



An Australian Government Initiative



national science week



Photo: Royal Society of Victoria



Inspiring ideas
for National
Science Week

**LIBRARY
ACTIVITIES**

A NATIONAL WEEK OF SCIENCE



National Science Week is Australia's annual celebration of science and technology, running each year in August. We've put together this pack of science-inspired ideas to help libraries plan an exciting week of activities.

This celebration of science is an opportunity to acknowledge the contributions of Australian scientists to the world of knowledge. It also aims to encourage a wider interest in science pursuits, and to encourage young people to be fascinated by the world.

National Science Week is supported by the Australian Government in a variety of ways, including through the \$500 000 National Science Week Grants Program. Other partners include CSIRO, the ABC and the Australian Science Teachers Association (ASTA).

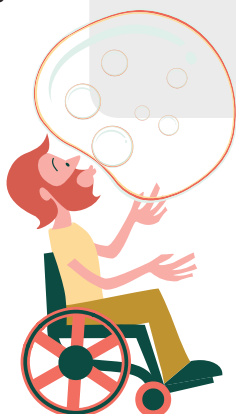
CORNUCOPIA OF EVENTS

Over one million people participate in more than 1000 events across the country. Each year these events attract a wide audience from children to adults, and science amateurs to professionals.

Events are held by universities, schools, research institutions, museums, science centres – and libraries. Libraries play an important role in the community, with the potential to link local groups and individuals with science. Libraries are community centres, accessible to everyone. The collections, information, technology and event spaces make libraries hubs for the community.

This pack aims to support libraries that haven't participated in National Science Week previously, by providing ideas and suggestions on how to be involved. Many libraries are already engaged in STEM activities, so we hope this pack provides further inspiration and encouragement to stay involved. The following pages include a list of event ideas, simple activities, and stories of science-related endeavours run by libraries in previous National Science Weeks, as well as helpful tips and more information.

Register your events on the National Science Week website at <https://www.scienceweek.net.au/event-holder-registration>



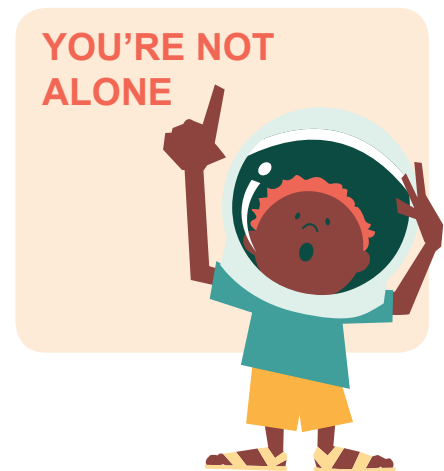
INSPIRING IDEAS

- Set up a sensational science book display – or a display on science fiction to show what has become science fact
- Include science-related children's books for story-time readings to raise awareness of science and arts being all around us – take a look at the Early Learning STEM Australia (ELSA) booklist for some ideas: https://elsa.edu.au/wp-content/uploads/2018/11/STEM-Booklist_Publishing-040518.pdf
- If you run a book club, include a science theme in August
- Run a session on technology for seniors, such as on iPhone photography – perhaps ask students to show how
- Host a science talk, panel discussion, or debate. Focus on a subject of most interest to your community, discuss how science can address the problems facing your region, or highlight how science helps your Council make decisions about roads, parks, water, building design and almost everything you see around you
- Ask a Tall Poppy (<http://www.aips.net.au/tall-poppies/tall-poppy-campaign>), Science Superhero (<http://www.chiefscientist.gov.au/category/media/profiles>) or Superstar of STEM (<https://scienceandtechnologyaustralia.org.au/what-we-do/superstars-of-stem>) to talk about their career in science
- Contact your local tertiary institution, CSIRO, or museum to ask for a scientist, engineer or other expert to give a presentation, suggest ideas or help develop partnerships
- Invite a local business or an industry leader to talk about how important science is to their field
- Invite a member of a citizen science project team to explain to the community how to be involved: <https://www.citizenscience.org.au/ala-project-finder>

