



WHAT I DO

I use technology to create immersive experiences. I blur the boundaries between gaming and learning. I build applications and hardware using the most suitable platform for each solution.

HOW I CAN HELP

I can bring bespoke experiences of any scale from mobile applications to full exhibitions to life using bleeding-edge technology. I can work with you to augment your existing ideas to go beyond the boundaries of science, art and engineering to create truly immersive experiences. I can provide guidance for projects to ensure the best outcomes.

WHAT IS INSIDE

My portfolio offers examples of projects I led or developed independently.



Microsoft Build Tour



0411 381853



j.oliver@destined.com

01

VIRTUAL REALITY

immerse

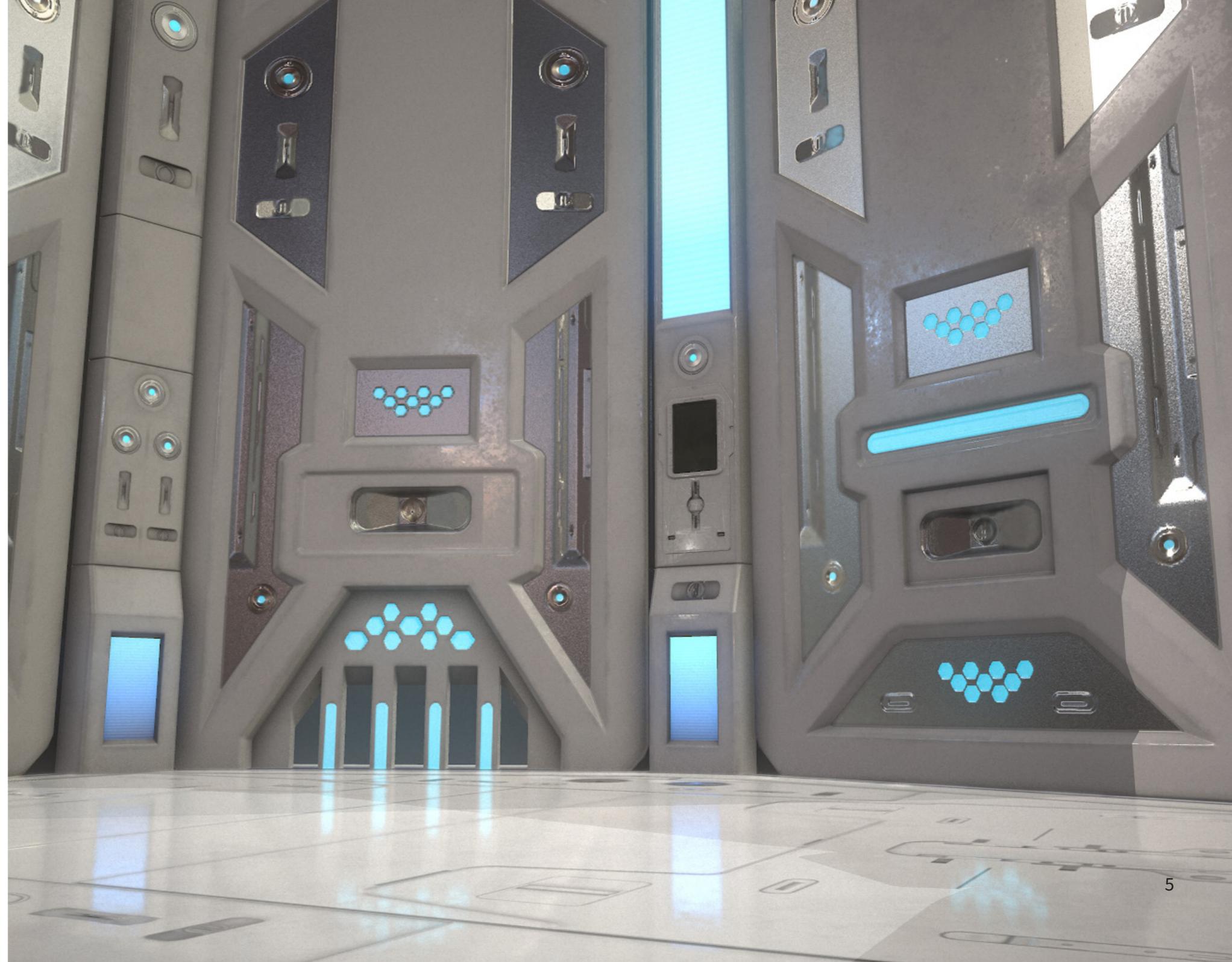
Category
Entertainment

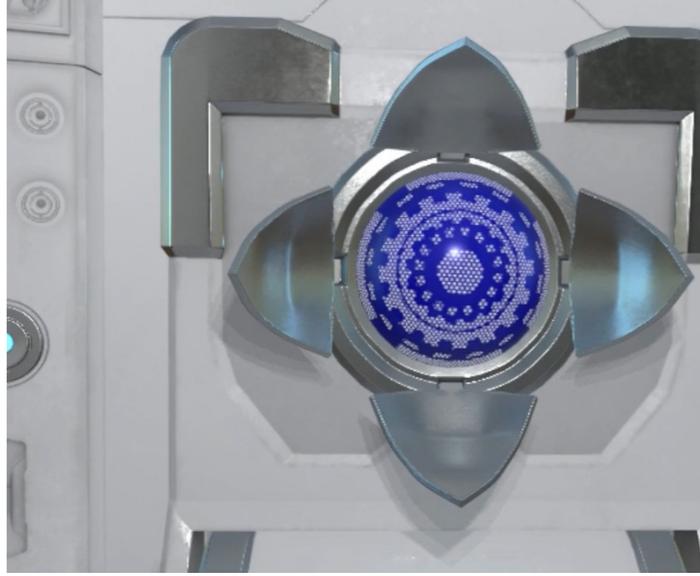
Platform
HTC VIVE, Steam VR

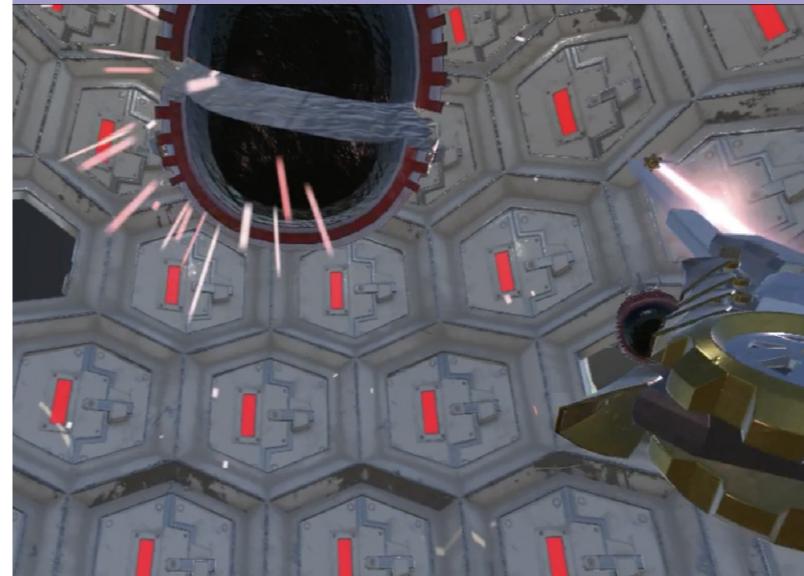
Destined

CONFIN3M3NT

Trapped in a space, there is no way out. But within contains the unlimited learning, exploration and interaction with artificial intelligences. Find your own destiny with every decision mutating the story-arcs even in future games. Designed to fit in a single space where there is no need for teleportation to create total immersion in room-scale virtual reality.







Destined

SABERSAW VR

Take the role of a warrior, controlling giant SaberSaws to defend yourself from waves of evermore challenging bots. Slice bots that come close with your sword, deflect lasers with your shield. Complete challenges to unlock new game modes. Available on Steam and included in bundles at Bundlestars.



