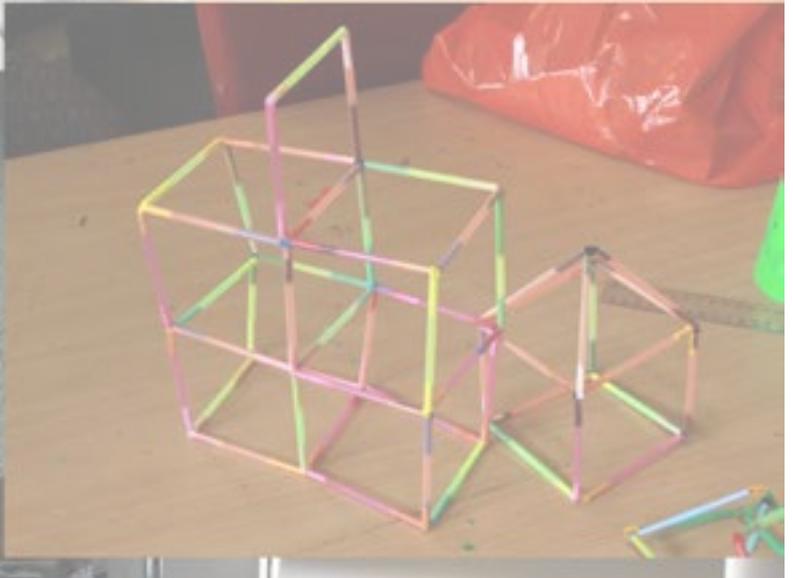




S.T.E.A.M POWER

REFILL - ARTS IN EDUCATION PARTNERSHIP



INTRODUCTION

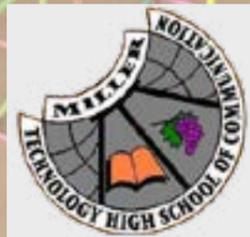


ReFILL is an arts-in-education partnership between community arts and media company, CuriousWorks and public secondary school, Miller Technology High School, with contributing partners Casula Powerhouse Arts Centre and Museum of Contemporary Art's Learning Centre.

This program builds creative networks for life between young people beginning their secondary education and the creative industries.

This project has been made possible by Crown Foundation's Western Sydney Arts Strategy and the Packer Family Foundation and the Way Out West Children's Festival. CuriousWorks is funded by Create NSW, Australia Council for the Arts, Vincent Fairfax Family Foundation and Nelson Meers Foundation

**CURIOWS
WORKS**



**CROWN
RESORTS
FOUNDATION**

PACKER FAMILY FOUNDATION

In 2018, CuriousWorks and Miller Technology High School deepened their collaboration, based on ten years of work together.

We wanted to challenge ourselves to develop and deliver a dynamic and interactive learning program, grounded in the principles of S.T.E.A.M.. This program encouraged links between what we learn as creative risk-takers and as observers of phenomena.

S.T.E.A.M. is learning which explores the points of connection between science, technology, engineering, arts and mathematics. This program provided Year 7 students at Miller Technology High School with an access point for inquiry, dialogue, and critical thinking. We wanted to engage more young people in the power of learning through hands-on fun that lit up ways that the arts and sciences are connected.

ReFILL - 2018 S.T.E.A.M was extraordinarily messy, hands-on and fun!

It was a team effort, led by experienced artist-educator and film-maker Sarah Emery in dialogue with Head of Student Voice and arts teacher, Sally Atkins and program producer, Caitlin Newton-Broad. The whole experience was a collaboration with a host of multi-disciplinary artists, producers, educators and scientists including Howard Matthew, Eric Avery, Adam McPhilbin, Tom Christopherson, Claudia Chidiac, Jaime Aguilar, Tracy Noble, Jason Lane (Head of Science, Miller Technology High School) and the team at the Sydney Observatory (MAAS).

THE HYBRID

What is a hybrid? A hybrid is the offspring of two plants or animals of different species, such as a mule, made by combining two different elements. Inspired by surrealist artists, young people examined the randomness and humour produced by automatic art processes and used their imaginations to see how these "absurd creations" might fit into the world.