- Hold a speed-meet of STEM professionals from local organisations, businesses, universities and professional associations
- Host a Brain Break using our kit, incorporate a morning tea, run quizzes or try out the hands-on activity ideas: <https://www.scienceweek.net.au/brainbreak>
- Run a build-a-robot workshop using Lego or other materials
- Run a Big Bang Science Workshop: <https://childrensdiscovery.org.au/programs/big-bang-science-workshop> or a Little Bang Discovery Club: <https://childrensdiscovery.org.au/index.php/programs/little-bang-discovery-club>
- Organise an educational program at your library using free videos, articles, resources and tools from The Royal Institution of Australia: <https://education.australiascience.tv>
- Book a Museum in a Box, with real museum specimens, casts, artefacts, dioramas, images, DVDs, CDs, books and resources from the Australian Museum: <https://australianmuseum.net.au/museum-in-a-box>

- Borrow a Spark! Discovery Box: <https://childrensdiscovery.org.au/programs/spark-discovery-boxes>
- Run an 'Introduction to coding' class to teach basic coding skills
- Run one of Code Club's projects to build programming skills, or use National Science Week to launch your own local club: <https://codeclubau.org>
- Organise a science fair to showcase local scientific talent
- Support a Premier's Reading Challenge or your local equivalent by promoting books on the reading list with a STEM focus: <http://www.premiersreadingchallenge.sa.edu.au/prc/pages/books>
- Highlight breaking news in August by using the Australian Science Media Centre's resources to get the facts and promote informed discussion: <http://www.sciencemediacentre.org>
- Show one of the SCINEMA International Science Film Festival films at your library: <https://scinema.australiascience.tv>

Some of these ideas have been successfully run in the past, and are described in more detail in the case studies on the following pages to foster curiosity and inspire your own ideas.



There are resources available on the National Science Week website (<https://www.scienceweek.net.au>), including:

- instructions on how to run an event
- logos and characters to add to fliers, posters and advertisements
- a free teaching resource book full of ideas and activities
- a free workplace or school science quiz (Brain Break)
- events and other activities planned for National Science Week
- information on grants that are available annually; national large grants (up to \$20 000, open October for the following year) and smaller rounds of grants from states and territories (various, open around February to May depending on jurisdiction)

Contact your local Inspiring Australia manager or National Science Week coordinating committee – they can provide assistance such as advice on becoming involved in science activities, provide a list of science-related books for children and other audiences, find speakers and connect you with science experts, let you know about funding to seed local activities, and alert you about local opportunities and activities you can join. See <http://inspiringaustralia.net.au> and <https://www.scienceweek.net.au/contacts> for a list of contacts in your state or territory.

MAKING YOUR WAY TO SCIENCE

Curtin Library Makerspace in WA got involved with recycling and renewable energy through workshops on paper recycling, crafting with plastic bags, making DIY solar-powered cars and designing a windmill.

'I particularly loved our workshops on building your own wind turbine,' said Marie Clarke, Curtin University Library's Makerspace Coordinator. 'We set it up to encourage people to make, test and try again, rather than just follow instructions. You could really see them learning – especially the kids, who have no hesitation about trying things out.'

As well as opening the resources of the space to a wider public, Makerspace invited four school groups as part of the Curtin Addressing Higher Educational Access Disadvantage (AHEAD) in School program, giving them the opportunity to explore science in a fun and creative way – and think about an education in science as a possibility.

The Energy Awareness Design Challenge got people teaming up to design something that would conserve energy. For one young girl, that meant conserving her own energy, so the team made a device that would produce the sound of waves. Very calming, and very creative, which



Photo: Marie Clarke

is what it is all about. Makerspace's goal is to provide a safe space where people can 'explore, tinker, invent, play, design and find ways to realise their aspirations,' said Marie. Mistakes are not only ok, they are welcome. 'That's how you learn – it's learning through doing and making.'