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ASCII WARS

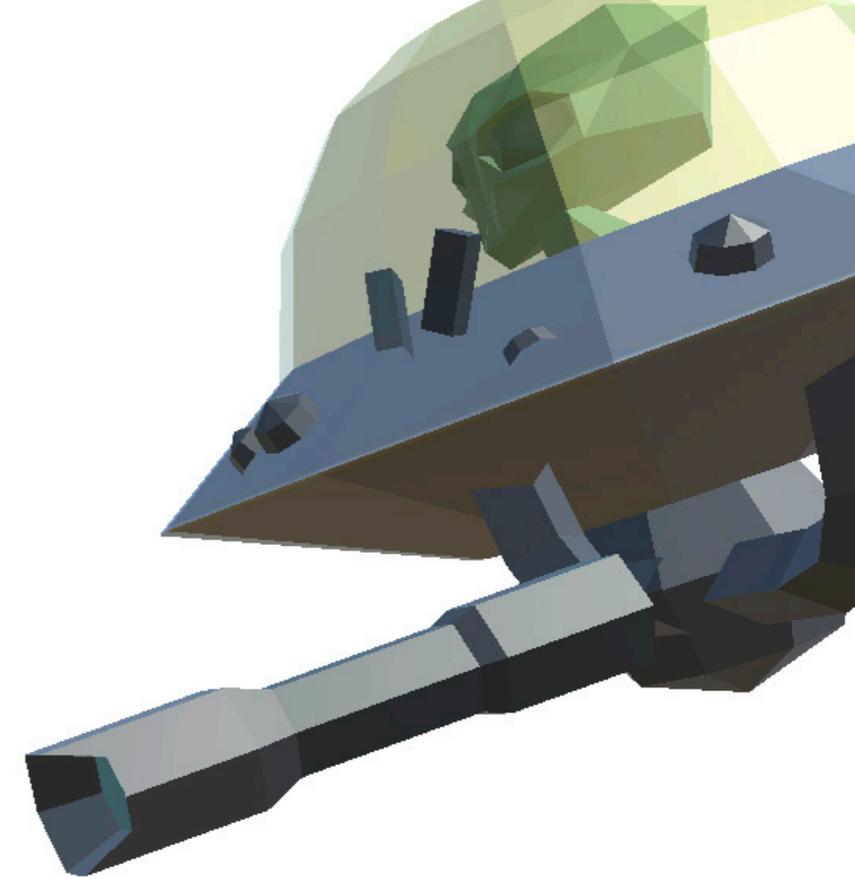
As nuclear war descends on the planet protecting the military computers from viruses has become vital to survival. Use problem-solving skills to defeat the viruses as they appear in the code.



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DEFENDER VR

Tower defense game for room-scale virtual reality. Create mighty weapons installations and position them to destroy incoming waves of alien invaders.



MARS LAB

virtual education

Category
Learning

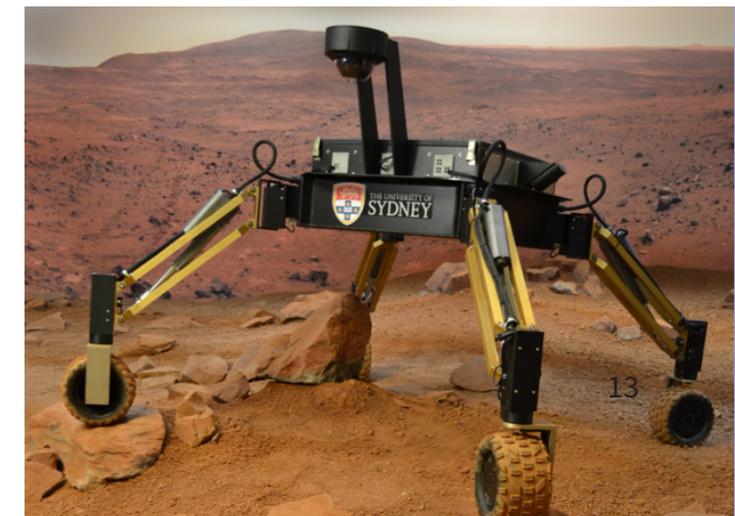
Platforms
Web, iOS, Android

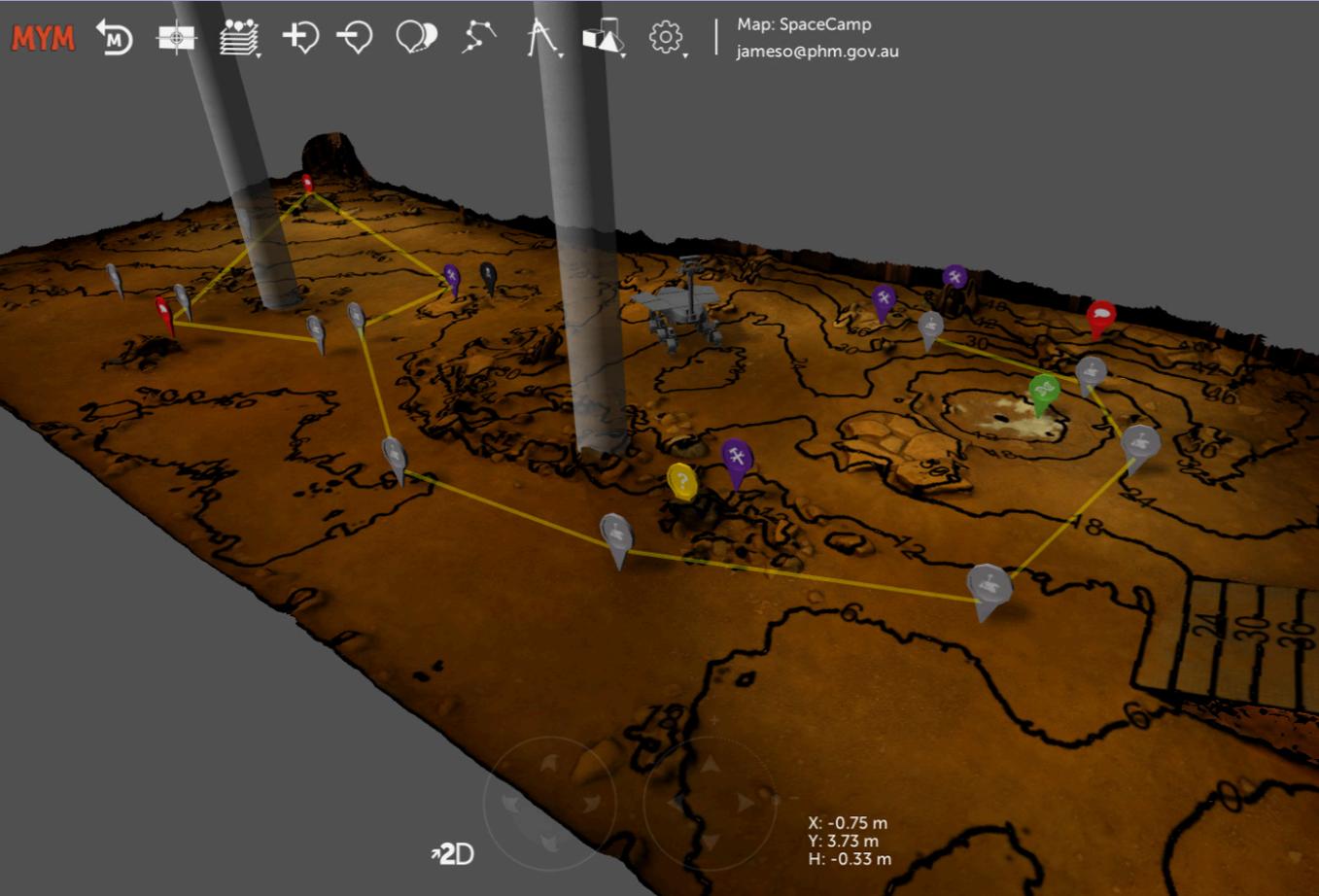
Museum of Applied Arts and Sciences

OVERVIEW

The Mars Lab (2011-18) was a research collaboration between the University of NSW (The Australian Centre for Astrobiology), the University of Sydney (The Australian Centre for Field Robotics) and the Museum of Applied Arts and Sciences (Powerhouse Museum). Working alongside these research collaborators were leading teachers and hundreds of enquiring young minds from connected schools across the country. The Mars Lab was a Mars Yard, or replication of the Martian surface, and robotics lab established within Sydney's Powerhouse Museum. It engaged high school students in the search for life on Mars, and the technologies which enable that search.

