

Little Bang and Bright Sparks

newsletter

Spring 2019 | Vol 6



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Welcome to the 6th newsletter in our biannual update.

We are beyond excited to announce that our long-awaited **Big Bang Book of Science** is now available! It's been a labour of love (and pain), and I thank the amazing efforts of Wendy, Simone, Phoebe, Gudrun, Liam and Colin. Take a sneak peek now, and take advantage of our 'pre-launch' special price!

We share with you some updates and improvements to the **Little Bang Discovery PLUS** which many of you have started implementing. There is another round of training taking place in Adelaide on 14 to 15 November, and we're looking for suitable date for a NSW session – perhaps coinciding with ALIA 2020 in May in Sydney next year.

Several libraries are running **Big Bang Science Workshops**, and we feature some of the excellent feedback they have been receiving.

Many of you participated in **National Science Week** in August, which really demonstrates the power of libraries as community hubs of local activity for a national initiative. We were delighted to be invited by Burdekin Library in North Queensland to participate in science week in Ayr. We also spent a day with the teams from Ayr and Whitsunday branches to train them on seven of our **Big Bang Science workshops** – that was a lot of science to take in!

Following so much demand from many of you (which, we love), **Spark! Discovery** (aged 8 to 12), **Spark Junior** (ages 3 to 5) and **Spark Technology** (8 to 12) themed boxes will soon be joined by **Spark Curiosity** (for ages 6 to 8), so look out for details on these early next year.

Wishing you a very bright spring,

Adam

Adam Selinger, Executive Director
Children's Discovery Museum

 www.facebook.com/childrensdiscovery/

PLEASE LIKE US! We'd love to share your stories of science in the library! Some of our resources are also available for sale from here.



Program Updates

As always, we rely on your feedback and practical experience to make improvements to all our programs.

Little Bang Discovery PLUS has been ‘in the field’ for less than one year, and there have already been some really useful adaptations, for example:

In Session 4, ***Our Precious Planet*** and ***Investigation Steps***, we have found better data to base the ‘*Why worry about landfill?*’- Activity:

We now suggest using data from the UN Food and Agricultural Organization (FAO) and World Bank Statistics (<https://ourworldindata.org/yields-and-land-use-in-agriculture>). There’s no change to the equipment, just a slight tweak to the lesson plan.

Then, in Session 5, ***Physical Change and Making Close Observations***, we recommend for *Changing State Activity 3 Gases*, that spraying the can of air freshener straight down to the ground in the middle of a circle works best, with the ‘drop-zone’ pre-marked with masking tape. Thus, add masking tape to your equipment list.

Lastly, in Session 7, ***Chemical Changes and Visual Results*** we suggest using **Hydralyte** tablets instead of Berocca and use warm air from a hairdryer as a safer alternative heat source for the lemon juice invisible ink activity.

Please keep your suggestions and feedback coming so we can share in the newsletter and update our training materials and equipment lists.



One of the great things about the science topics and investigations we choose to explore is, that it can be so very practical – especially for ourselves (why do you think we choose what we do?).

Here’s something for just the adults to experiment with (science is not just for kids, right?!) Take photos and let us know how it worked for you!

Take a look at your kettle – does it seem darker and cloudier inside than when it was brand new? This can be explained as being due to deposits of calcium and other mineral salts left behind after the water boils. For those living in a ‘hard water’ area this will be very familiar. Hard water is water that has travelled through certain types of mineral such as limestone or chalk.

When water boils, or evaporates, most* of the dissolved minerals remain behind and stick to the bottom or side surfaces. Over time, these minerals build up and can start to look unpleasant or even cause deterioration. They can be hard to remove with soap and water. In fact, soaps and detergents often react with these salts and become less effective.

So, this is where some good old kitchen chemistry comes into play.

We need something to prevent the minerals in hardwater from interfering with cleaning. For this we use something called a **chelating agent**. These are molecules that prevent soaps/detergents reacting with the mineral deposits in hard water.

The mechanism is complex, but simply stated **chelates** combine with certain metal ions to lock up (“*chelate*”) the minerals. Kettle surfaces calcified by the boiling of hard water can be cleaned with citric acid to “chelate” away the calcium salts.

Citric acid from a lemon, lime, orange (in powdered form or from a bottle) is an effective chelating agent. Fill your kettle with water and add some citric acid. Boil the kettle,....and see the result. You can also watch this video <https://youtu.be/CPzGmXJeBSw> for inspiration.

