



ALS Public Libraries SA
Conference 2017

Are we there yet?

Public Libraries in the 21st Century

How Public Libraries Contribute to the STEM agenda

Adam Selinger
Children's Discovery Museum



Children's
Discovery
Museum

“

Libraries are arguably the single most important grass-roots community space with capacity to provide ALL members of their community access to current knowledge and information. They can provide Internet-enabled computers and tablets, collaborative working spaces, themed activities and programs targeting different audiences and acquire new resources to add to their borrowing collections.

Adam Selinger, Children's Discovery Museum

”

The Journey

- Who Children's Discovery Museum
- Why STEM
- What *Little Bang Discovery Club*
- Where Libraries
- How Partnership builds community capacity
- When Now



Children's Discovery Museum

- Established 2001
- Not-for-profit educational charity
- Supported by philanthropy, grants and earned income
- **Evidenced-based mission to improve outcomes for children through engaging learning experiences**



Philosophy

- Every child deserves the best start in life
- Learn through play - engage parents and carers
- Improve science and digital literacy
- Start young and support the 5 Cs

Curiosity Creativity
Critical thinking
Communication and a
Can-do attitude



Milestone Projects



Opened May 2015
5000 family memberships
200,000+ visits to date



First Sydney library pilot February 2011
Train-the-trainer piloted 2015
Today in 80+ libraries in 3 States and growing

Why focus on STEM?

- Technology brings changes in the job market²
- 75% of the fastest growing occupations will require STEM skills and knowledge²
- Less than 5% of classroom time in preschool focuses on STEM-related activities¹
- Science achievement gaps begin very early³



1 The Conversation: <https://theconversation.com/group-work-gets-kids-more-engaged-in-stem-65710>. 2016

2 Chief Scientist, SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS: AUSTRALIA'S FUTURE 2015

3. Morgan, et al. Science Achievement Gaps Begin Very Early, Persist, and Are Largely Explained by Modifiable Factors. 2016

Evidence based

- **Early childhood** experiences can be critical to life outcomes¹.
- Programs need **not be academically focused** to have academic impact².
- Informal, **play-orientated** mediums significantly support science enquiry skills³.
- **Out-of-school** programs strongly support learning²:
 - Adult-child co-learning
 - Heterogeneous audience
 - Metric not curriculum or exam
 - Higher participation rates by disadvantaged families



1. JAMA and Archives Journals. "Early childhood experiences have lasting emotional and psychological effects." ScienceDaily. ScienceDaily, 7 May 2010.

2. Afterschool Programs Make a Difference: Findings From the Harvard Family Research Project Published in SEDL Letter Volume XX, Number 2, August 2008.

3 National Research Council. (2009). Learning Science in Informal Environments: People, Places, and Pursuits. Committee on Learning Science in Informal Environments. Nat. Acad. Press.

The



experience

- Pre-school children with **accompanying adult**
- **Inquiry-play** sessions
 1. Collect & Classify (sort)
 2. Compare & Measure (differences)
 3. Question & Test (experiment)
 4. Science Fair & Celebration
- Loan of the ***Discovery Box*** and *@home* notes.
- Co-produced and hosted in **public libraries**





