

# STAGE 4 GEOGRAPHY

## School Water Audit Activity

### FOCUS AREA - Water in the World

#### Outcomes explored

##### A student:

- Locates and describes the diverse features and characteristics of a range of places and environments GE4-1
- Describes processes and influences that form and transform places and environments GE4-2
- Explains how interactions and connections between people, places and environments result in change GE4-3
- Discusses management of places and environments for their sustainability GE4-5

##### Key inquiry question

- How do natural and human processes influence the distribution and availability of water as a resource?
- What effect does the uneven distribution of water resources have on people, places and environments?
- What approaches can be used to sustainably manage water resources and reduce water scarcity?

##### Content:

- Water scarcity and water management

##### Content focus

##### Students:

- Investigate the nature of water scarcity and assess ways of overcoming it
- Discuss variations in people's perceptions about the value of water and the need for sustainable water management
- Discuss variations in people's perceptions about the value of water and the need for sustainable water management

##### Australian Syllabus Links:

- ACHGK040

# STAGE 4 MATHS

## School Water Audit Program

### FOCUS AREA - Computation with Integers, Data Collection and Representation

#### Outcomes explored

#### A student:

- Applies appropriate mathematical techniques to solve problems MA4-2WM
- Collects, represents and interprets single sets of data, using appropriate statistical displays MA4-19SP

#### Content focus

#### Students:

- Investigate techniques for collecting data, including census, sampling and observation

#### Australian Syllabus Links:

- ACMNA280
- ACMSP284





# STAGE 4 SCIENCE

## FOCUS AREA - Processing and analysing data and information, Problem solving, Communicating

### Outcomes explored

#### A student:

- collaboratively and individually produces a plan to investigate questions and problems SC4-5WS
- follows a sequence of instructions to safely undertake a range of investigation types, collaboratively and individually SC4-6WS
- processes and analyses data from a first-hand investigation and secondary sources to identify trends, patterns and relationships, and draw conclusions SC4-7WS
- elects and uses appropriate strategies, understanding and skills to produce creative and plausible solutions to identified problems SC4-8WS
- presents science ideas, findings and information to a given audience using appropriate scientific language, text types and representations SC4-9WS

#### Content focus

##### Students:

- WS5.1 Students identify data to be collected in an investigation
- WS5.2 Students plan first-hand investigations
- WS6 Students conduct investigations
- WS7.1 Students process data and information
- WS7.2 Students analyse data and information
- WS8 Students solve problems
- WS9 Students communicate ACHGK040

#### Australian Syllabus Links:

- ACSIS012,14, 25, 29, 38-42
- ACSIS125-26, 29, 30, 140-41, 44- 46, 48
- ACSIS213

# SCHOOL WATER AUDIT PROGRAM

## What is a Water Audit?

Water audits are an important tool in monitoring water usage and finding better ways to lower water consumption so that everyone has water for the future. Looking at various objects in and around our school that use water will provide a good indicator of where water is being used on a daily basis.

## Why is an Audit important?

Water is a resource that is vital to all living things. Having a reliable source of water is an ongoing challenge around the world to meet the needs of the environment and the people. The Central Coast is an ever-growing community of businesses, schools, hospitals, homes and farms that use water daily. A water audit is an important tool that allows us to better manage our water usage to ensure we have water for the future.

## Let's Do a Water Audit!

What do we need to start?

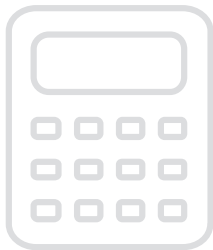
- School's Water Bill
- School's water meter
- Interview sheets
- Audit recording sheet



Water Meter

## How to read the water bill

Water meters are being read every quarter (three monthly) by meter readers to record how much water you have used over that period. This process is no different for schools. The water bill is generated to show you how much water in Kilolitres (1000 litres) the school has used and the cost per kilolitre based on that meter reading.