60 MINUTES ON MARS

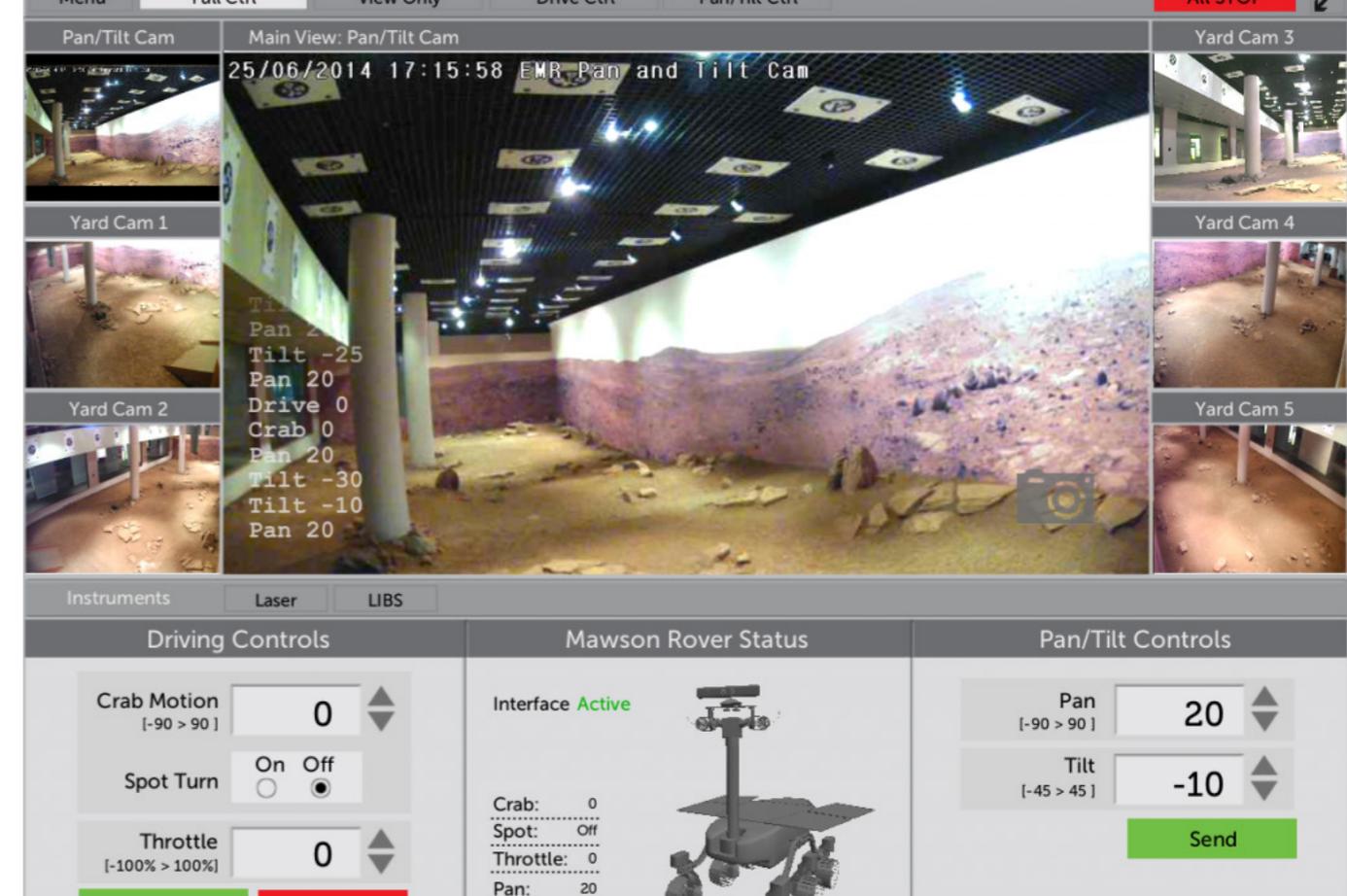




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MARS YARD MAPS

The Mars Yard Maps (MYM) app gave Mars Lab users an efficient and interactive way to plan and record their Mars Yard experiences. It also made sharing discoveries and collaborating on missions easy and enjoyable.



Museum of Applied Arts and Sciences

TELEOPERATION

The teleoperation interface was used to control the Mars Lab rovers and to view the camera streams around the Mars Yard. The interface was designed to enable young people to perform various mission roles from their classroom and to collaborate to achieve their rover mission goals.

Education

digital learning

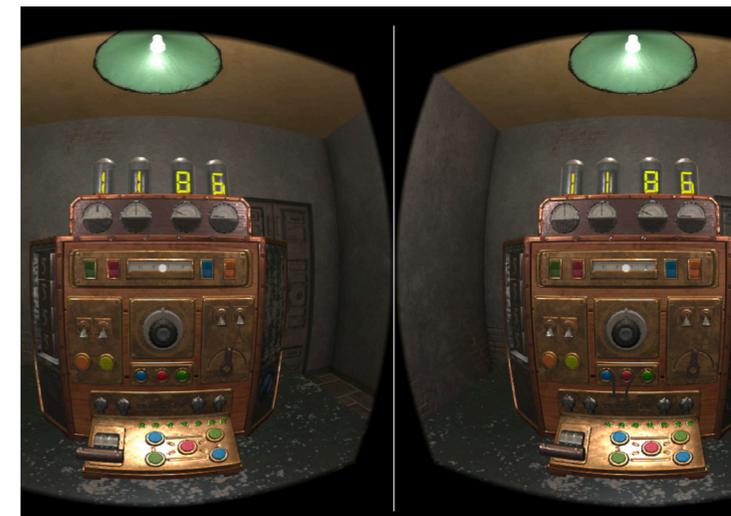
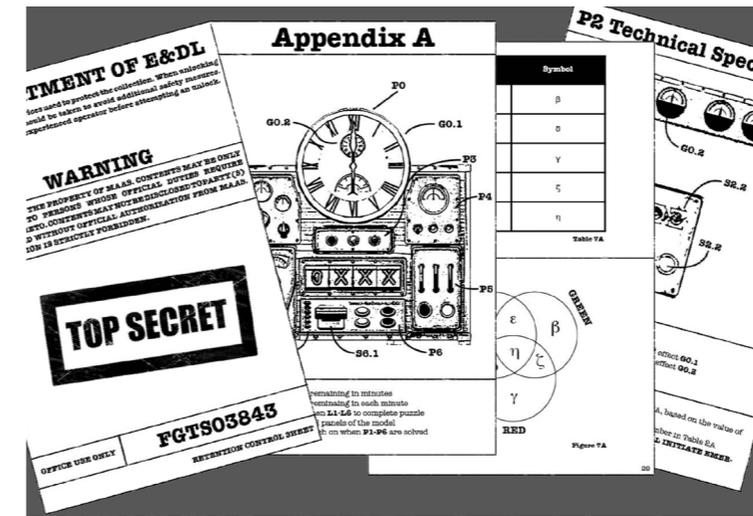
Category
Learning

Platforms
Hardware, Web, iOS, Android, Arduino

Museum of Applied Arts and Sciences

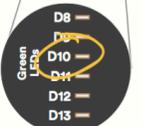
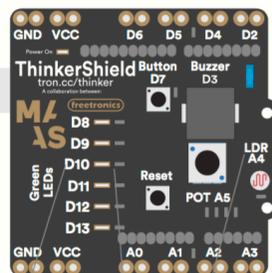
ESCAPE ROOM

One of the first truly interactive Virtual Reality learning programs in a cultural institution and deployed as one of the leading education programs. Immerse yourself in a virtual world where you attempt to escape the panic room in a race against time. This fast and furious session will stretch your students' 21st-century learning skills in group work, communication and problem-solving. Taking turns with virtual reality headsets, they will engage in the style of collaborative code breaking that has captured the minds of digital natives across the globe to take up the challenge to escape. Only those who are quick thinking, fast-talking and adaptable will succeed. Young learners who experience this challenging 3D animated experience reality beg for just one more turn.



LDR.Night.Light

Make an automatic night light



Light-emitting diode (LEDs) on digital pin D10



Light dependent resistor (LDR) on analog pin A4

First we do a few tests to find out the range of values that your LDR produces — this will always be different depending on the lighting conditions and may vary a tiny bit between ThinkerShields.