S1 Collect and Classify





S1 Collect and Classify





S1 Collect and Classify





S2 Compare & Measure





S2 Compare & Measure





S3 Question & Test





S3 Question & Test



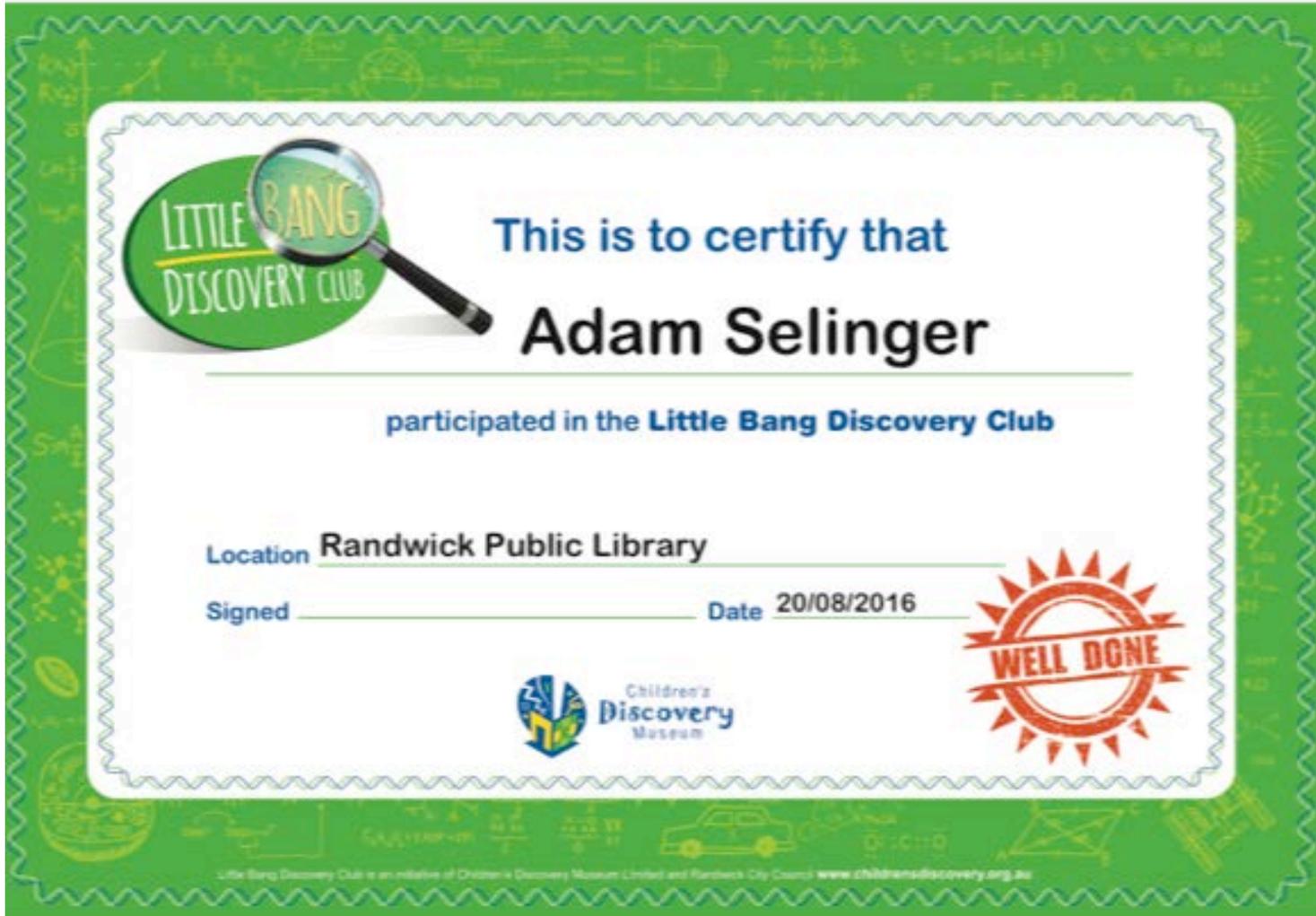


S4 Science Fair





S4 Celebrate





Discovery Box





Little Bang Book & Passport



MEASURING AND ESTIMATING

ABOUT

One way to find out more about things is by measuring them. We can measure all sorts of things like: how tall we are, how long we can jump and how much we weigh. We use different tools to measure different things. You may know about some of the things we use to measure like: rulers, tape measures, thermometers and timers but did you know you can also use your hands, feet or even chopsticks to measure too!

How big are you?

YOU WILL NEED:

- Paper and a pencil
- An A4 piece of paper
- Tape measure

Draw a picture of yourself. Using a tape measure, get a parent/carer to measure how tall you are. Measure around your

What's the biggest and the smallest thing in your toy box?

YOU WILL NEED:

- 8 favourite toys
- Paper and pencil

Can you guess by looking at them and arranging them on the floor which is the smallest toy in your toy box and which is the biggest? Sort them in a line on the floor from biggest to smallest. Use a ruler to measure the smallest toy in your toy box and the biggest toy. Draw a picture of the tallest and the smallest toy and get an adult to write down their height.

Can you guess how many?

YOU WILL NEED:

- A jar, a basket and a plate.

Objects to go in each of the containers for example: biscuits, grapes and pebbles.

A piece of paper and a pencil to write down the estimates and results.

Can you guess how many biscuits there are in the jar? How many grapes on the plate? And how many pebbles there are in the basket? Get a grown up to help you write down your guess. Count each of the things. Is this what you expected?

How hot or cold is it?