This is obviously not something for the children, but there are some other great experiments to do with citric acid:

<https://www.education.com/science-fair/article/lemon-cleaning-products/>

*Not everything in water is left behind: think about perfume smells emanating from humidifiers, or the distilling of whisky.

Source: Chemistry in Australia Sep/Oc 2019 pg38-9 Science for Fun: Cabby chemicals. Ben Selinger.

AYR REPORT



Big Bang Training in Ayr for National Science Week

This August, Burdekin Library invited Children's Discovery to travel to Ayr in North Queensland to deliver staff training and run public workshops as part of their National Science Week festivities.

Eight library staff from Ayr and Whitsunday branches participated in learning about the content and operation of seven Big Bang Science Workshops: All Wired Up, Awesome Astronomy, Edison Robots, Eggsperiments, Feel the Pressure!, Magic Magnets and Quake n' Shake.

The library had pre-purchased the workshop kits, which were delivered in advance. They were then available for both training sessions and the public programs. Local schools, and home-school groups booked places in the public sessions which took place over two days inside Ayr library.

Staff workshop training was intense, but effective, with seven workshops to cover in one day we spent about 45 minutes on each. The focus was on the main concepts and how to best facilitate each activity. We also demonstrated how best to prepare and set up the activities, and discussed different approaches that could be used.

The librarians received detailed workshop plans for each workshop on a memory stick which includes Risk Assessments, @ Home notes, experiment instructions and activity sheets.

Any library who purchases Big Bang Science Workshops will receive these materials, which are also now available in our Big Bang Book of Science.



Participants feedback



"This was one of the best STEM sessions I have attended. I love the content and the way it was presented. Thanks heaps."

"Fantastic organisation and extremely interesting and well-presented workshop. Kits easy to follow and 'real-world' based with simple, accessible materials."

"Awesome! Very informative, generous with info, very practical."

Now Available!

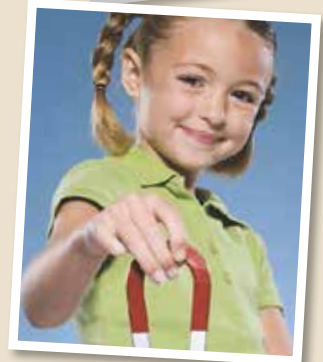
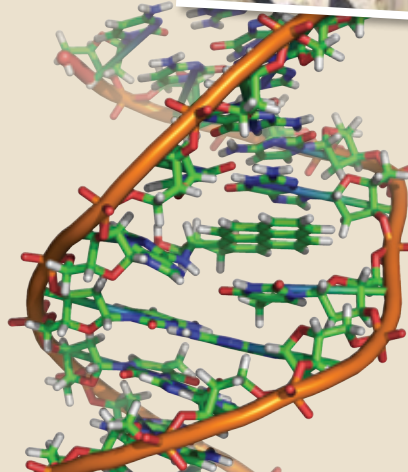
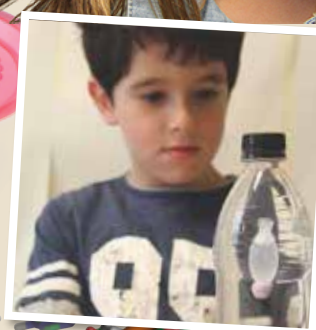
BIG BANG BOOK OF SCIENCE



The Big Bang Book of Science is a two book collection of our 24 most popular and affordable workshops developed for delivery in libraries by librarians. It is full of practical hands-on activities designed to encourage scientific inquiry skills and covers a range of STEAM topics for ages 5-12. Each workshop set comes with comprehensive information and all the resources you need to run it in your service.

This includes:

- Workshop Summary (Key Messages and Equipment/Materials List)
- Full Workshop Plan
- Workshop Risk Mitigation Form
- Additional Resources (Handouts, Recipes, Instructions, Templates etc)
- Discover @ Home Handouts



PRE-LAUNCH PRICE
\$49.95
FOR THE SET OF TWO BOOKS (PLUS POSTAGE)
FOR ORDERS RECEIVED BY 4TH OCTOBER 2019

To order email and use code BB19:
info@childrensdiscovery.org.au

Feature Product Dobsonian Telescope

We have three larger DOBSONIAN TELESCOPE available at a discounted price if there's a library keen to own one (or more). Might be too large to borrow, but certainly excellent for hosting any nighttime viewing.

Technical Specifications

- 80mm diameter
- 500mm focal length
- 25 - 250x magnification
- 6mm & 20mm eyepiece

The
MARS SCOPE
retails at \$280.
Available for
only \$180
from Children's
Discovery



We have finally exhausted our supply of the Galileoscope telescope which have been a stalwart of our initial **Spark! Discovery Boxes**. They proved to be a robust and satisfactory introduction to the wonders of back-yard astronomy for hundreds of families.