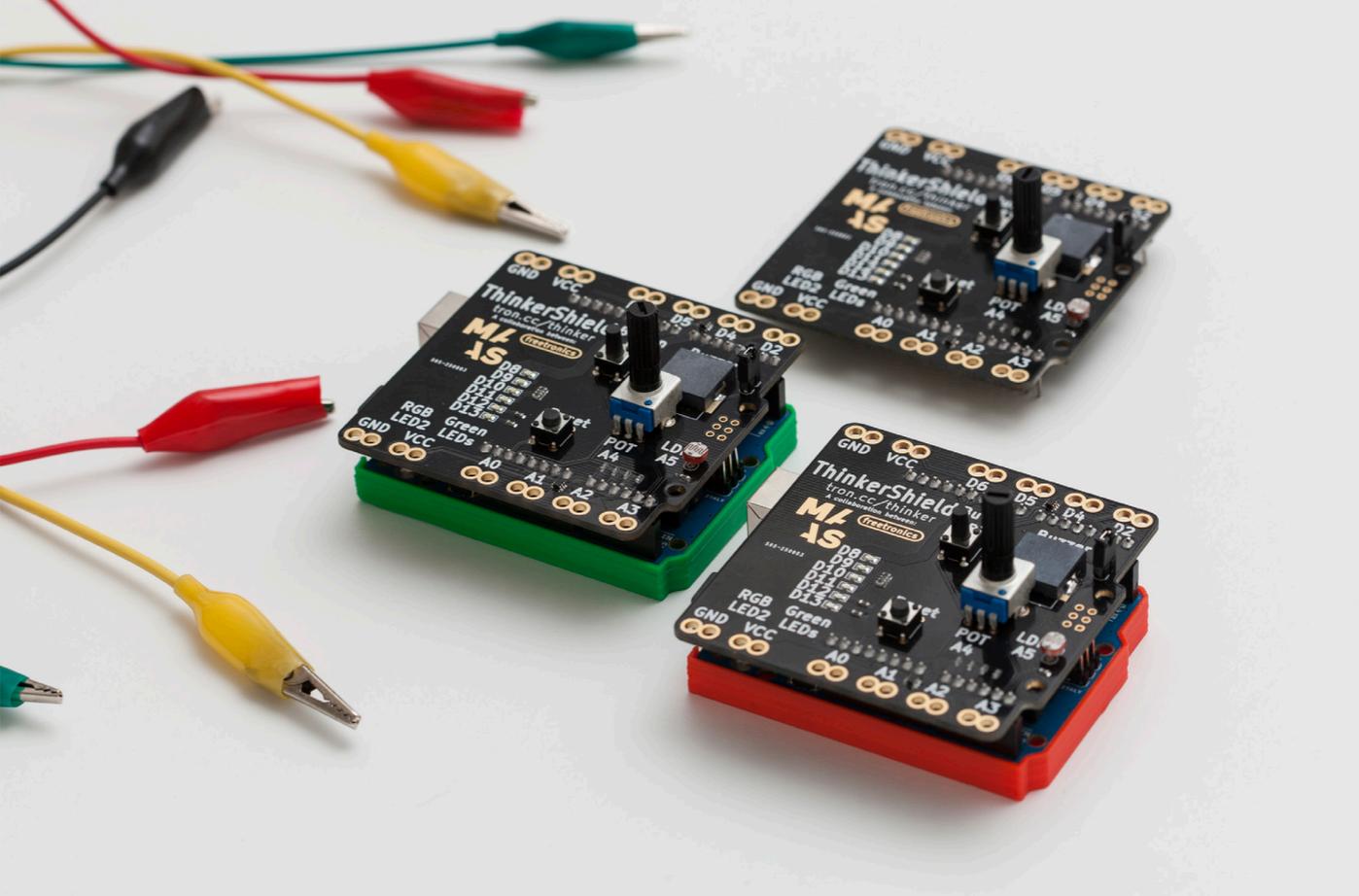
Then we can use what we find out to decide when it's day and when it's night.

We'll need to use the Arduino map() function so we can send the right values to the LED pins.



And then we do a digitalWrite to an LED pin to turn it on and off as the values change.

Ingredients



Museum of Applied Arts and Sciences

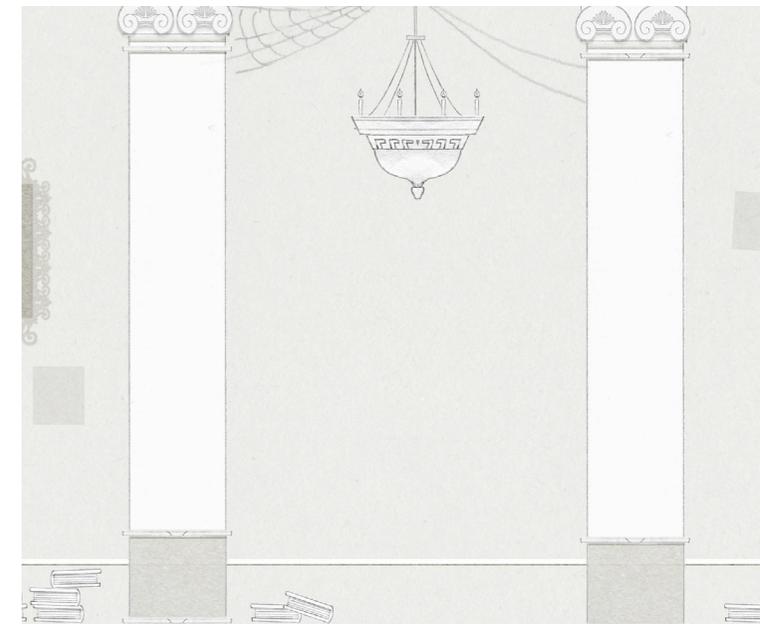
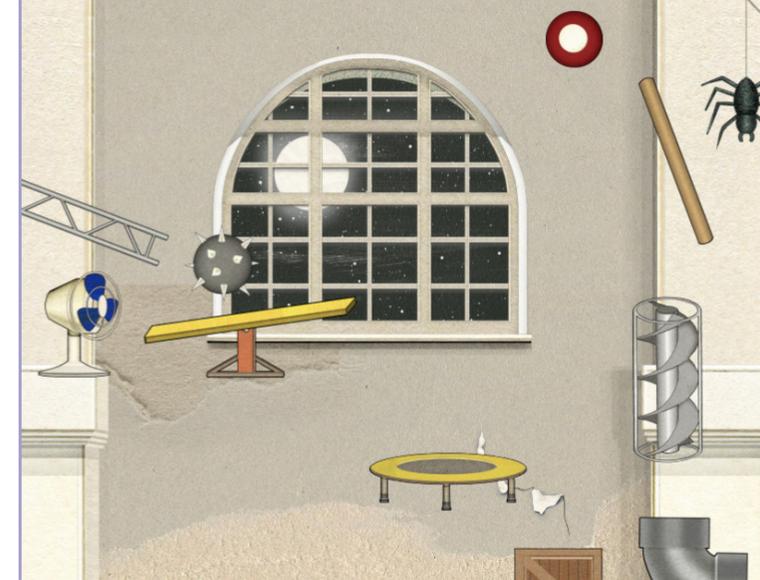
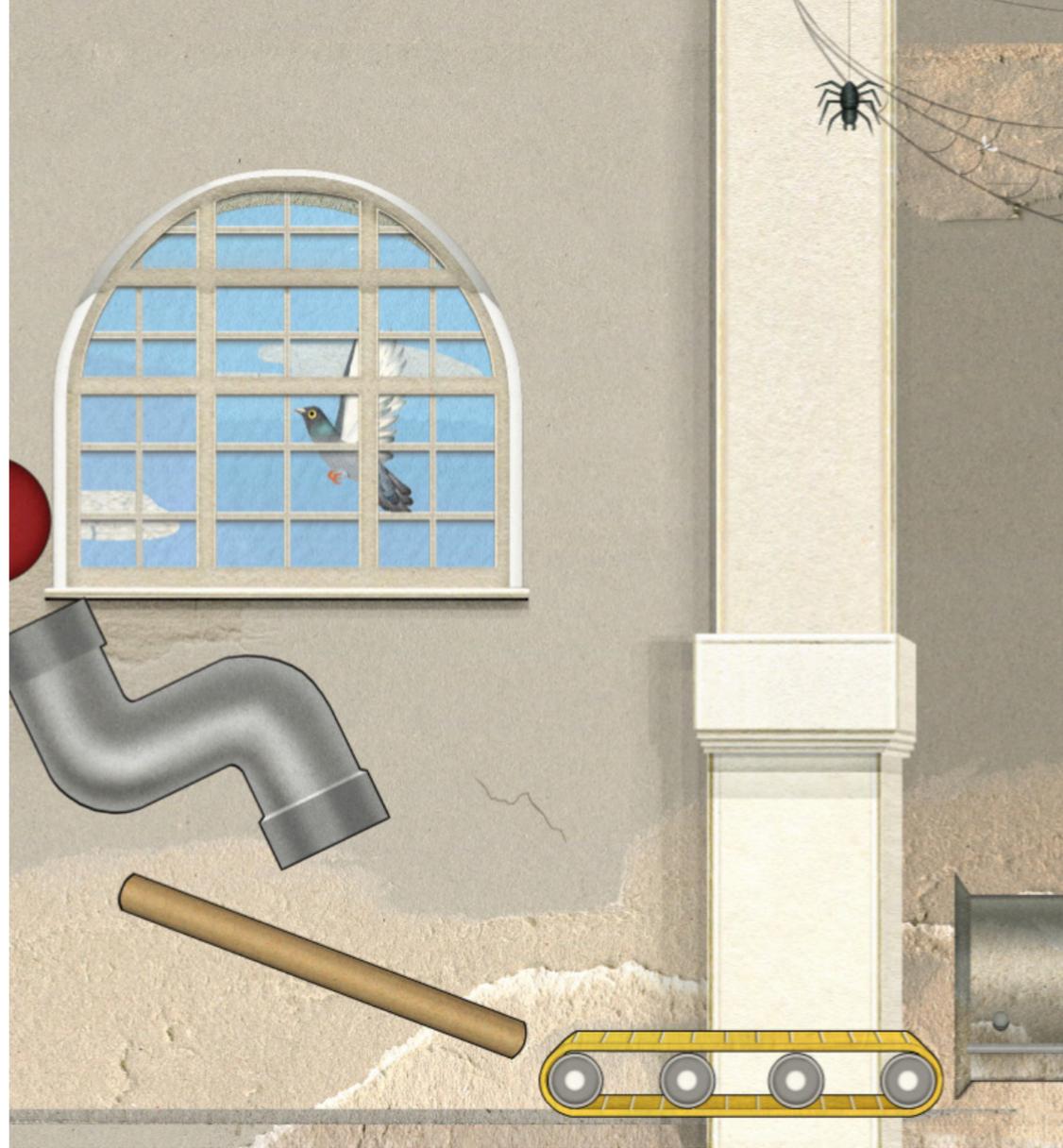
LEARNING GUIDE

Co-author of a fun 60-page guide and code for 18 activities. Ages 8 and up. No coding or electronics experience necessary. Exercises are developed hand-in-hand with the audience.