YOU WILL NEED:

- Thermometer
- 2 plastic cups
- Ice cubes
- Water, warm and cold

Fill two small plastic cups half way with water and get a grown up to help you measure the temperature in each cup. Write it down. Add some ice cubes to one of the cups, measure the temperature again. What have you discovered?

Everytime you attend a Little Bang Discovery Club meeting you get a stamp!

www.childrensdiscovery.org.au

WELCOME

PASSPORT
Little Bang Discovery Club

LITTLE BANG
DISCOVERY CLUB

www.childrensdiscovery.org.au

Attended the following Little Bang Discovery Club meetings

Measuring and Estimating Objects

DATE

DATE

DATE

DATE

DATE



@Home Inquiries



Little Bang Discovery Club

Collect @ Home

Scientists collect things; they collect information, data and samples. Science is also a collection of known facts, and a process by which we come to know things about the natural world.

Observing and Collecting

Scientists collect things that they are interested in knowing more about, or things that provide evidence for their research. In the process of collecting, scientists learn, and so will you! You can apply our own skills in identifying, selecting, discriminating, evaluating, classifying (sorting) and arranging items.

Make a collection

You can create your own collection and bring it to show everyone at the next session. We'd like you to explain what your collection means to you. Why did you decide to collect these items – did one special item spark the idea for your collection?

Record your observations

Use the notebook and pencil in the Discovery Box to write down information about your collection such as when it was collected, where it was collected, what you observe about the items in it.



Example Collection: Leaves from my park



Little Bang Discovery Club

Measure @ Home

Scientists measure things; they measure the size, distance, speed, weight, density and really just about anything that provides information (scientists call this data).

After participating in today's session you can try a few things out for ourselves at home.

Measuring

Measuring things scientifically means being as accurate as possible. This is because scientists often rely on the measurements made by others – and they want them to be right!

There are some tools in your Discovery Box to help you practice making accurate measurements.

We can compare the length of one object against another (e.g. who is taller). We can be more accurate and use a known measure, such as a ruler, to measure the length of objects.

Perhaps you could use the ruler to measure the size of your Discovery Box? We can compare your measurements with others next session. You could use the measuring tape to measure round items, like your head!

Try comparing the circumference (size) of your waist with the circumference of a tree trunk.



Children's Discovery Museum (SAM)
ABN: 16 103 344 488
www.childrensdiscovery.org.au
weedy@childrensdiscovery.org.au

The Little Bang Discovery Club is an initiative of Children's Discovery Museum and Rankbark City Council.
This Inspiring Australia initiative is supported by the Australian Government.



Experiment @ Home

Sink & Float

Changing the shape of an object can change whether it sinks or floats.



Experiment:

1. Fill a cup with water (could you use honey?)
2. Make a ball of blutack and release it gently on top of the water (could you drop it from high up?)
3. Repeat the experiment, but this time change the shape of the blutack into a bowl and release it hollow side up on top of the water (could you place it hollow-side down?)
 - a. Make a hollow ball out of the blutack – will it sink or float?

Friction & sliding

Friction between different objects is responsible for how fast or slow they slide down a slope.



Experiment:

1. Choose a flat surface that can be sloped, such as plastic, metal or wooden chopping board or use your Discovery Box lid

2. Choose several different objects to place on the slope
3. Slowly tilt the surface higher until the objects begin to slide - can you predict which objects will move first?

Taking temperature

Temperature is a degree of hotness or coldness that can be measured using a thermometer.



Experiment:

1. Fill two cups with water and use a thermometer to measure the temperature of the water
2. Add some ice to one of the cups – what do you notice? Compare to the other cup.
3. What happens if you add more ice to the cup with ice? Compare to the other cup.
4. What happens if you repeat the experiment but start with warmer water in each cup?
5. Redo both experiments but this time you might like to use a timer to measure how long it takes for the temperature to change
 - a. Does tea with milk stay warmer longer than tea without milk?



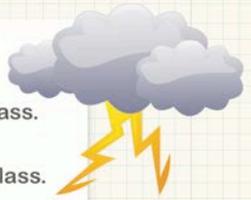
Inquiry-based Investigations



TABLE-TOP SCIENCE ENCOUNTER

Bottled Lightning

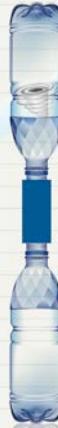
Observe the steams of colour.
Move your hand gently towards the glass.
Touch the glass. What happens?
Bring a fluorescent tube close to the glass.
What happens?
The coloured plasma you see is the same thing as lightning from a storm.