**Using your school's water bill calculate the total cost of water used.**



Can you Live to 150L per person per day?  
centralcoast.nsw.gov.au/lovewater

Central Coast Council  
Address line 1  
Address line 2

**Property Location:**  
Street SUBURB NSW 22\*\*  
LOT 1 DP 123456

### Your Account Itemised

#### Service Charges For the period

	No. of Services	Charge	Amount
Water Service - Residential	1	41.15	41.15
Sewer Service - Residential	1	120.82	120.82
Drainage Service Charge - Residential	1	32.08	32.08

**Total Service Charges** **\$194.05**

#### Usage Charges Water meter reading details over the page

	Usage (kL)	Tariff Tariff	Amount
Water Usage	34	2.29	77.85

**Total Usage Charges** **\$77.85**

## Water Account

ABN 73 149 644 003

### Account details

Assessment Number	02034019
Issue date	27 Jul 2018
Due date	27 Aug 2018

### Summary

Balance brought forward	\$0.00
Current Charges	\$271.90
Pension rebate	CR \$43.75

### Total amount payable

**\$228.15**

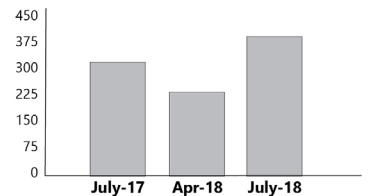
### Due date 27 Aug 2018

Deduct payments since 20 July 2018

### DIRECT DEBIT IN PLACE

### Your average daily water usage (litres)

1kL = 1000 litres



Billers Code: 7583  
Billers Ref: 02034019

**BPAY®** this payment via internet or phone banking  
**BPAY View®** View and pay this bill using internet banking  
**BPAY View® Registration No.** 02034019

Online Services ID 123987



Central Coast Council  
ABN 73 149 644 003

Send payments to: Central Coast Council  
GPO Box 2518  
Sydney NSW 2001

*This address is for payments only,  
not for general correspondence.*

### Payment Slip

Assessment No.	02034019
Date Due	27 Aug 2018
Amount Due	\$228.15
Date Paid	
Amount Paid	



21234566

000000039234556

### Cheque Details

Please do not attach cheque or money order with staples or pins

Drawer	
Bank	
Branch	

000773

0000000000

0000025076

## Time to do some simple math!

Example

Usage (kL)		Tariff (\$)		Amount
34	X	2.29	=	\$77.86

School

Usage (kL)		Tariff (\$)		Amount
	X		=	

# WHAT IS OUR AVERAGE DAILY WATER USAGE AT SCHOOL?

## How to work out your water usage?

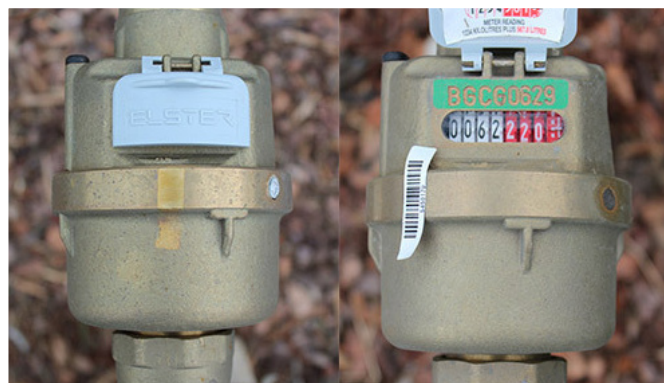
When determining your school's average water use per person, we need two important items:

1. Total water used (kL) Hint: water bill
2. Total student/teacher number at school

The website link below allows you to access your school's enrolment and teaching staff for this calculation

[www.myschool.edu.au](http://www.myschool.edu.au)

Once we have both total water used and total student/teacher numbers we can do the calculation.