DREAM ANIMALS:

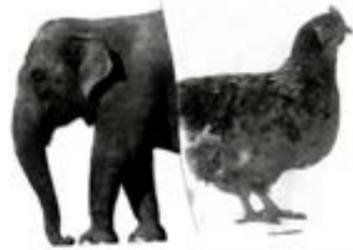


Lamel

elecken



The name is Dat.
It eats meat and other small animals.
It lives in California.

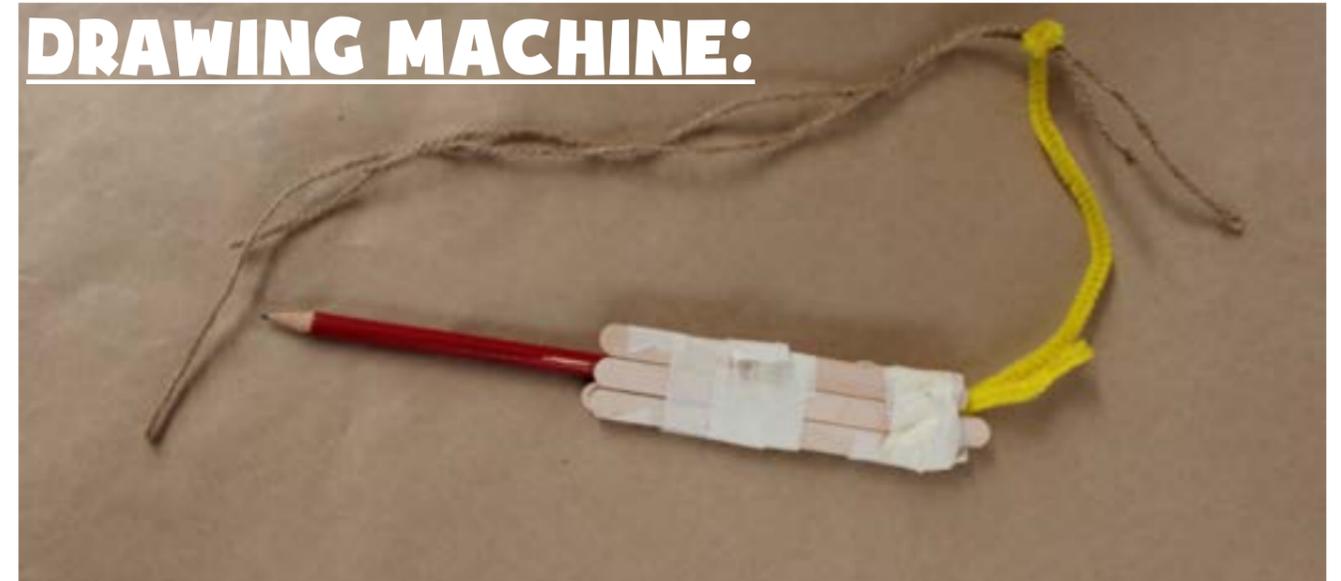


elecken food - Vege steak Africa

Young people created a series of 'Dream animals' by combining two or more animals using collage. They named their creatures and explored where they might live, what they might eat and what sounds they might make.

How does science see it? Evolution and adaptation, biology, genetically modified, 'living world' syllabus

DRAWING MACHINE:



*How does science see it?
Micro-engineering*

Students used a selection of found objects to try and create a drawing machine where their hand was not allowed to touch the pencil. We had devices constructed out of string, bbq tongs, old toys and more.

MANDALAS AND SPIROGRAPHS:



What happens when you combine the two distinct subjects of art and maths? In the Refill program, young people explored how to create art using shape, repetition and radius to create a series of beautiful artworks.



*How does science see it?
Geometry*

What did young people know about STEAM at the start of the year?

<https://vimeo.com/277934216>



SENSES AND THE MOBILE UNIVERSE

As part of this year's Way Out West Children's Festival at Casula Powerhouse, young people at Miller created an art + science wonder cart called Universum Mobili. The cart housed interactive games and sensory experiences. The cart got a positive response at the festival,

"It's just like a mini-Questacon... my kid keeps coming back - fascinated by everything".