Developed by Children's Discovery Museum. This Inspiring Australia initiative is supported by the Australian Government.



TABLE-TOP SCIENCE ENCOUNTER



Tornado Tube

Allow the water to fill the bottom bottle...
Flip the bottles over...
Wait to see what happens...
Next try spinning the bottles briefly...
How quickly can the water drain from the top bottle to the bottom?
A tornado or vortex should form.



Developed by Children's Discovery Museum. This Inspiring Australia initiative is supported by the Australian Government.



Why Public Libraries?

- Widespread trusted community portals to information
- Complimentary mission and adapting to modern community needs & expectations
- Utilise their venues and networks of borrowers
- Highly engaged staff
- Not school



Public Libraries towards 21C

- The 21st century library positioned as a community centre of learning, innovation and creativity.
- Provide a lifeline to jobs, educational opportunities, literacy, health resources and government and community services, especially for new arrivals and disadvantaged populations.
- Public libraries are highly trusted institutions rooted in the neighbourhoods that they serve.

A Shared Mission

Principles that have always been at the center of the public library's mission:

- Equity, access, opportunity, openness and participation.
- A capacity to drive opportunity and success in today's knowledge-based society.
- A network model that promotes economies of scale, broadening the resource reach while preserving local identity.
- The right people, in the right places with the right assets.

Scale-able and sustainable

- Public libraries inspire learning and empower **people** of all ages, culture and demographics.
- Promote a better trained and educated **workforce**.
- Ensure equitable **access** and provide important **civic space** for advancing democracy and the common good.
- Are engines of **development** within their communities.
- Over 1,500 public library services servicing over 110 million visits annually there is a significant physical presence and **infrastructure** to leverage for long-term success.

Intentional Partnership



Our common goal is a society that values science, critically engages with scientific issues, and encourages young people to pursue STEM careers.

PRODUCT: National strategy delivered through effective local implementation.

Our libraries are valued as institutions of civil democracy and community engagement. They are hubs of knowledge, creativity and innovation.

PRODUCT: State-wide programme aligned to achieve specific Federal outcome.

Together with our supporters and partners we seek to improve life outcomes for children through early access to inspiring educational experiences.

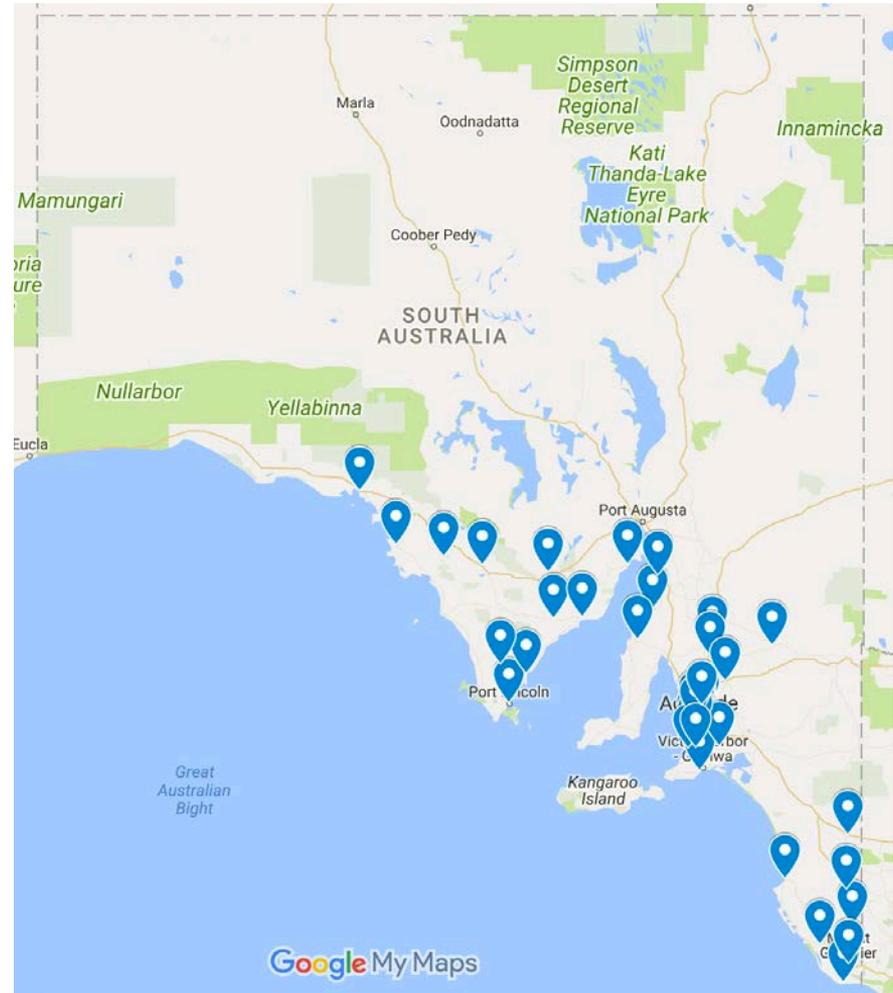
PRODUCT: Legacy project through access to key audiences and the means to train, equip and sustain.