What is energy?

Tricky question. Go to your local library, dig out a book and you will find that it is the capacity to do work, and that it cannot be created or destroyed. We say that it takes several forms, such as kinetic, potential or nuclear energy, or even dark energy. We can experience it in the form of heat or light, observe it in the movement of things, and measure it.

More information:
<https://maker.library.curtin.edu.au>

SHOWING OFF SCIENCE THROUGH SCIENCE SHOWS

Libraries ACT have hosted a series of fun and accessible science shows for families, presented by entertaining science communicator, Dr Graham Walker, from *Science ShowOffs*.

More than 350 people attended booked-out shows at eight libraries across Canberra's town centres, as well as smaller, outlying suburbs that usually miss out on science events. The participants, rather than Graham, conducted almost all the experiments as audience volunteers.

'The shows involved lots of experiments with lots of volunteers – so rather than being a piece of the puzzle, they were the puzzle,' said Graham. 'This satisfied the young kids' insatiable desire to volunteer, while also getting the parents involved in some more challenging science, such as using liquid nitrogen.'

The newly developed shows built on science tours Graham has done on topics such as energy and climate change, including puppet shows for early learners.

Graham obtained funding from the ACT National Science Week committee, so the shows were free for libraries. 'The libraries got a unique program that was different to their practical



Photo: Marie Clarke

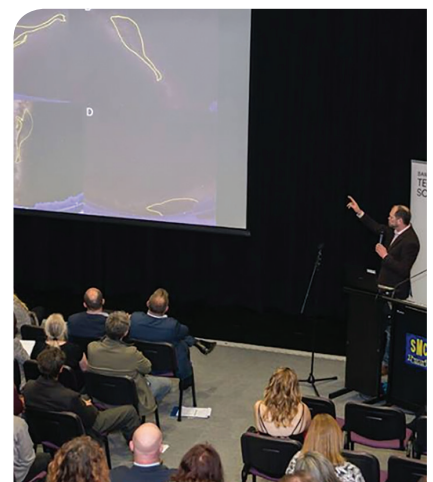


Photo: Royal Society of Victoria

Photo: Inspiring SA



events or story time. By partnering with the libraries, I was able to reach their amazing community network.'

His presentations are all about making science accessible to families. 'I often get nice feedback that people have gone home and done experiments. They send me videos and stories about making their own vacuum-cleaner-powered marshmallow bazooka, and things like that.'

'A girl, who came along to one of my shows five years ago when she was really small, came back the following year with a picture of the last show,' said Graham. 'The same family keeps coming back, so I've seen this girl literally grow up as she comes back each year for the science show.'

Marshmallow law

The marshmallow bazooka is an example of Newton's first law of motion, first proposed in 1686. The law states that an object will stay at rest or in motion until a force changes it.

More information:
<http://www.scienceshowoffs.net>



STRENGTH IN NUMBERS

As part of the Sapphire Coast Regional Science Hub, Bega Valley Shire Libraries could tap into a whole network to run a truly wild program for all ages.

Exhibitors showed off their citizen science programs, microscopic views of marine life, and equipment for monitoring wildlife in the local national parks. The hub was also fortunate to receive funds for one of Questacon's travelling exhibitions.

'The Atlas of Life is one of the science hub members and they are really active here. National Science Week

was an opportunity to talk about the work they've been doing and recruit citizen scientists for their bioblitzes,' said Scott Baker, Programs and Partnerships Officer at Bega Valley Shire. 'No doubt there are new recruits out there right now logging wildlife with their Nature Mappr app.'

Bega Valley Shire is also keen to build the technological literacy of people in the municipality. The library also rolled out a 3D printer, which a keen angler used to print out a replacement part for his antique fishing rod.