Museum of Applied Arts and Sciences

THINKERSHIELD

The ThinkerShield for Arduino makes it easy for anyone to get started with programming and controlling things with their computer in minutes. No need for any wiring or soldering or program knowledge. Even if you have never seen a computer program before, with the ThinkerShield you will be making things flash, buzz, beep and respond in no time. It has been featured as the NSW Premier's coding challenge. It has been recommended by the Department of Education in multiple study units.



The lab

LOGIC MACHINE

Logic Machine is the ultimate problem-solving challenge. What seems like a simple task at first glance soon becomes a complex problem-solving mission, with learners needing to use digital objects such as ramps and shelves to assist in the movement of their ball. All of the artwork is created with cardboard by Nancy Liang.



Museum of Applied Arts and Sciences

SOLAR SYSTEM AR

Users connect with the solar system using a physical cube to unlock the digital content. Moving the cube moves the planets. Used in education programs at Sydney Observatory.



Museum of Applied Arts and Sciences

MEMORY LANE

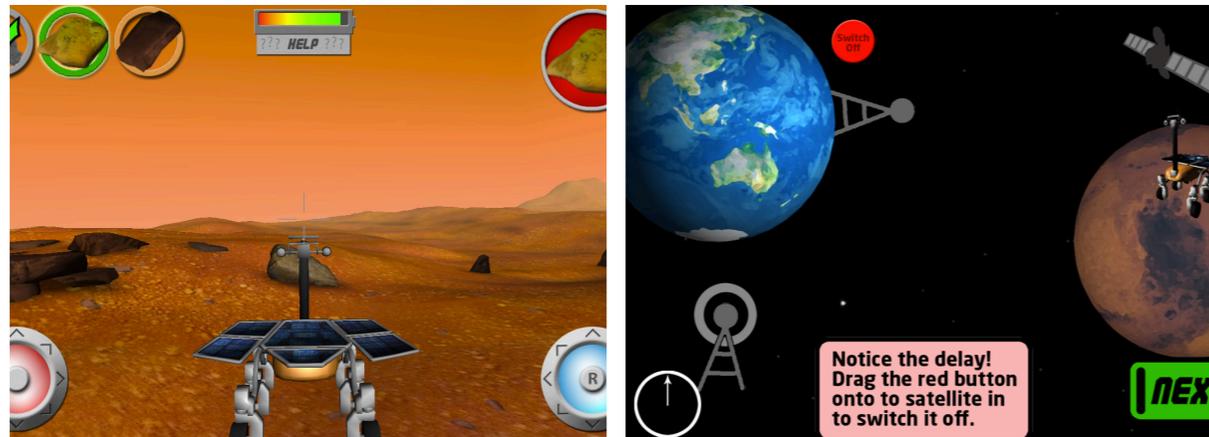
Created for the Apollo 11 exhibition to celebrate landing on the moon, users explore photos from key themes of the exhibition in the form of cloud to create their own story, which is then played back to them as a video.



Left
Pathways to Space

INTERACTIVE

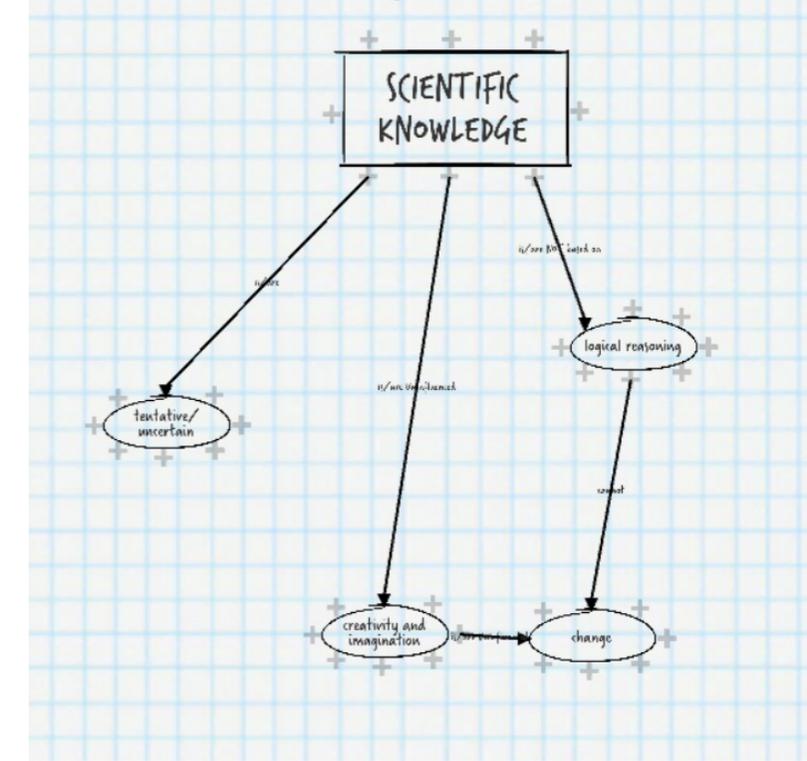
Games developed for use in classrooms nationally and internationally around analysing samples from the Mars Yard. The success of the games led to a Museum interactive version on display at Powerhouse Museum.



Right
University of New South Wales

LEARNING TOOL

This assessment tool was developed to test the level of scientific literacy of university students as part of a current doctoral project at UNSW.



eFAEC
 e-Future Australia's Electoral Commission

Welcome to 2025 federal election website

NOTICE TO ALL VOTERS
 This year, Australia is welcoming its first robot e-Prime Minister, the Hon L-35|149. Instead of voting for a preferred candidate, all voters will contribute to programming the e-PM's 'brain' by creating a concept map that will teach it what and how to think about important issues. This is called a vote-code.

e-PM L-35|149's artificial intelligence will embody the collective knowledge and ideals of all voters to ensure that 'it' is an accurate representation of the Australian public.

The science component of the e-PM artificial intelligence is ready to be coded for the voters. Please click the button below to enter