Up-skilling Librarians

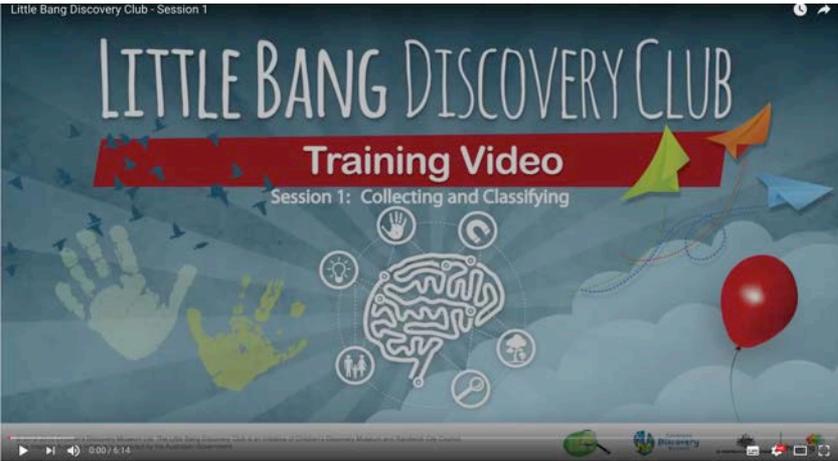


Little Bang family, SA

- Port Lincoln
- Tumby Bay
- Cummins
- Cleve
- Streaky Bay
- Ceduna
- Cowell
- Kimba
- Karcultaby
- Whyalla
- Wudinna
- Morgan
- Bordertown
- Penola
- Port Macdonnell
- Naracoorte
- Kingston SE
- Mount Gambier
- Millicent
- Port Broughton
- Clare and Gilbert Valley
- Riverton
- Kadina
- Port Pirie
- Burnside
- City of Charles Sturt
- Tusmore
- Woodville South
- Modbury
- Brighton
- Hallett Cove
- Saint Peters
- Tumby Umbi
- Unley
- Victor Harbor
- Aberfoyle Park
- Morphett Vale
- Strathalbyn
- Noarlunga
- Aldinga Beach
- City of West Torrens
- Willunga
- Salisbury
- Nuriootpa



Resources



Little Bang Discovery Club - Session 1
Unlisted
133 views



Information sheet

Little Bang Discovery Club

Caregivers, parents and preschool educators provide many creative opportunities for young children to explore their world. That's why we've created the Little Bang Discovery Club (LBDC).

This 4-week course shows where discovering means to genuine scientific enquiry and why this makes understanding how the world works so much better. The course is designed for preschoolers (aged 3-5) and lower primary-aged children and their accompanying adult facilitators.

The aim of the LBDC is to develop ideas and skills that inspire further scientific exploration, discovery and learning. The LBDC is designed to be engaging for both children and accompanying adults. Key features of the LBDC are the hands-on activities, question and answer time and a Discovery Box and Book loaned to each child for the duration of the LBDC. Activities experienced during each session can be safely replicated and further explored at home.

A Discovery Club Passport is provided to each child and stamped after each session and a graduation ceremony follows a Science Fair on the final session.

The course is divided into the following sessions:

Little Bang Discovery Club
Little Bang Discovery Club is an initiative of Children's Discovery Museum Limited and Randwick City Library.

Session 1 Collecting and Classifying

The Little Bang Discovery Club (LBDC) is designed for preschool children aged between 3 and 5 or Year F to 2 children. In the community setting, each child is accompanied by an adult co-learner. The aim of the Club is to have everyone think and behave like a scientist as we explore and make discoveries about the world around us. We hope everyone will have a great time learning new things during the Club, and leave confident enough to do their own investigations after the Club is finished.