After much discussion and consulting, we're planning to update the telescope kit with a different type of telescope.

An advantage of the **Dobsonian telescope** is that it's large enough to view night sky objects such as the moon, planets, and bright nebulas and star clusters, yet compact enough to sit on a desk and store in your shelves.

Refractor v Reflector

The Galileoscope is a **refracting** telescope, or refractor: a long tube with a big lens (the objective) at the front end and a small lens (the eyepiece) at the back end.

When Galileo built each of his telescopes he used a convex (magnifying) objective lens and a **concave** (demagnifying) **eyepiece** lens. This combination produces an image that is both right-side up and correct left-to-right, but the field of view is very narrow — as if you're looking at the sky through a drinking straw.

Johannes Kepler, a German astronomer who lived at the same time as Galileo, showed that using a **convex eyepiece** the telescope creates a wider, more comfortable field of view — but turns the image upside-down. This isn't a problem when looking at the moon and stars because there's no "up" or "down" in space.

In a **reflecting** telescope, or reflector: It is a mirror and not a lens that collects and focuses light to produce an image. Light enters into the telescope and hits the primary, curved mirror at the far end of the telescope. This then rebounds onto a smaller, secondary mirror which reflects the image through the eyepiece — which, for comfort, is usually mounted to the side, and at 90 degrees to the telescope. This system was developed by Sir Isaac Newton, so telescopes that use mirrors are often referred to as **Newtonian telescopes**.

A **Dobsonian telescope**, which uses **Newtonian optics**, allows a large amount of light into the telescope. This allows us to see images further in the distance. **Dobsonian telescopes** have a short focal length, which means that they are relatively short and extremely portable.

BIG BANG UPDATE

Thanks again for sending in and sharing your experience and ideas for Little Bang Discovery Club/Plus. Here are some things you might like to try:

EGGSPERIMENTS

Add some more 'drama' to an "egg-drop" activity. The egg-drop is a great engineering activity, where you have

to design a system to protect an egg from cracking after being dropped from a set height — somewhere between 2m and 3m, or from a balcony, or whatever you have available. Materials are generally cardboard, straws, egg-cartons, sting, cloth, it can vary and change every time.

Ideas: <https://sciencing.com/successful-egg-drop-ideas-8424463.html>

A really cool demonstration we found online (<https://www.steampoweredfamily.com/activities/oobleck-egg-drop-project/>) uses **Oobleck** (cornflour and water 'slime') to absorb the energy from the fall, thus protecting the raw egg.
TRY IT OUT!

Materials: zip lock bags, water, cornflour, mixing stick, raw egg.

Training Updates

Our most recent LITTLE BANG training was in Melbourne at the end of August with 27 librarians attending from five metropolitan library services and one librarian from regional Victoria and one from regional NSW.

We are looking forward to heading to Adelaide in November for another Little Bang training session. This builds on the state-wide roll out across South Australia which began in 2016. Thanks to the support of Inspiring South Australia and the Public Library Service, every library service across the state has been offered both training and equipment.

In November we also train the follow-up program *Little Bang Discovery Plus* in Adelaide. This program offers up to eight sessions and is designed for families with children aged between 4 and 5 who have already experienced Little Bangs. Both *Little Bang Discovery Club* and *Little Bang Discovery Plus* can be adapted to meet the interests of children aged 6 to 8.



Images: Facebook

Feedback from
Little Bang
Discovery Plus
in South Australia



What one thing will you take from this program to continue with your child?

"Asking questions about how things work and letting them decide what they think before telling them answers."

"Curiosity of the world."

"Doing things together."

"Science can be done with everyday objects too."

"Try to talk about science in day to day activities"

"Predicting and observing."

"Letting the kids lead in their learning instead of always following."

"Play based learning."

"Using scientific words to explain experiments and everyday experiences."

What was the best thing about the program?

"Fun experiments, age appropriate learning."

"My daughter was able to do the experiments herself."

"Time with friends, doing new things, new words."

"Allowing the kids to be so hands on."

"Expands young minds. Discovery of how much they know and how they explain things."

"The progression of experiments from the original program was good."

"Having fun while learning."

"Experiments, hands on fun, interesting, very organised and easy to follow along."

"It was nice to be able to attend a class with quite a strong but fun educational substance."

"Brought science into everyday conversations."