Australia's e-Prime Minister, the Hon L-35|149 MP

EXPERIENCES

interactive

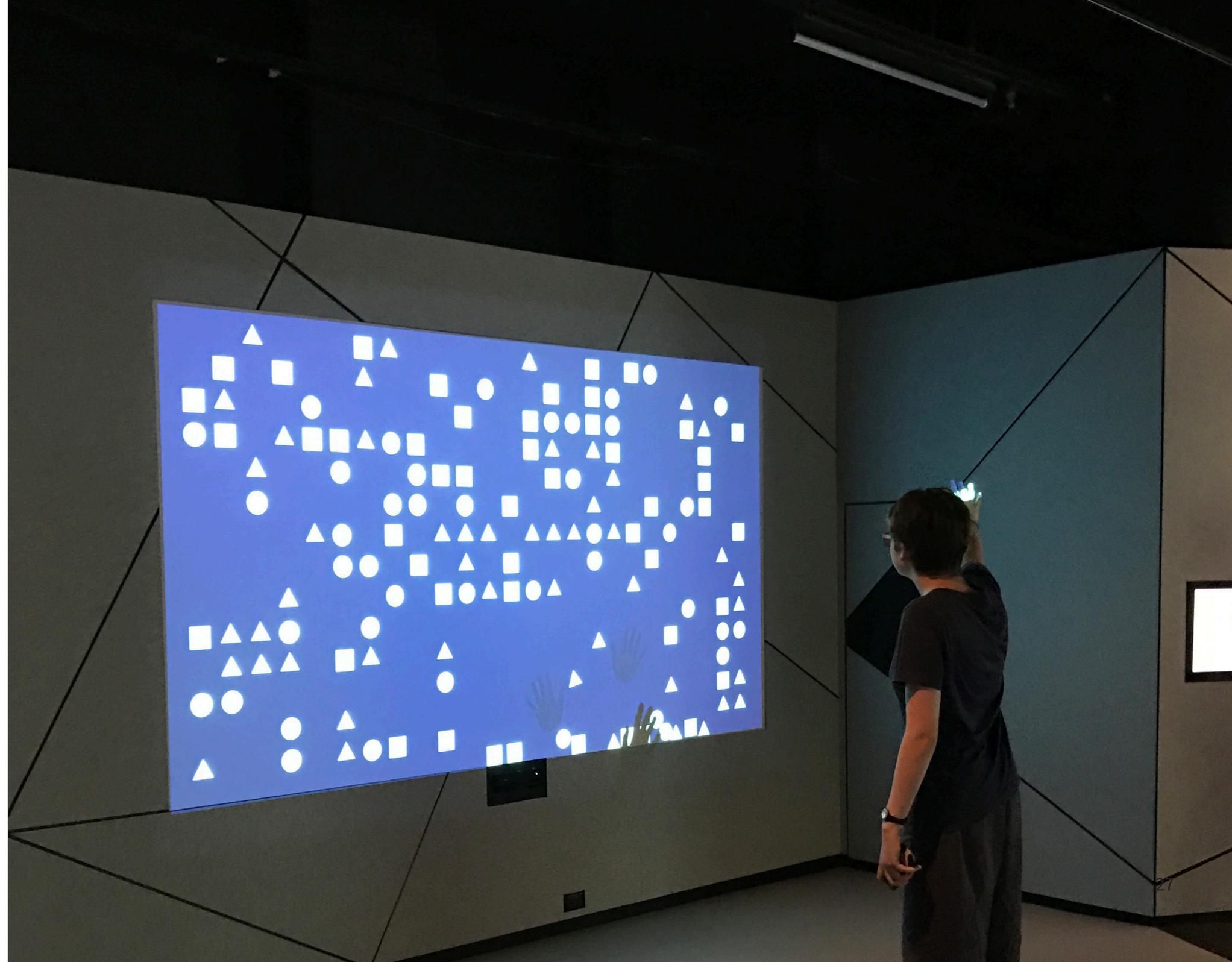
Category
Exhibition

Platform
Physical, iOS, Android, Web, Windows

The Lab

SHAPES

This exhibit designed to encourage shared play is in The Lab immersive learning area of the Museum of Applied Arts and Sciences. Groups or individuals can manipulate shapes in a host of ways including size, gravity and colour.

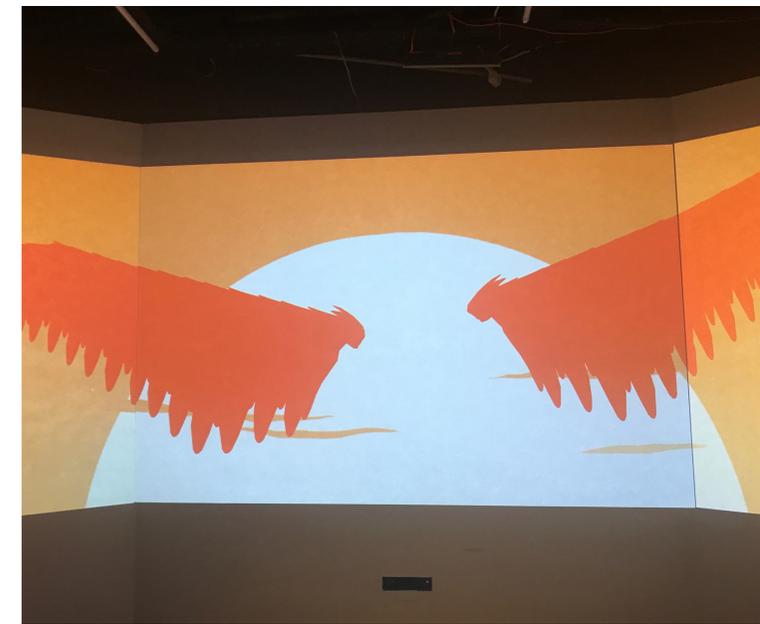


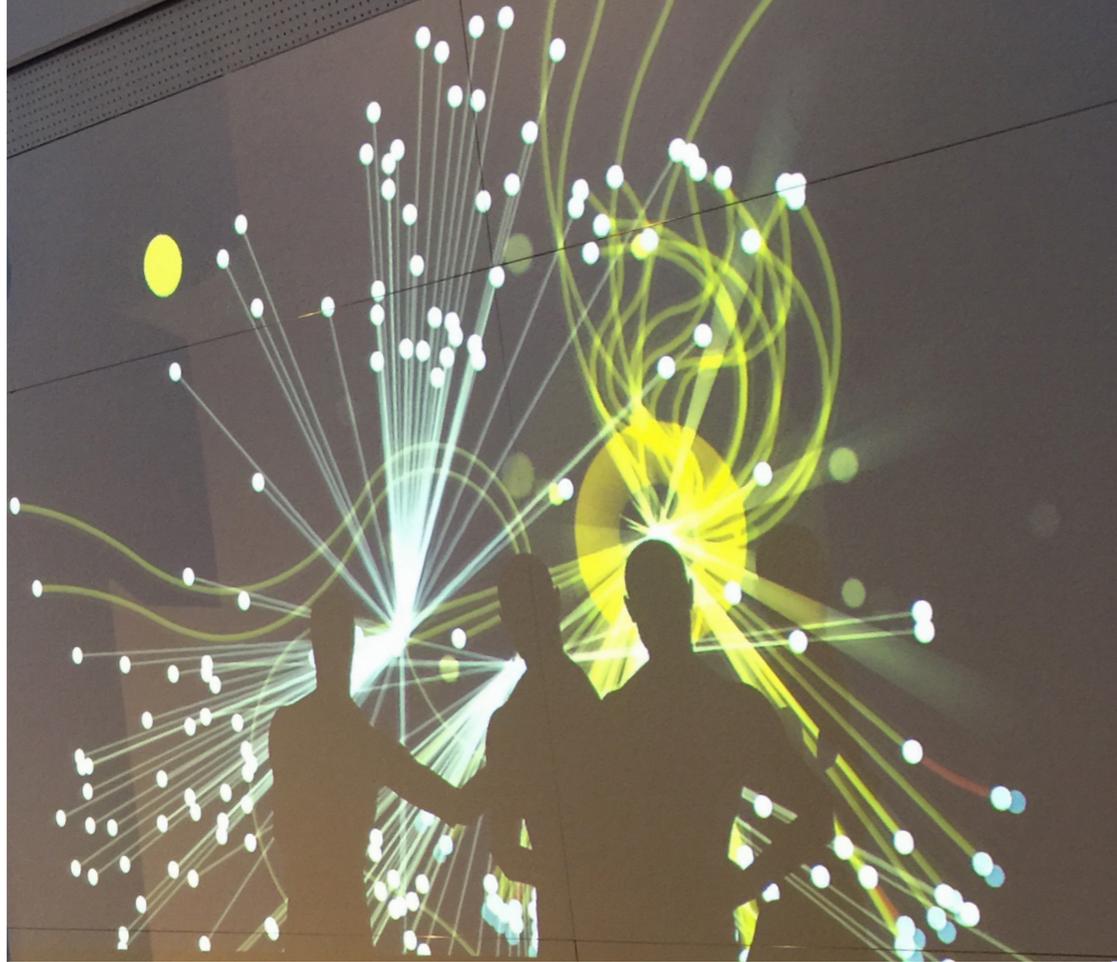


The lab

SHADOWS

Come and let your shadow be transported into a fantasy world. Change your shadow and make it fly, create life and cast spells. This interactive includes a three-screen projection and touch screen to modify properties of the world you want to explore.





