STAGE 3 SCIENCE

School Water Audit Activity

FOCUS AREA - Digitial Technologies

Outcomes explored

A student:

- Plans and uses materials, tools and equipment to develop solutions for a need or opportunity ST3-2DP-T

Skills Focus

- Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships
- Employ appropriate technologies to represent data
- Compare data with predictions
- Present data as evidence in developing explanations

Content:

- Using and Interpreting Data

Content focus

Students:

- Develop knowledge and understanding of project management
- Learn abstraction and the relationship between models and real-world systems they represent

Australian Syllabus Links:

- ACHGK037
- ACTDIK015
- ACSIS090ACSIS107
- ACSIS218
- ACSIS221

STAGE 3 MATHS

School Water Audit Activity

FOCUS AREA - Whole Numbers 2

Outcomes explored

A student:

- Gives a valid reason for supporting one possible solution over another MA3-3WM

Content focus

Students:

- Interpret integers in everyday contexts, eg temperature

Australian Syllabus Links:

- ACMNA124

School Water Audit Activity

FOCUS AREA - Data 1

Outcomes explored

A student:

- Gives a valid reason for supporting one possible solution over another MA3-3WM
- uses appropriate methods to collect data and constructs, interprets and evaluates data displays, including dot plots, line graphs and two-way tables MA3-18SP

Content focus

Students:

- Pose questions and collect categorical or numerical data by observation or survey
- Constructs displays, including column graphs, dot plots and tables, appropriate for data type with and without the use of digital technologies
- Describe and interpret different data sets in context

Australian Syllabus Links:

- ACMSP118
- ACMSP119
- ACMSP120

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.

Central Coast Council

love water use it wisely — 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

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 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**

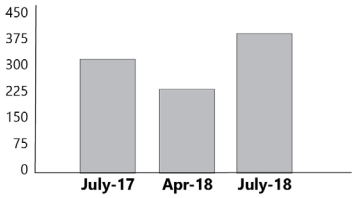
Usage Charges Water meter reading details over the page

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

Total Usage Charges **$77.85**

Your average daily water usage (litres)

1kL = 1000 litres



Biller Code: 7583
Biller 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

POST billpay
21234566

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

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

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

Drawer	
Bank	
Branch	

Payment Slip

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

000000039234556 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:

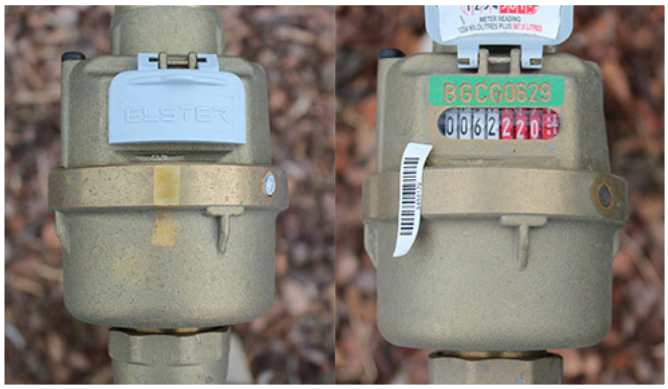
1. Total water used (kL) **Hint: water bill**

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

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

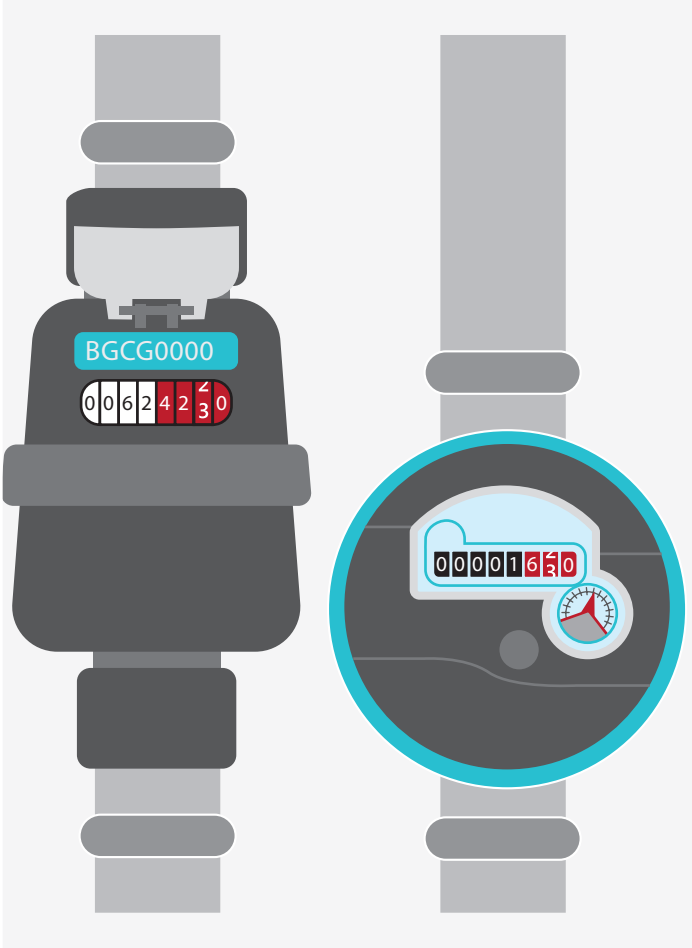
Daily Average Water Use

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

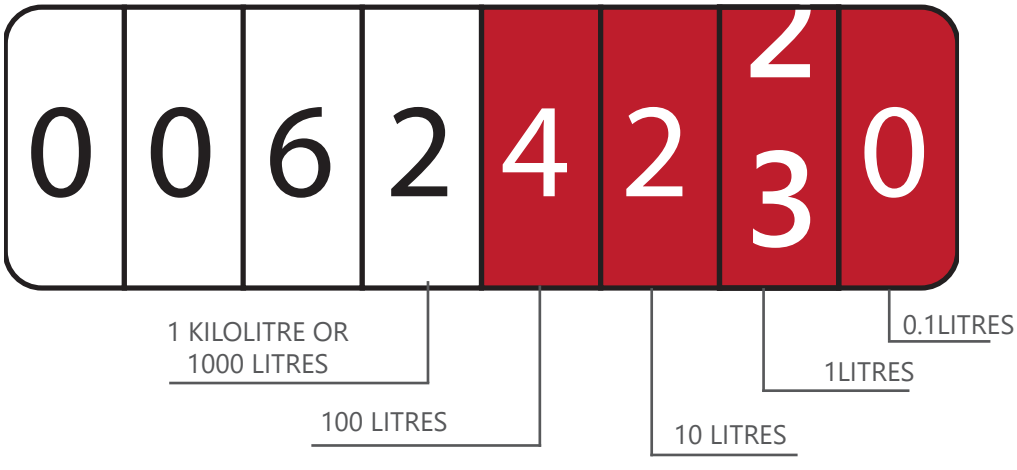
WHAT IS A WATER METER?

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 reads 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 Kilolitres 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 Kilolitres 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 managment 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-tolerants 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				
Total				

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				
Total				

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 a 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?
e.g. Boys toilet	*Both sinks*	*Cannot turn off the water completely in both.*	*A plumber can fix the taps so they turn off completely*	*Facilities/maintenance*

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 usuage?

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:

Principal Signature: