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ASET-NSW NEWSLETTER

JULY 2021

Volume 4, Number 2

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Links for Articles

- <https://assist.asta.edu.au/>
- <https://seaact.act.edu.au/conasta>
- <https://scienceweek.net.au>
- <https://envirostore.com.au>

Contact Us

<http://www.asetnsw.org.au>
secretaryasetnsw@gmail.com

Temp Editor

Loretta Fincato
fincatol@stmarks.nsw.edu.au

Chairperson's Report

Welcome to the 8th edition of the ASET-NSW newsletter. Well, here we are again in Sydney lockdown. I hope you are all safe and able to continue working. There is always plenty to do and it is the ideal opportunity to do all those little or big jobs without any interruptions. I'm cleaning and updating the chemical storeroom and database.

#STARweek 2021 will 1-5 November, when things have slowed down, and we can be given sole recognition without other support staff getting all the accolades.

CONASTA 69 – Canberra, ACT; more details here <http://asta.edu.au/conasta>

Registrations are open and early bird rates have been extended. It is being hosted at St Edmund's College and St Clare's College – Griffith, ACT. Fingers crossed that state lockdowns will be lifted, and this conference will be able to proceed.

Unfortunately, our Booragul PD day that was set down for 12th July had to be postponed because of COVID. Hopefully this will be able to proceed in Term 4.

We had booked UTS for our annual 2-day conference in September. COVID again has seen us postpone the conference until Term 4. If we are unable to hold the conference face to face, we are looking at holding an online conference – this has been successful in other states.

CONSTANZ – the NZ conference of science technicians will be held 5-7 October 2021. Details can be found here: <https://stanz.nzase.org.nz/constanz/>

Hopefully the travel restrictions will be lifted, and we will be able to attend. I can highly recommend this conference, but the downside is that it conflicts with week 1 Term 4.

Stay safe.

Current Elected Committee Members

Margaret Croucher

Chairperson, Public Officer

Linda Stanford

Secretary

Elizabeth Brown

Vice-Chairperson

Johnathon Gray

Publicity Officer, IT Manager

Loretta Fincato

Membership Secretary, Treasurer

Jonathon Blair

Committee Member

Margaret Croucher

Secretary's Report

Welcome to Term 3.

It has been a bit up in the air with the Covid virus and I hope everyone is staying safe and sane.

It will be interesting to see what happens when the Year 12 students return to school. Working from home most of the time has been very different.

All contacts on the old website have been archived. We have deleted any non-financial members off the new database, and any new members can join via the new website.

It would be great if more people would like to join the committee more hands make light work.

We will be holding the AGM on Saturday 18th September, please save this date.

Linda Stanford

Publicity Officer's Report

We've had new sponsors join us, so please see what they have on offer.

I know that Science Week in Sydney has probably been sabotaged by Covid restrictions, but please send me any photographs or reports if your regional school hosts any events this month.

I'm heading into my 7th week of staying home, so I will be chomping at the bit to return to school once I am fully vaccinated next week.

We are looking for a newsletter editor. If you are interested, please contact Linda or Margaret, or mention it during our AGM.

Loretta Fincato

Calendar of Events

27 March

Earth Hour

12 April

International Day of Human Space Flight

22 April	International Day of Girls in ICT
29 July	Australian National Chemistry Quiz
30 July	Australian Science Olympiads Chemistry
14-22 August	National Science Week – Food: Different by Design
1-5 November	#STARweek
Term 4	ASET-NSW Conference T.B.C
18 September	ASET-NSW AGM
26-29 September	CONASTA69 – Kingston, Canberra
05-07 October	CONSTANZ – Christchurch, NZ
20 October	HSC Exams begin
18-24 October	Aussie Backyard Bird Count
8-14 November	National Recycling Week
06 March 2022	Clean Up Australia Day

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Our staff would welcome the opportunity to provide further information on or assistance with your specific requirements. These may not be included on our website, but our experience, facilities and resources enable us to source a wider range of products.

<https://alphachem.com.au/product-category/laboratory-chemicals/>

Shane Longmore

(Managing Director)

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If you have any interesting science stories, photos, hints, tips or freebie suggestions, and they haven't been published on other forums, please send us an email so we can publish in the next edition of the newsletter. Please put NEWSLETTER in the subject line.

fincatol@stmarks.nsw.edu.au

national science week



SUPPLIER SUGGESTION

Circle Harvest is a Sydney supplier of insect based foodstuffs. Very well suited to the National Science Week theme which is Food: Different by Design.