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PARTICLE SMASHER

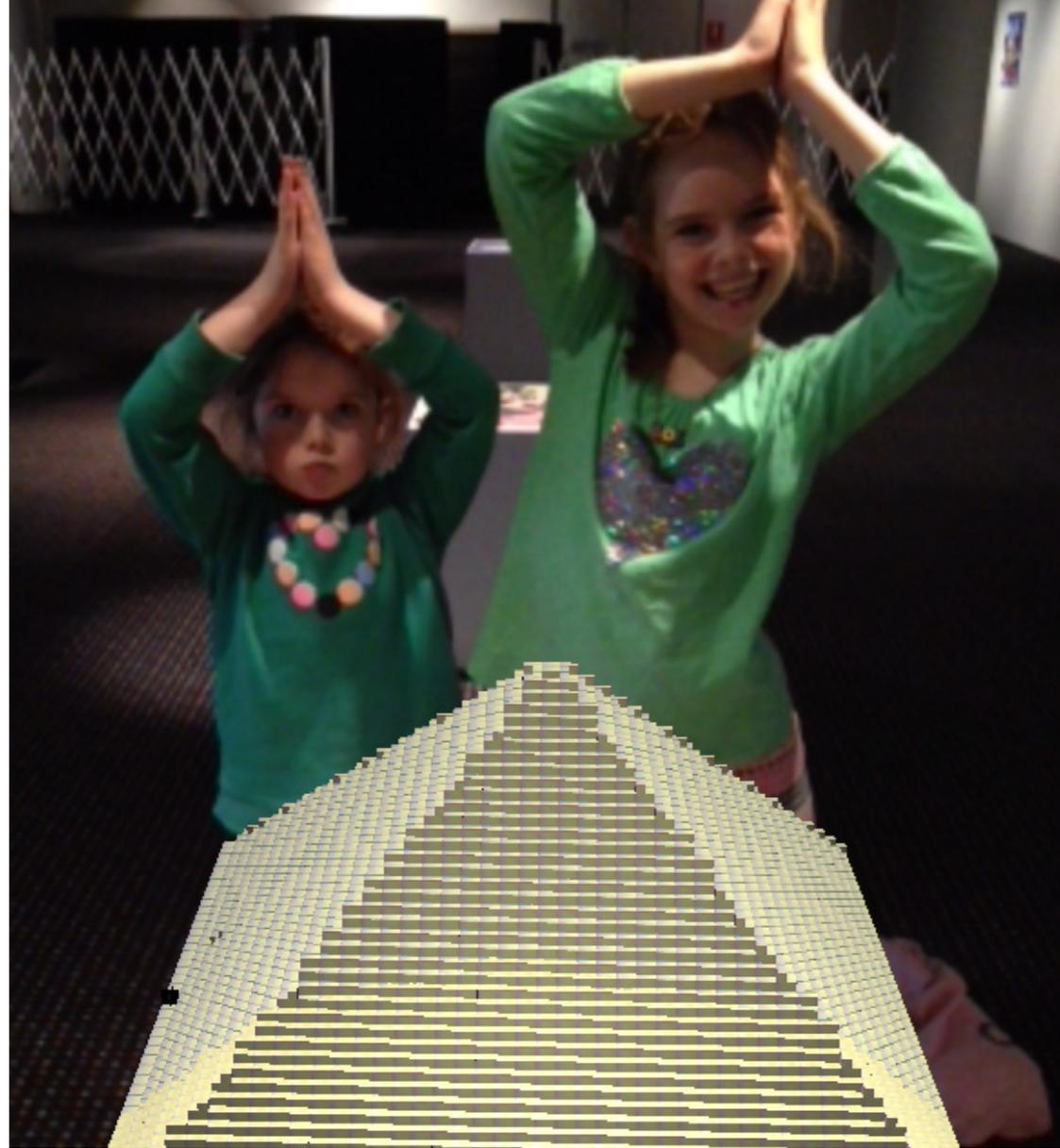
An artistic digital response to the touring collider exhibition. Members of the public could come and smash particles together to create beautiful art. Used over 10,000 times in the two-week period on display.



Karolina Novak

FRUIT AND NUT

Designed an application with Karolina's art to allow anybody to create still art in minutes. Included pre-created pieces and the ability to draw, scale and rotate your art.



Thinkspace

THINKSPACE AR

ThinkspaceAR is the Powerhouse Museum's interactive application which displays 3D objects in Augmented Reality. Explore and manipulate fascinating objects. This augmented reality has been viewed in the museum during the display-time by tens of thousands of curious minds.

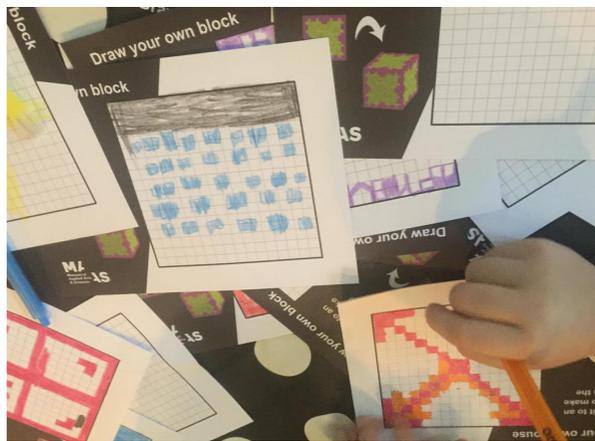




Museum of Applied Arts and Sciences

BLOCKY WORLD

Blocky world is a response allowing people to turn the physical into a voxel world. Learners create hand-draw 8-bit art and see it appear in a 3D world. Used by in excess of 10,000 people in the three-week period it was live.



Museum of Applied Arts and Sciences

HIDE AND SEEK

Particle hide and seek was the museum's response to Pokemon Go during the collider exhibition based on the Large Hadron Collider. Learners explored the museum to catch all the particles in augmented reality while learning about the properties of them.