Water Meter

### Converting kL to Litres

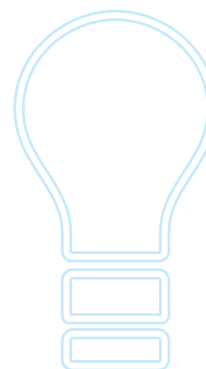
Schools' (kL)				Total Litres
kL	X		=	L

### Average Water Use

Total Litres		Total Students teachers		Average water use per person
L	+		=	L

### Daily Average Water Use

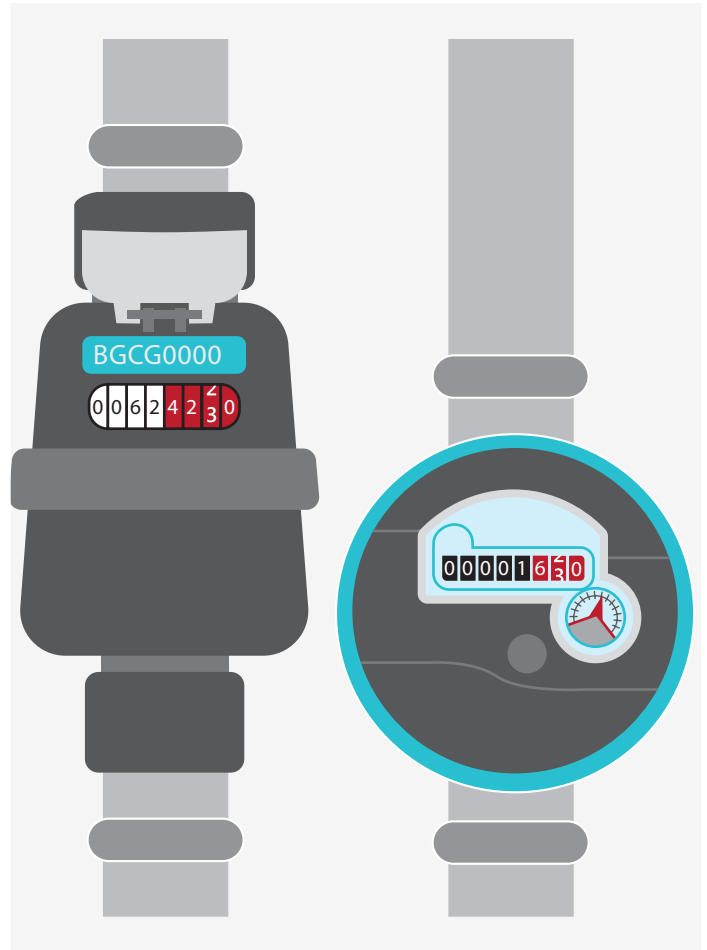
Average water use per person		Days at school		Average water use per person per day
L/person	+		=	L



Use the colours to help guide you to calculate the average water use per person per day

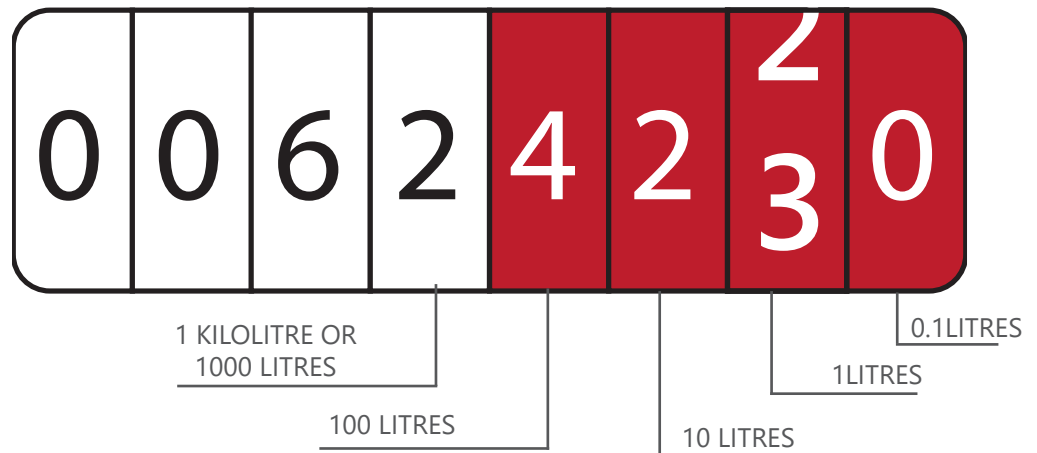
# WHAT IS A WATER METER?

Water meters are devices that allow the measurement of water as it passes through to homes, schools and businesses. When you want to see how much water that has been used at any given time you can read the meter to get an accurate number. Water meters are often found near the perimeter of the schools or close to streets. Typically, schools have one water meter monitoring their usage, but it's not uncommon for larger schools to have more than one.