The diverse program drew in a wide range of people. 'Bega Valley Shire Library has been doing National Science Week for three or four years now,' said Scott. '2017 was big – we got 1000 people through, which was great for a shire with a population of 30 000.'

'The numbers are satisfying but what's even better is how it gets people thinking,' said Scott. 'The 3D printer got a lot of use but the main thing was that it showed that it was an accessible technology – I saw a few local designers and inventors walk away with a twinkle in their eye.'

More information:
Sapphire Coast Regional Science Hub <https://www.aeensw.org.au/networks/sapphire-coast-regional-science-hub>



PRINTING THE FUTURE

Students in Western Australia entered designs in a 3D printer competition, with the winners having their inventions printed free at the FabLab Makerspace at Falcon eLibrary and Community Centre.

Photo: Jesika Miller



Jesika Miller, Library Officer at City of Mandurah, says after reaching 25 000 people on Facebook they received more than 50 entries. 'Entries from primary school students included a glass eye to help a friend see again, and an invention to change taste buds to make children eat more vegetables,' said Jesika.

The winning entry was a sponge-like device to replace lost keys by filling an imprint with liquid metal.

'The competition brought out creativity within the community, and highlighted the potential for 3D printing,' said Jesika.

Before the competition, many people didn't know the library's maker space was open for the public to do STEM and DIY activities. 'The competition led to the community seeing the library as a cool space for them,' said Jesika.

'It was fully booked by people wanting to use the 3D printer for four months after the competition, and its continued use a year later is incredible.'

As well as awareness of 3D technology and other aspects of the library, the community gained computer programming skills, met new people, and formed partnerships with others in libraries, schools and universities.

Back to the future

3D printers were invented in the 1980s. Rather than print an image using ink, they create an object using layers of plastic or metal.

More information:
<https://www.mandurah.wa.gov.au/facilities/libraries/digital-hub-and-fablab>

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EARTHWORMS FOR BOOKWORMS

For 2017's Future Earth theme, libraries around Perth hosted *Soil Secrets Revealed*, a series of more than 20 free community workshops to show how composting can replenish soils with vital nutrients.

Organiser Kerry Mazzotti said that people learned how important soil was for everything from food production to healthy ecosystems by looking at what was going on in their own backyards.

More than 300 people visited libraries, gardens, schools and community halls across Perth to see demonstrations of worm farming and composting and listen to talks on topics such as how plant roots detect water flowing through soil. A local company tested soil samples and people could enter a competition to win a sustainability prize pack.

One library ran 'pop up science at pick up time' targeting primary school aged students, surprising people with a flash-mob style of activities.

'Previously the libraries hadn't had anything like this,' said Kerry. 'The science was innovative, and very new to the audiences of the area. The activities brought research into the libraries.'



Soil Secrets Revealed was delivered by Switch Your Thinking, a local government initiative that inspires sustainable action in the Perth community. The events were promoted through a flier, bookmark and poster on soil secrets, and online at switchyourthinking.com and through Facebook posts.

‘The program changed me personally,’ said Kerry. ‘I had a light bulb moment about the need to respect soil health and biology, so I now buy organic food. It changed my behaviour, and I enjoyed watching people question their own day-to-day activities and realise the need to grow plants ethically.’

Old soils

New soils form when rock is weathered. In Australia this has been going on for a very long time – the Western Plateau, which covers more than half of the continent, and most of Western Australia, has been weathering for more than 2.8 billion years! One thing about old soils is that they are low in nutrients – which is why compost is important.

More information:

<https://www.switchyourthinking.com/our-projects/past-projects/soil-secrets>

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TIME FOR SLIME

Slime. It’s our favourite non-Newtonian fluid; that is, a liquid that you can transform into a solid just by tapping it. Noosa Library Service’s twist? Put the kids in charge.

‘Two very enthusiastic library lovers, Mia and Amy, both 10 years old, ran a slime workshop during National Science Week,’ said Tracey King, Noosa Council’s Literacy and Learning Coordinator. ‘It was inspiring to have young people teaching young people. It was a really fun workshop – very different to reading a textbook.’