SENSORY BOX:



Young people created a sensory box to touch and smell through small holes. Participants had to guess what rough, gooey or brittle textures they were feeling or what bitter or sweet smell they were sniffing.

How does science see it?
Biology

MINI WORLD:

Young people developed two miniature worlds exploring insect life and under the sea. The sculptures were mounted inside the cart on a wheel that could swivel around and view through a magnifying glass.



How does science see it?
Biology, plant/animal cells, microscopy

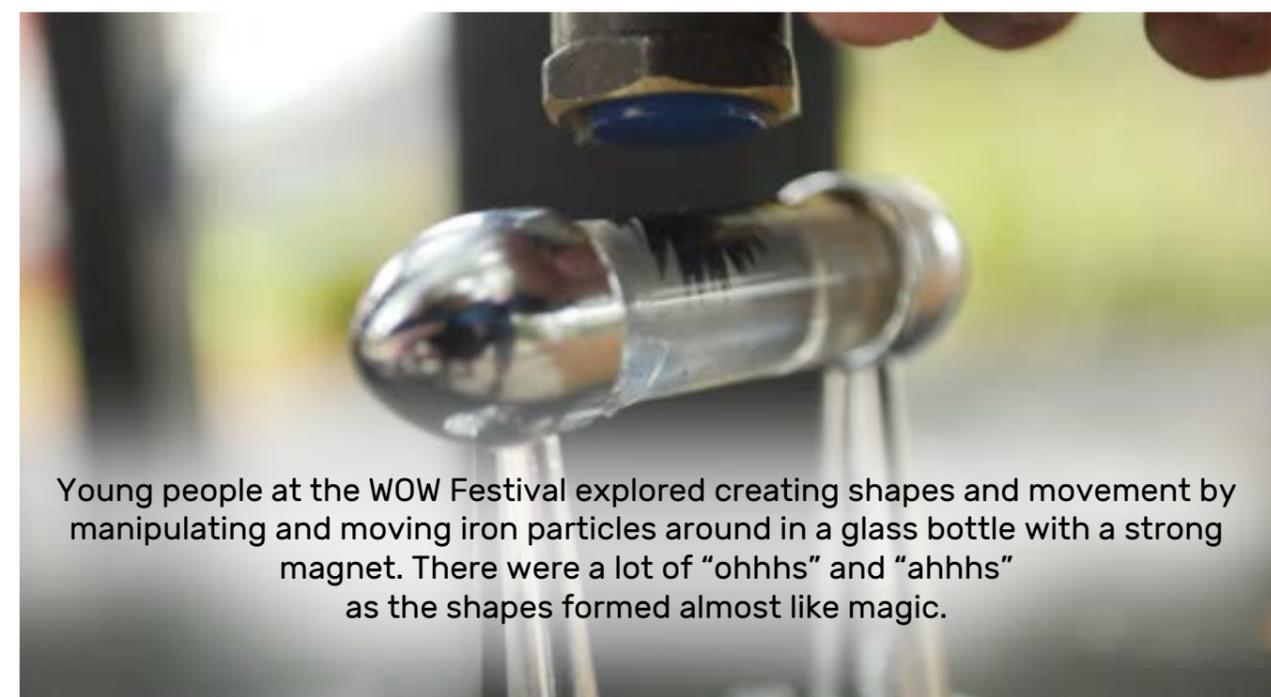
MILK AND DETERGENT:

Young people explored the colourful patterns made by the chemical reaction of combining milk, detergent and food colouring. They captured this process on film using a macro lens. This video was inserted into the cart and children were able to view it through a periscope.



How does science see it? Chemistry, density, two immiscible liquids

IRON FILINGS/FERROLIQUID:



Young people at the WOW Festival explored creating shapes and movement by manipulating and moving iron particles around in a glass bottle with a strong magnet. There were a lot of "ohhhs" and "ahhhs" as the shapes formed almost like magic.