# HOW TO READ THE WATER METER

Reading a water meter for the first time may seem confusing but once you know what you are looking at it is a very simple thing to do. Water meters vary – some have numbers and clocks, others only have numbers. The meters generally read from left to right – black digits show the kilolitres (1,000 litres) and red digits show the single litres used. Your meter may have two, three or four red numbers





# TIME TO INVESTIGATE

## Start monitoring?

As a class you need to locate your school's water meter(s) and record the number. This number is the starting point for monitoring your water usage from this point onwards.

### Example Meter Reading

1000 Kilolitres	100 Kilolitres	10 Kilolitres	1 Kilolitre or 1000L	100 Litres	10 Litres	1 Litre	0.1 Litres
	8	6	7	5	3	0	9

### Schools Meter Reading

1000 Kilolitres	100 Kilolitres	10 Kilolitres	1 Kilolitre or 1000L	100 Litres	10 Litres	1 Litre	0.1 Litres

When the water meter is first installed it starts to collect data based on the water passing through it. The water meter is not reset, which means you are reading the total amount of water that has passed through since its installation.



# INTERVIEWING SCHOOL STAFF

## Let's Talk?

It's important to meet with decision makers at your school to see if any procedures or programs have been put in place to help manage your school's water usage. Principal, teachers, cleaners, kitchen staff and the facilities team are all good people to ask about how the school is using water. The information gathered by interviewing different people at school will help to provide a story or context to your school's water usage.



## Who are you interviewing?

- **Principal**
- **Kitchen/Canteen**
- **Facilities/Maintenance**
- **Cleaners**
- **Teachers**

In small groups you will be designated one person/group to interview. Once you have collected information from the interview you will be able to share your findings with the class.

As a group, the class will now be armed with the information needed to identify areas of water loss and conservation within the school.

**This will be key in developing a school water management plan.**

# INTERVIEW QUESTIONS



School Principal Interview Questions	Response
1. How do we report a leaky tap and bubblers if we find them?	
2. Does our school have a water management plan?	
3. What areas of the school do you think use the most water?	
4. What is something teachers could do to conserve water?	
5. What do you think would be the best thing for the school to do in conserving water?	
6. How often does our school lease out space for community and business functions that use water?	
7. Are there functions on the weekends at school that require water?	

Kitchen /Canteen Staff Interview Questions	Response
1. What tasks use the most water in the kitchen?	
2. Do we have any known water saving devices in use?	
3. What would be something that could lower our water consumption in the kitchen?	
4. What time of the day does the kitchen use the most water?	
5. How do we wash dirty plates, cups etc at school?	

Facilities/Maintenance Interview Questions	Response
1. What locations do we water or hose down at school?	
2. What time of the day do we water plants and/or grass?	
3. What is our method in watering ovals?	
4. Do we use timers when watering?	
5. Is there any water saving devices on fixtures? E.g. aerators, dual flush, etc.	
6. Does the school have water tanks? If so, are they pumped into the school or unplumbed for use outside only?	
7. Do we have drought-tolerant plants at school?	
8. Do we use mulch in garden beds?	



Cleaners Interview Questions	Response
1. Which areas of the school require the most amount of water when cleaning?	
2. When using the hose, does it have a trigger nozzle on it?	
3. Do we use a washing machine at school?	
4. Is the water that is used to clean outside areas potable (drinkable)?	
5. Are there methods in place to help you use less water during cleaning?	

Teacher Interview Questions	Response
1. Have teachers been shown ways to conserve water at school?	
2. What areas of the school do you think use the most water?	
3. Are there any wet spaces for art and industrial subjects at school?	
4. Does our school have commercial kitchens for teaching students?	
5. Are there any projects students could do to help conserve water at school?	
6. Do we have any agriculture plots that require water?	