Resources – Cleaning Hotplates

In schools, hotplates seem to have a bad habit of turning black. The secret to cleaning them is hydrogen peroxide.

The way this is thought to work is as follows:

This burnt black mess generally consists of mostly carbon. When carbon based “stuff” such as plastic coating of the cord comes in contact with the hotplate and is heated to above 150°C, the volatile components evaporate leaving larger long chained hydrocarbon molecules behind. These long hydrocarbon molecules bond electrostatically to the metal surface. The use of hydrogen peroxide is thought to loosen the bond between the hot plate metal surface and the black hydrocarbon substance. The mechanism of how this works is not clear.

It is interesting to note that hydrogen peroxide is also used to clean aluminum coins by collectors.



You will need.

- Dish washing detergent for cleaning and ethanol for drying.
 - A few small beads Use glass boiling beads or get glass beads from a \$2 shop-test these with a Bunsen burner to ensure they can stand heat.
- Non-metallic scourer Scotchbrite® or similar for cleaning.
- Hydrogen-peroxide 3% version in the brown bottle from the supermarket is fine.
- Ceramic tray (not metal nor plastic) outdoor garden pot trays.



Instructions

Do this in a well-ventilated area or fume hood – you're going to generate volatile compounds. **Do not breathe the fumes.**

1. Degrease the top of the hotplate thoroughly with detergent being careful to keep internal electrics from getting wet. Then wipe down with ethanol to remove any remaining moisture.
2. Make the ceramic tray level on the bench close to the power outlet. Put the small beads in the tray, this will serve to hold the hotplate just above the tray surface.
3. Put hotplate upside down in tray, on top of the beads.
4. Pour in just a few millimetres of hydrogen-peroxide ensuring that the hydrogen-peroxide is just touching the entire hotplate surface.
5. Set the hotplate to 50°C or its lowest temperature - you don't want to boil the hydrogen-peroxide, just heat it.
6. Heat for 20 to 40 minutes - check the hydrogen-peroxide level regularly to ensure it is not getting too low.
7. Turn off the hotplate and allow to cool.
8. Carefully remove the hotplate and turn it up the right way.
9. Use a Scotchbrite® or similar non-metallic scourer to clean the hotplate - wear gloves to keep your hands clean. Stubborn lumps of material can be carefully chipped of the surface with a sharp metal spike (screwdriver/needle etc.)
10. Wash thoroughly with water, once again being careful to keep internal electrics from getting wet.
11. Stand back and admire your good work.



Freebies

Check out the free experiments including making dinosaur eggs on madaboutscience.com.au website, and read the blogs on www.sasta.asn.au

Welcome to the Wonderful World of Waste and the School Laboratory Part VII & VIII

By Michael Pola
Envirostore Chemical Consulting
mike@envirostore.com.au

What makes a chemical a favourite? Can it be re-used or recycled? These are not the same thing: reuse is for immediate use as is, recycling may require repacking, filtering, or another cleaning step. Is it a non-dangerous good or non-hazardous substance? Again, these are not the same thing. Dangerous goods represent an immediate danger i.e. they are explosive, toxic or flammable. Hazardous is a term used in the GHS system of classification of chemical substances for potential harm when exposed to them during use. Dangerous goods present danger in an acute and immediate way. Hazardous substances usually present a chronic hazard over a period of time, not necessarily now. There is plenty of overlap between the two systems, but in mind that the dangerous goods classification (with coloured diamonds, UN numbers, segregation, and storage rules) is primarily for transport and storage. Hazardous substance classification applies when you wish to use them, such as weighing it out, dissolving, mixing etc. The Safety Data Sheet is supposed to tell potential users whether a substance is hazardous and why according to the criteria of Safe Work Australia. It should also contain any dangerous goods information usually under the transport section of the SDS.

Examples of handy chemicals are sodium carbonate anhydrous (soda ash) which you can use to deodorise your acids cabinet and fridge. It can also neutralise acids. Sodium bicarbonate has the same potential uses. Citric acid is good to neutralise ammonia solutions. Kieselguhr or Fuller's Earth is a good absorbent. Alumina or aluminium hydroxide are excellent inert powders to dilute solid metal powders such as aluminium or zinc powder. It is the same magnesium oxide although it is a bit light. Ammonium sulphate is good for the lawn as is urea. Never throw any of these chemicals away.