The library simply provided materials for Mia and Amy, and children and adults teamed up to make slime. Tracey said it was so popular, the library will run it again.

‘We had one participant go home after the workshop, make slime on their own, and then come back in to the library to show us their home-made slime.’

The slime workshop was part of the library’s week-long science program, in which more than 300 children and adults – and library staff – tried out new and emerging robotics, told stories with a science focus, learned to code, and ‘ice-cavated’ plastic dinosaurs caught in the ice.

Noosa Library Service aims to engage young people in STEM-related learning and encourage them to think about solutions to complex issues. ‘We don’t know what jobs will be around in 20 years’ time, so we focus on what skills they’ll need,’ said Tracey. ‘We aim to provide free and equitable access to science resources and emerging technologies for people who may not otherwise have the opportunity.’

The library will continue to run similar programs, including 3D printing and modelling workshops for kids, adults and seniors – and more slime workshops by Mia and Amy.

What is slime anyway?

Many of the liquids you know become thicker as they cool and thinner as they warm. But some, called stir-thickening liquids, become thicker when you apply pressure to their surface – the more and quicker the pressure, the thicker the liquid. Cornflour slime is one of these: you can slowly push your finger through it, but punching the slime makes the cornflour particles lock together, causing the slime to become hard like a solid.

More information:

<https://www.libraries.noosa.qld.gov.au/digital>

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Photo: Kerry Mazzotti



Photos: Noosa Library Service

TOP TIPS FOR LIBRARIES

- Give yourself plenty of time for planning and advertising: August comes around quickly
- Check other local library websites to see what they're up to
- Contact Inspiring Australia in your state or territory, find a local regional science hub and tap into some local science: <http://inspiringaustralia.net.au>
- Check the National Science Week site: <https://www.scienceweek.net.au>
- Check out Questacon's list of hands-on STEM activities: <https://www.questacon.edu.au/outreach/programmes/questacon-smart-skills-initiative/workshops/resources/teacher-resource-hands-stem-activities>
- Use the resources of the Children's Discovery Centre, such as their Little Bang Book of Discovery's simple experiments to do at home (or the library) using everyday items: <https://childrensdiscovery.org.au>
- Explore a galaxy of possibilities for mobile STEM programs or online and in-class learning on the STARportal, the Office of the Chief Scientist's directory of STEM activities: <https://starportal.edu.au>
- Visit the CSIRO Education page: <https://www.csiro.au/en/Education/Programs>
- Draw ideas from 50 Kids' Activities from CSIRO: <http://www.publish.csiro.au/book/7556>
- Use CSIRO's Double Helix magazine: <https://www.csiro.au/en/Education/Double-Helix>
- Be inspired by San Francisco's Exploratorium: <https://www.exploratorium.edu/explore/activities>
- Check out the Powerhouse Museum's lesson plans and worksheets: <https://maas.museum/event/ecologic/resources/lesson-plans-worksheets>



Photo: Inspiring SA



Photo: Royal Society of Victoria



Contact us

Follow National Science Week on Facebook (<https://www.facebook.com/nationalscienceweek>) and Twitter (@Aus_ScienceWeek) and tell us what your library is doing by tagging #scienceweek.

For general information about National Science Week, contact the National Science Week Team at:

Email scienceweek@industry.gov.au

Phone 02 6270 2880

Post Questacon, PO Box 5322, Kingston ACT 2604

Register your events on the National Science Week website at <https://www.scienceweek.net.au/event-holder-registration>

THANK YOU | National Science Week would like to acknowledge the helpful assistance in finalising this information pack from the Public Libraries Victoria Network and Australian Library and Information Association. Thanks also to everyone who provided insightful comments and photos about their exciting events. Content by Scientell and gramma communications. Design by Lea Walpole.