**Students' Choice: Students can create five of their own questions to ask a staff member at school about water usage.**

Students' Choice Interview Questions	Response



Mardi Dam

# SCHOOL FACILITIES AUDIT

Location: \_\_\_\_\_

Water Device	Number of devices	Number broken /not working	Number dripping or leaking	Number of Water efficient devices
Toilets single flush				
Toilets dual flush				
Urinals				
Taps				
Bubblers				
Zips/hot water heaters				
Hoses				
Sprinklers				
Other				
<b>Total</b>				

## Class Results Combined

Water Device	Number of devices	Number broken /not working	Number dripping or leaking	Number of Water efficient devices
Toilets single flush				
Toilets dual flush				
Urinals				
Taps				
Bubblers				
Zips/hot water heaters				
Hoses				
Sprinklers				
Other				
<b>Total</b>				

—  
**What does a drip cost?  
more than just a drop in a  
bucket**  
—





# WHAT DOES A DRIP COST?

A dripping tap may seem like a drop in a bucket when it comes to water loss at school. In fact, if your school has five dripping taps that drip five times a minute, over a year the total water lost is 3,285 litres! That is equivalent to filling up 23 red rubbish bins every year.

So, let's look at how to calculate how much water a dripping tap can lose over a year.

## What you need

- 1) 10mL graduated cylinder
- 2) Stop watch
- 3) Calculator

Locate a tap that is dripping or has slow leak. Place the graduated cylinder under the drip/leak and start the stop watch. After 1-minute record how many millilitres of water you collected. Write down this number in section "A" in the table below. If you have no leaky taps at school that is great. If you want to try this experiment to see how much water is potentially lost from dripping/leaky taps, allow a tap to drip slowly and record your data.

## Dripping Tap Example

Drip Rate	A ml in 1 minute	B ml in 1hr (A x 60)	C ml in 1 day (B x 24)	D Litres in 1 day (C ÷ 1000)	E Litres in 1 year (D x 365)	F Number of dripping taps	Litres lost in 1 year (ExF)
Slow	2ml/min	120mls/hr	2,880mls/ day	2.88litres/ day	1051.2litres/ yr	1	1051.2litres/ yr
Fast							

## Dripping Tap Activity

Drip Rate	A ml in 1 minute	B ml in 1hr (A x 60)	C ml in 1 day (B x 24)	D Litres in 1 day (C ÷ 1000)	E Litres in 1 year (D x 365)	F Number of dripping taps	Litres lost in 1 year (ExF)
Slow							
Fast							



# SCHOOL WATER USE

## ACTION PLAN

An Action Plan is designed based on your findings to make effective changes at your school which will help to conserve water. The table below allows you to put in your findings with suggestions on where, what, how and who can help fix these issues. Take some time as a class to go over your School Water Audit Totals and Interviews to help guide you in this process.

Location	Water Fixture	Water issue (ie. Dripping tap)	What can be done?	Who can fix the problem?
<i>e.g. Boys toilet</i>	<i>Both sinks</i>	<i>Cannot turn off the water completely in both.</i>	<i>A plumber can fix the taps so they turn off completely</i>	<i>Facilities/maintenance</i>

# WATER ACTION PLAN REPORT

Date:

Name of School:

Number of Students/teachers:

Total water usage (water bill):

Avg Daily Water Use:

Number of broken/dripping/fixtures:

## Findings from your Water Action Plan

1. What areas of the school do students and teachers use the most water?

2. What are some things that can be done immediately to improve the school's' water usage?

3. What are some things that can be done to use less water at school?

4. What are long term improvements that could be done to use less water at school?

5. One suggestion that you think would best help the school in its water usage?

## Implementation of your Water Action Plan:

Now is a perfect time to utilise the results from the water audit to design a plan for your school. As a class you will create short- and long-term plans that address your findings from your water audit. This will provide your Principal with viable options in making your school more water efficient.

## Monitoring the success of your Water Action Plan:

Once your Water Action Plan is in place and your school has implemented some immediate changes to help save water, you can monitor your school's usage over the next month to see how it compares to the previous month by re-examining the water meter and bill.

# WATER ACTION PLAN PROPOSAL

Date:

Class:

Teacher:

**Reasoning for a Water  
Action Plan:**


**Water Audit findings:**


**Implementing immediate changes:**

Items

Locations

## Potential Water Savings

Items Fixed/Changed

Amount of Water Saved

### Water Action Plan Short Term Goals:


### Water Action Plan Long Term Goals:


### Student Signatures:


### Teacher Signature:

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### Principal Signature:

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