Some dangerous goods that can be used as lawn fertilisers are calcium, ammonium, and potassium nitrate. Silver nitrate will always be recovered for silver, as will any precious metal or solution.

Lead, tin, nickel, zinc granules and copper are always re-used. Not so much sodium, potassium, calcium, barium, or strontium as elements. We have never had any requests to recycle any of those alkaline earth metals.

Gas cylinders are dangerous goods Class 2 and are rarely found in the school laboratory. It is the high pressure of gas in the cylinder that makes them dangerous. The pressure in a car tyre is around 30 pounds per square inch (psi). A cylinder of compressed air may be as high as 30,000 psi. That's a lot of energy stored in a metal container! BBQ gas bottles are under high pressure as well as being a flammable gas. If you intend to use gas cylinders in the school laboratory you must address storage and handling. Even if it is just a small gas cylinder of LPG for a Bunsen burner.

You must be familiar with the colour coding system for fire extinguishers. They are red with various coloured stripes. A blue stripe indicates that is a foam extinguisher, white is a dry powder, black is carbon dioxide, and no stripe is plain water. The best all-rounder is probably the dry powder extinguisher. The carbon dioxide extinguisher will give you about 20 seconds of gas but as it comes out under pressure, it is sufficient to extinguish most fires. Solid carbon dioxide (dry ice) holds a temperature around -40 degrees so you do not want to spray any exposed skin with this extinguisher. The other cylinders are just above normal air pressure and so present no freezing hazards.

It is normal to have a company come and inspect your fire extinguishers every 6 months. It would be dangerous to need to extinguish a small fire and discover that your equipment is faulty. Also ask this company to dispose of any damaged goods as high pressure cylinders are not suited to general rubbish.

Now let's bust some myths!

That you can use sand or soil to soak up a liquid chemical spill. Wrong, sand is silicon dioxide, completely insoluble in most things except for hydrofluoric acid. The only use of sand I can think of is to use it as a physical barrier for a large spill to enclose it while you apply a real absorbent like vermiculite or other mineral based material.

Another myth is that you use powdered sulphur for a mercury spill. You will end up covering the mercury in powder which may help in keeping the vapour in, but there is no actual reaction. Mercury is a liquid metal with a strong affinity for other metal with which it forms solid amalgams. Amalgamation is the property to use against the mercury to convert it from a liquid emitting vapour to a solid metal with zero emission. Tooth fillings are based on this property and copper, tin or silver amalgamating with mercury to form a very strong filling. Use zinc granules on a mercury spill to form a zinc amalgam which is solid enough to be easily swept up.

The other myth is using lead to shield radioactive materials. Lead is the material of choice to shield gamma emitters such as Co 60 and alpha emitters such as Am 241 (found in smoke detectors). Beta particles like Sr 90 are shielded by aluminium. The presence of radioactive sources in the school lab is usually to show the various shielding efficacy per particle type, and to demonstrate the inverse square rule using a Gieger Muller tube detector. The counts at one metre will be a quarter that at two metres (the reciprocal of two squared = $\frac{1}{4}$) and $\frac{1}{9^{\text{th}}}$ at three metres etc.

The other rules to observe are the storing of chemicals on our shelves. They are best stored according to dangerous goods class, preferably within dedicated cabinets to observe the segregation rules versus the dangerous goods rules. The main point is to keep class 5.1 oxidisers away from class 3 flammable liquids. Acids and alkalis are both class 8 corrosives and need to be kept separate. The only chemicals that can be stored in alphabetical order are the non-dangerous items which are called zone 0 in schools. The class 3 cabinet needs to be vented externally. There are no requirements to have any of the other cabinets vented. In the acid cabinet have some soda ash in a dish to absorb an fugitive vapours. The use of screw topped bottles and not stoppered glass bottles will considerably reduce the chance of any vapours.

Buy class 8 cabinets in plastic and with a physical partition, acids and alkalis can be stored within the same cabinet. The dangerous goods rules apply to transport (not applicable to schools) but also to

storage which certainly is applicable only on a small scale. Remember that the dangerous goods system is based on physical properties that don't change when a chemical becomes waste. Those pesky chemical properties such as flammability, toxicity, dangerous when wet won't disappear because a chemical is no longer required.