In this first session we introduce what it takes to be a good 'discoverer' or scientist. We start by being observant and asking lots of questions. We learn how to collect items and record what we observe about us.

Learning outcomes:

- Making choices: items to collect.
- Observing and describing: similarities and differences in items.
- Making decisions: what items go into each collection based on similarities.

Science is commonly defined as an intellectual and practical activity involving the systematic study of the structure and behaviour of the physical and natural world through observation and experiment. In this exercise we will accomplish a 'systematic study of natural items' and classify them according to our own rules.

Introduction	Equipment	Time
Great kids as they arrive and give them a name tag for themselves and their adult. Let's learn how to be a good discoverer or scientist. Discussion about what scientists do - they ask lots of questions, look at what's happening (make observations), try things over and over again - all things kids are already really good at, so they might not know it yet, but kids are already great scientists.	Equipment: Labels, Tacks	5 mins
Sorting (Classifying) One of the things that scientists like to do is to sort things. Another word for sorting is to classify things. Sorting activity 1: Let's sort you! (The kids stand up if they have this, older children can move into separate groups) Who has shoes with buckles? leavers? jeans? no fastenings?		5 mins



Equipment

Little Bang Discovery Club

Session 1: Collecting & Classifying
In this session the participants are sorting along with themselves. They then try sorting a collection of sorting tasks before discussing sort collected objects. Plus, in addition, some primary school students, in fact, plastic, string and paper.

Session 2: Measuring & Recording
Early in session 2, participants do some comparing and measuring using items from their Discovery Box. They then compare their own weight using a scale.

A new number balance is then used by everyone to explore balancing an object from the Discovery Box can be carefully balanced too.




National Library STEM Initiative

Little Bang Discovery Club

Training Manual



LITTLE BANG DISCOVERY CLUB

Tornado Tube

Allow the water to fill the bottom bottle...
Flip the bottles over...
Wait to see what happens...
Next try spinning the bottles briefly...
How quickly can the water drain from the top bottle to the bottom?
A tornado or vortex should form.

Library Sets



Little Bang DISCOVERY CLUB



- Connect >
- Explore >
- What's On** v
- Children's Activities >
- Library Activities >
- What's On Calendar**
- Local History >
- eLibrary >

[Library](#) / [What's On](#) / [What's On Calendar](#) / [Little Bang Discovery Club - City Library](#)

Little Bang Discovery Club - City Library



SUN	MON
27	28
3	4
10	11
17	18



Science for children aged 3-5 years

4 week FREE program

Lake Mac Libraries

Share the story

- Home
- Catalogue
- eCollections
- Events

- News Archives
- Events
- Activities for Kids

Little Bang Discovery

1 AUGUST 2017

Join the Little Bang Discovery Club for 4 weeks and enjoy hands-on activities and skills to inspire scientific exploration.



- About Us
- Services
- Community
- Business
- Planning and Building
- Libraries

Home > Libraries > Library Events

- In this Section**
- Home
 - About Us
 - Services
 - Community
 - Business
 - Planning and Building
 - Libraries**
 - ▶ Online Catalogue / Loans
 - ▶ Library Collections
 - ▶ Kids and Teens
 - ▶ eLibrary
 - ▶ Outreach / Mobile Services

Library Events

17/08/2017 to 07/09/2017

Little Bang Discovery Club



Feedback

I have been meaning to get in touch to let you know that our Little Bang Discovery Club sessions have been fantastic – regular storytime sessions morphed into the Little Bang Discovery Club and the resources were incorporated at home where they were thoroughly immersed in STEM.

Thanks to you all, we are enjoying incorporating this valuable and engaging program into our Library and community.

Best regards

Louise
Manager Library Services Port Lincoln

Thank you so much for a truly amazing 4 weeks!

The children had a wonderful time. It was fascinating to see how their interest and abilities grew from week to week. I thought Sandra's experiment with the jelly was brilliant. Science you can eat - maybe that's an idea for a new lesson?

The kids would have loved it if there were more sessions - we will definitely be doing this again.

Kate

Children and Youth Services Librarian
Hurstville City Library

A Sustainable Future

- Little Bang Discovery *Plus*
- *Big Bang* Science club for ages 6 to 8 and 9 to 12
- Spark! Discovery Boxes and Little Spark.
- Maker Spaces
- Touring *experiences*
- *Curious Science talk series*
- Supported network





QUESTIONS?