How does science see it? Magnetism, force

To see more about the Mobile Universe: <https://vimeo.com/301531678>

ALL MIXED-UP

Young people explored making art using DIY kitchen cupboard chemical reactions. They got their hands messy as they splattered, stirred and mixed. They also investigated what ingredients explode, repel or create a gooey slime when combined.



RAINBOW REACTIONS:

Students created an exploding rainbow of colours using food colouring, baking soda and vinegar.

How does science see it?
Chemical reactions, Chemical World

SHARPIE TIE DYE:

Young people created their own bandana using sharpies and rubbing alcohol. The alcohol moved the colours across the fabric to create beautiful patterns. However, the room did get a bit smelly!



How does science see it?
Chromatography

EXPLODING COLOUR:

Young people filled film canisters with water, food colouring and alka-seltzer. These created big, colourful explosions onto a large canvas.

How does science see it? Fluid dynamics, chemistry, using the Alka-Seltzer tablet it resembles a rocket/volcano – pressure build up from the tablet (CO_2) causing it to erupt – the release of carbon dioxide gas

PAINT CATAPULTS:



Young people made their own paddle pop stick catapult. They explored how to change the direction of magnitude force by building a simple contraption using elastic bands. These were turned into paint catapults and used to create a giant Jackson Pollock style splatter painting for the science fair!

See it fly! <https://vimeo.com/304066250>



How does science see it? physics, distance, gravity, force, projectile, pulleys

OUT THERE IN SPACE

Young people explored their place in the universe by looking at the real and imagined possibilities of space. They asked, "What is out there?" and "How do we fit in?" We also went on a night time excursion to Sydney's Observatory where we found out more about the night sky, interacted with planets using an augmented reality app and looked through the largest telescope in the southern hemisphere.

How does science see it? Out there in Space is an explicit theme in the Year 7 Science Curriculum introducing Space and Planets

LIGHT PAINTING:

Students created a series of light paintings exploring their ideas of space using coloured torches and slow shutter photography.



CONSTELLATIONS:

Young people used their own star sign to create a DIY constellation projector using a paper cup and a torch. These created a beautiful starry night sky when we turned off the classroom lights and turned them on all at once.



A ROCKY MARS SURFACE:

Students created a planet surface by imprinting shells and objects into a sandmould. The mould was then covered in plaster of Paris and set. The outcome was an extremely textured surface that looked and felt just like a rocky terrain.



SPACE ANIMATION:

Young people explored the idea of anti-gravity by creating a group stop-motion animation where they could make objects and puppets float in outer space. To make this they used DragonFrame software, which allowed them to operate the camera and playback their animation instantly.

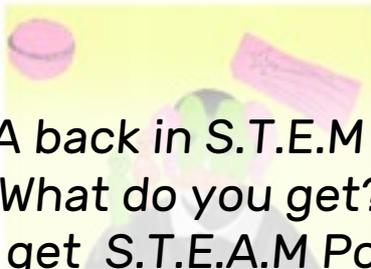
ROTATING SKY:

Refill young people created an artwork that explored the shift of the sky from day to night using a silhouette drawing and a rotating split pin background.



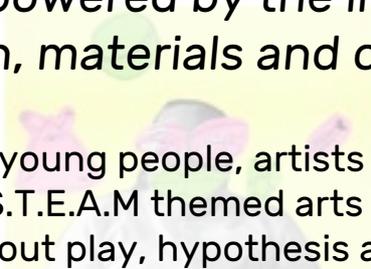
What did young people find out about Outer Space?

<https://vimeo.com/306147036>



Put the A back in S.T.E.M learning.
 What do you get?
 You get S.T.E.A.M Power!

Activities powered by the imagination,
 sensation, materials and curiosity!



For one year, young people, artists and scientists
 explored a S.T.E.A.M themed arts in education
 program, all about play, hypothesis and exploration.

In ReFILL S.T.E.A.M 2018, we made mess, explosions, got
 lost, dreamt of the stars and had fun!



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 Sarah Emery

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