These articles were previously published in Lablines and have been included with permission from the author. Editor.

CONASTA 2021



CONASTA is the annual science education conference of the Australian Science Teachers Association (ASTA). In 2021 CONASTA will be hosted by the Science Educators' Association of the Australian Capital Territory (SEAACT) and will be held from 26-29 September.

The CONASTA 69 theme of 'Science Revealed' has been chosen to inspire all educators to focus on the less obvious and most intriguing aspects of science and how this contributes to the broader body of scientific knowledge that supports breakthrough technologies. CONASTA 69 will also focus on the celebration and successes of science, particularly Australian science, and will explore the vital role of science in our future. Registration is open.



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New Publications

Books published in 2021 that were recommended by BBC Science Focus Magazine.

- The Science of Can and Can't by Chiara Marletto
- Hand Made by Anna Ploszajski
- Mysteries of the Quantum Universe by T Damour & M Beruniat
- Graphic Science by Darryl Cunningham
- Gastro Physics by Charles Spence
- Woman in Science by Rachel Ignatofsky
- How to Invent Everything by Ryan North
- The Science of Sin by Jack Lewis
- The Little Book of Cosmology by Lyman Page

You know you are a geologist when: -

1. You have ever had to respond "yes" to the question "What have you got in here, rocks?"
2. You've taken a car over 15kms of dirt track just to see a road cutting.
3. You have to explain to airport security that a rock hammer is not a weapon.
4. Your rock garden is located inside the house.
5. You have ever hung a picture using a Brunton as a level.
6. You consider a recent event to be anything that happened in the last hundred thousand years.
7. Your photos only include people for scale.
8. Your field trips include scheduled stops at gravel pits and liquor stores.

A word from our new sponsor...

My name is Chris Simm, and I'm the Service Manager for Conditionaire Manufacturing Pty Ltd. We are a Melbourne based company that specialises in fume cupboard testing & manufacturing, ductless fume hood testing, chemical storage cabinets, ventilation units & fans for chemical cabinets/chemical storage rooms in your school.

The company is well established and has been operating for 70 years. This gives us a very distinct advantage over our competitors when it comes to knowledge and problem solving. We currently repair/trouble shoot all makes and models on the market today. We are also NATA Accredited and adhere to the current standard AS/NZS 2243.8 and AS/NZS 2243.9. Our testing equipment is calibrated to NATA standards.

We have experience in all models of fume cupboards currently on the market, and most past makes & models. We can either offer you original parts or retro-fit ours when replacement parts become unavailable. This is a huge advantage over our competitors, when they cannot offer the same service.

All our reports come with a photo/sketch as per the standards requirements. It seems there are a lot of companies out there not adhering to this, and we now have access through a portal on the internet for all our clients to see or gather their test reports and have a full asset history on their fume cupboards etc including comments/repairs. We normally just email out as a PDF and there will be even more capabilities coming in the future!

What we can offer the regional NSW schools and Sydney Metro is this...we currently do a number of schools in the following areas: Albury, Cowra, Dubbo, Bathurst, Orange, Mudgee, Lithgow. This has come about due to the expensive pricing schools are being quoted from companies based in Sydney. For us to come to your region, I would suggest you contact all the lab assistants and facilities managers in the surrounding region, and discuss what you are currently paying for this type of service, and email me back with how many fume cupboards/fume hoods/ductless fume hoods (portable units on wheels) to get a no obligation quote for your school/s.

We would like to offer your school the following pricing...\$60 plus GST per NATA Test (airflow/smoke test with full report) and if you are 50klms or more out of Sydney, a travel cost of \$300 plus GST to anywhere else in NSW.

Remember also, double sided fume cupboards get tested both sides as per the standards and have to have certification labels on both sides.

I hope to hear from you soon.



Chris Simm - Service Manager/Business Development

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BOB'S INSTRUMENT SERVICE

Bob's Instrument Service specialises in the service and repair of school science lab equipment including microscopes, balances, power supplies, panel meters and other equipment throughout NSW and ACT.

Please feel free to contact Bob Death on 0416 721 011 or bobsinstruments@gmail.com to discuss your school's needs.