway
MENINGIE SA 5264
Ph: 8575 1008

Tailem Bend Office

95 Railway Tce
TAILEM BEND SA 5260
Ph: 8572 3611

Other Learning Opportunities

Rates of Decomposition Experiment



Students conduct experiments to examine the rate of leaf decomposition.

- Collect a selection of different types of leaves.
- Discuss what will happen to the leaves if left in water for 3 weeks and predict which leaves will decompose the fastest.
- Record the types of leaves collected. Name the tree, if known (eucalypt, pine, ash etc.) Alternatively trace the leaves or make rubbings.
- Fill jars with water and place 3 or 4 leaves (from the same tree) in each jar.
- Label the jars.
- Observe the jars and record the changes every second day.
- Students report on their observations.

You can vary the experiment by having a set of jars with lids on and a set with lids off. Alternatively shake one set of jars every day while leaving another set untouched. If you have a Water Monitoring Kit you could test the water after 3 weeks.

Working with the Data

Select a graphing technique to present your Gutter Guardians Data.

- You could categorise the rubbish collected according to materials, use or the ability to recycle.
- Compare your Gutter Guardian Data with 'gutter sweep' results from previous years and/or with results from other catchment areas. See your Waterwatch Regional Coordinator for details.



Your data represents the number of bags of street litter collected from a 50 metre length of street, on one day. Work out a mathematical formula for calculating how much street litter could be collected from a greater area. Measure the length of several streets around your school, or calculate how much street waste in a kilometre.



1 Kilometre: total number of bags () $\times 20 \times 2 =$ () bags per kilometre.
NOTE: 50 metres $\times 20 = 1\text{km}$ **2** represents both sides of the street.

Street Trees

Imagine a real estate developer is planning a new housing estate in your catchment area. The brochure for the estate advertises beautiful tree lined streets.

- Investigate different types of trees that may be suitable.
- Conduct a classroom debate or survey the community to explore people's attitudes to native and non-native trees.
- Write a persuasive letter to the developer suggesting what trees you think would be most suitable for the housing estate and why.



Adopt a Tree



Select a tree in your garden or local area and create a profile book about it.

- Find out what kind of tree it is and investigate its life cycle.
- How many ways can you measure the tree? (height, canopy, leaves etc)
- Get creative with rubbings, sketches and poetry about your tree.