So long, and thanks for all the TUNA

Reflections on
ASPAC2019



Adam attended the Asia Pacific Network of Science and Technology Centres Conference, ASPAC 2019, in Brisbane (4-6 September 2019). There, he met colleagues from across the science engagement sector; science centres, museums, galleries, universities, and libraries.

Dr Matt Finch, a writer and public engagement specialist, gave the opening plenary at the conference. He addressed the difficulties of developing strategies for a future when there's not enough evidence from events that haven't yet occurred (think: climate change or running out of fossil fuels).

“What happens to strategy when we face “TUNA” conditions, characterised by Turbulence, Uncertainty, Novelty, and Ambiguity?”

He urged delegates to think about what science would look like in the future, as it faces growing pushback from people who do not respect science, and don't trust scientists on issues such as vaccination or climate change. He argued that meeting that challenge was one of the key issues for science institutions as they went forward into the 21st century.

During a later session, it was observed that science is both hero for creating solutions to our needs, and villain for creating problems for our world, and sometimes it's for the same technology! An example is plastic; once hailed as one of the greatest 20th Century innovations, to now being a pariah pollutant. Whilst too simplistic, it does remind us of our responsibilities as citizens, communities and governments to be aware of the impact of our choices on the world.

So, what was my take-home for the role of libraries in helping individuals engage with and build trust in science?

I believe it comes down to individuals' understanding of the scientific process and how this self-correcting way of knowing brings understanding, but does not in itself drive innovation, or make decisions.

Spending time in a Science Museum exhibition ('Apollo' is currently on at Brisbane Museum) it became apparent to me that scientific

advancements and innovations are largely driven by curiosity (why is it so?), need (think: food, security, energy) and pride (to be the first).

There is also a growing awareness and appreciation of indigenous ways of knowing; a culture and society that has existed for thousands of years and considers that the land itself has agency and spirit.

Libraries could expect to grow in their role as a trusted community hub for knowledge and information. Whether on-line or on-shelf, they provide community access to the latest books, magazines, newspapers and conversations around contemporary issues, both local and global.

One of the greatest advantages that libraries bring to this rapidly changing world, is being rooted in their communities while networked locally, nationally and internationally. Libraries have the capability of being both a rapid reaction force (hosting publications and conversations) well as meeting the specific needs and interests of their community (collections, clubs, training, social networks, etc.)

While the future may be uncertain, the one thing we can seemingly rely on, is that society will continue to rely heavily on science and technology to maintain our lifestyle and solve our problems.

In terms of helping to prepare children, families and communities for a future defined by TUNA, libraries offer an oasis of trusted information, knowledge and conversations.

“While the future may be uncertain, the one thing we can seemingly rely on, is that society will continue to rely heavily on science and technology to maintain our lifestyle and solve our problems.”

Spark! Update



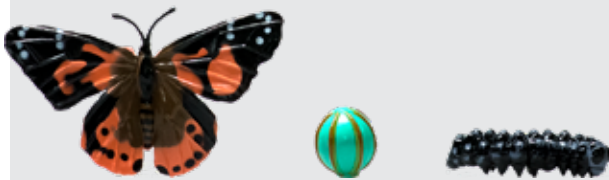
Newcastle Libraries has compiled loan stats for the life of their *Spark! Discovery box* collection. **The kits have been in circulation for just over two years with 585 loans from the collection of 30 boxes (three of each type). This is an average of 19.5 loans per kit.**

"This is a fantastic figure. We very rarely see them sitting on the shelves!" says Mala Scorse, Early Literacy Specialist at Newcastle Library.

The most borrowed kit was **Magnets** (30 loans) followed by **Animals** (28), **Human Body** (28) and **Rocks and Minerals** (27). The biggest challenge is that kits aren't always on the shelf due to having to repatriate missing parts/replace damaged items, so there are periods of unavailability while sourcing missing parts. Getting feedback forms returned is also challenging. From verbal feedback and the circulation rates they have proven to be very popular.

Don't let 'Out of Order' and 'Currently Unavailable' keep science out of the hands of your members! We are always happy to help with replacing materials. We keep a limited stock of most items, and can usually order in most items on request. Contact us at info@childrensdiscovery.org.au or **0417 690 423**.

Perhaps you can also try 3D printing lost items, such as replacement knucklebones or the egg from the butterfly lifecycle kit? Get your Maker Space team onto it! Anyone want to share their design file?



Recommended Resources

International Observe the Moon Night: October 5
<http://www.starnetlibraries.org/observe-the-moon-night/>

Science Toys From Trash
<http://www.arvindguptatoys.com/toys.html>