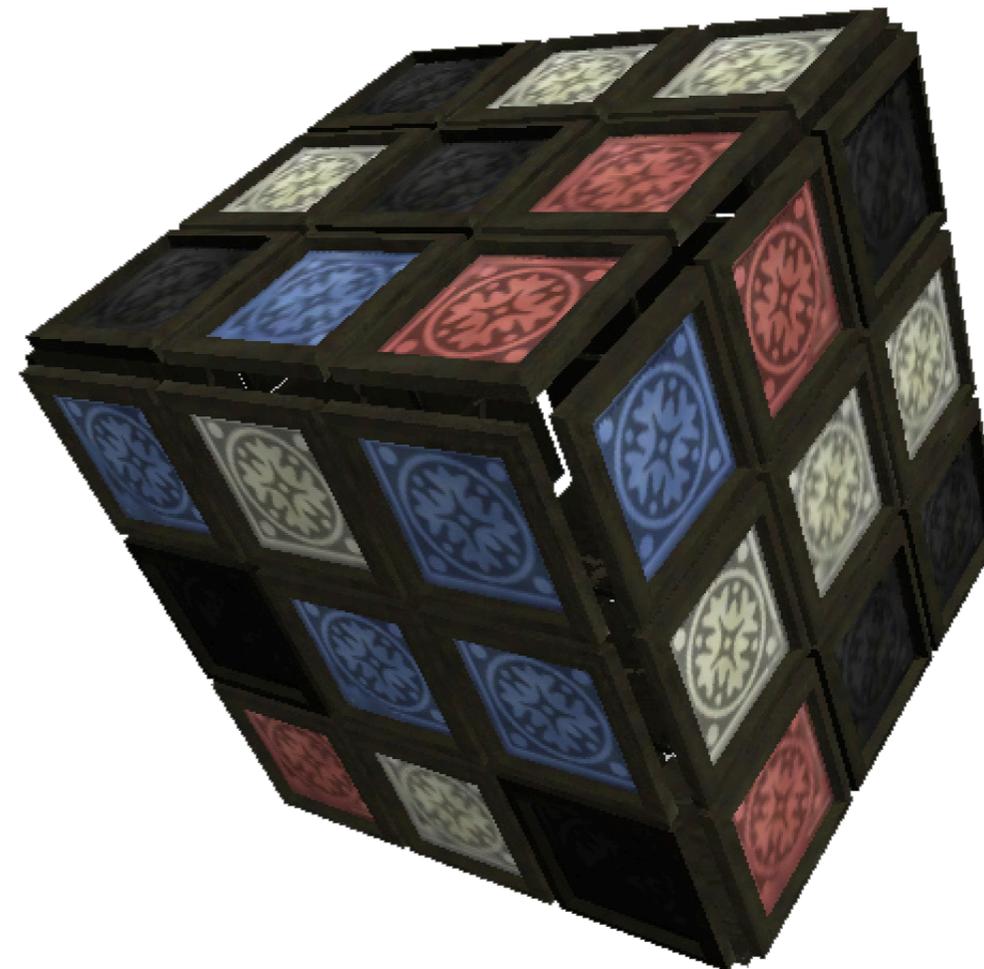


GAMES

Intuitive

Category
Learning

Platforms
Web, iOS, Android, Windows

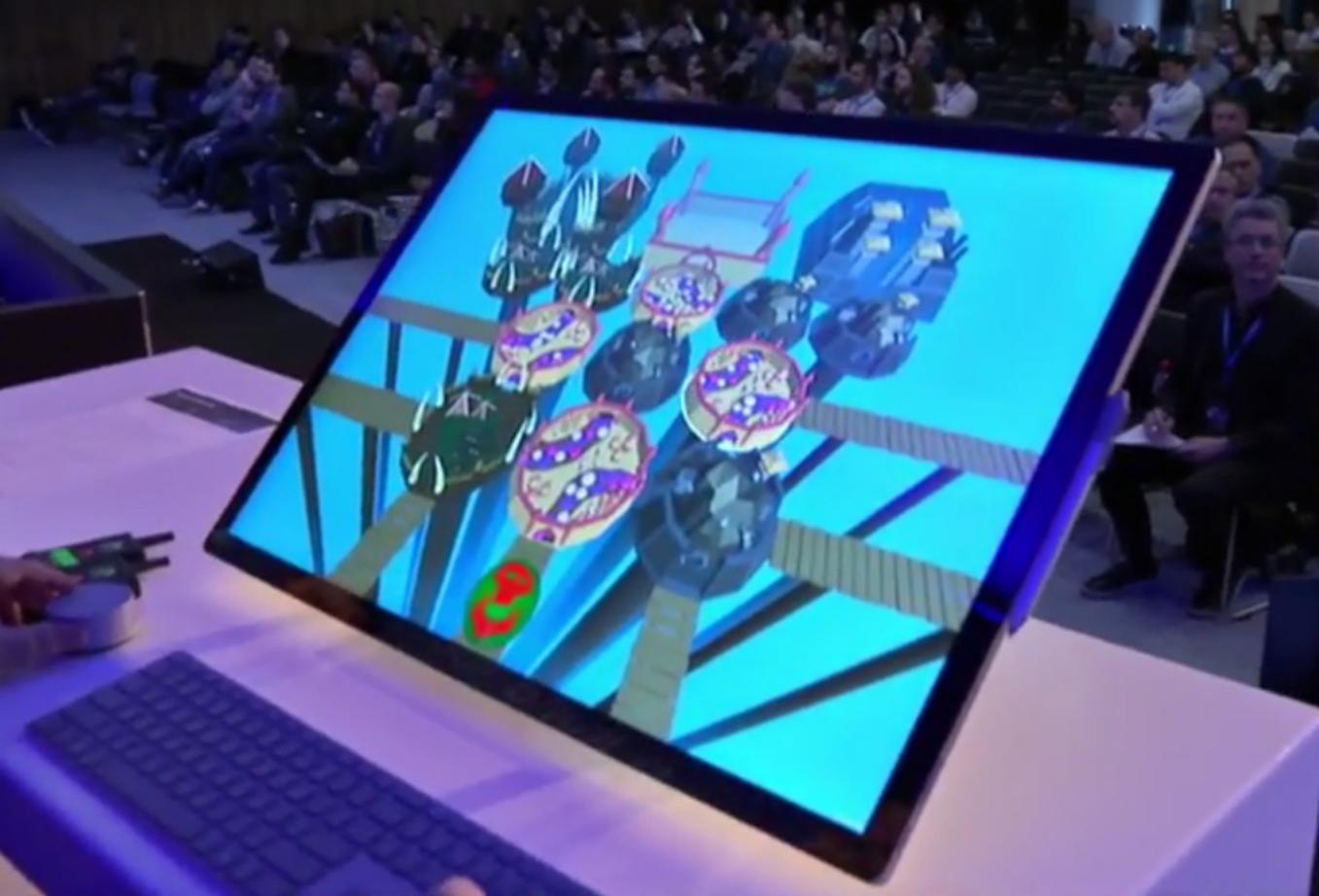


Destined

THE LIGHT BOX

This challenging and unique puzzle game is easy to pick up. Released in the Google Play store and the Apple App Store. Simply press the sides to turn all the lights off.





Destined

SPINNING TO SAFETY

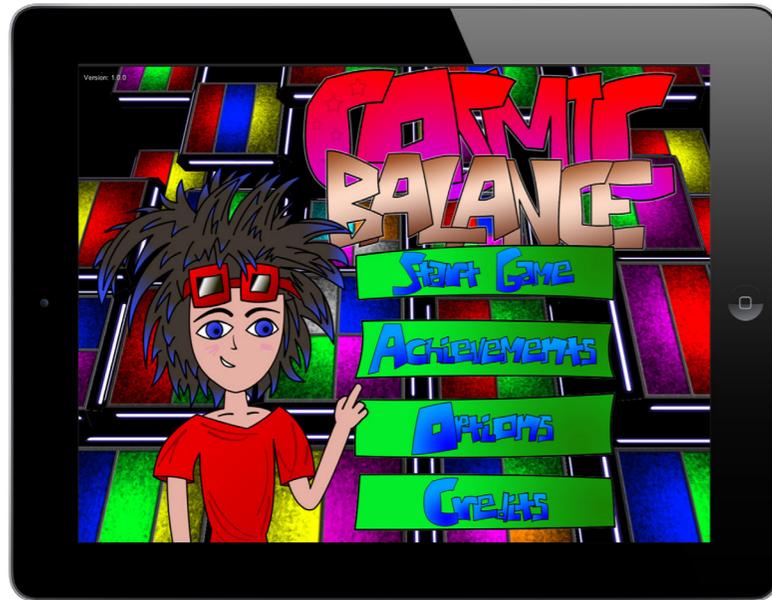
Created specifically to take advantage of the Surface Dial and Surface Studio touch screen. Spin worlds to help the inhabitants get home.



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TAKE OFF

Designed to take advantage of the on screen interactions available with Surface Studio and Surface Dial. Control robots and use the dial to transport them over obstacles. This unique game changes the way you can experience a game.



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COSMIC BALANCE

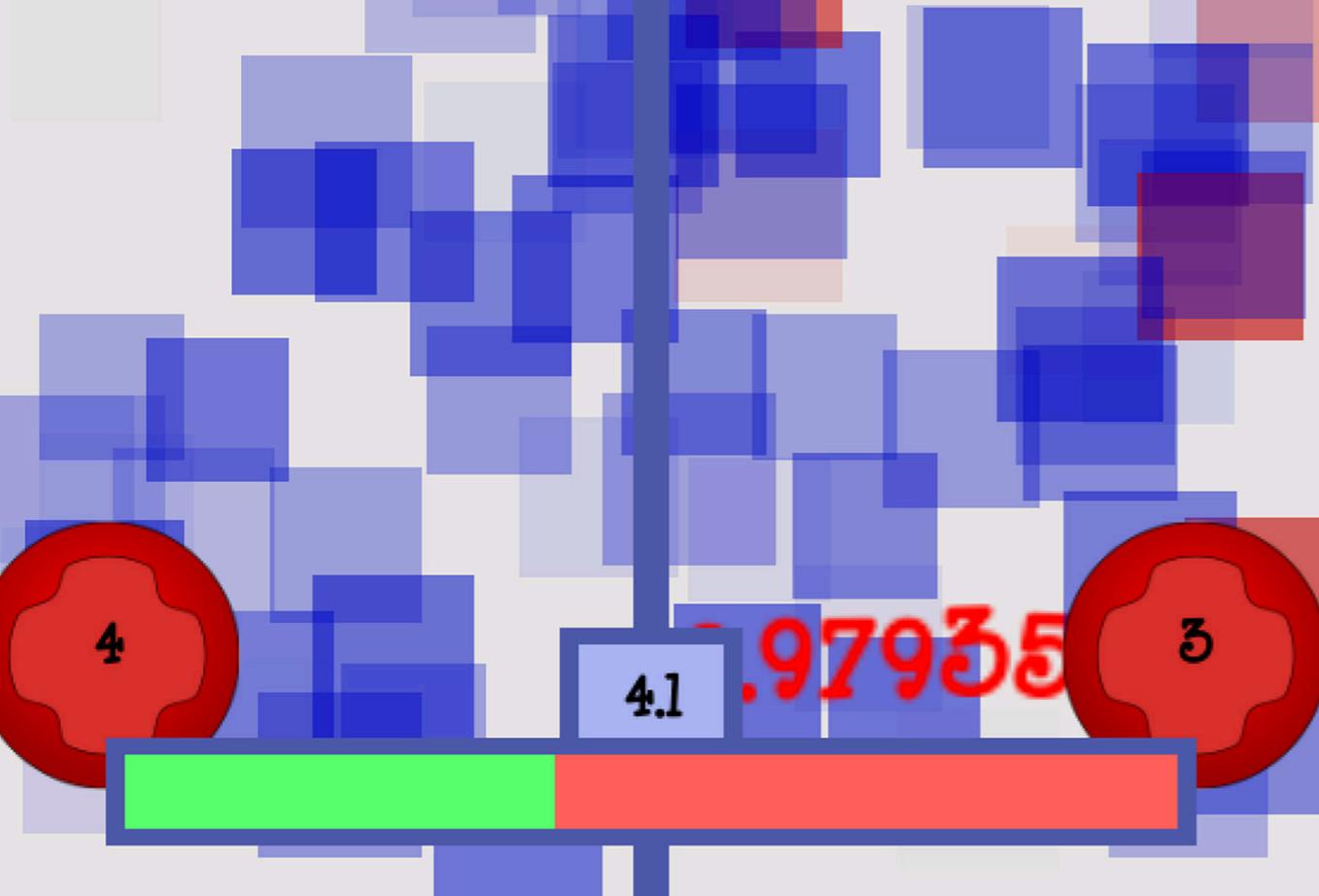
Puzzle game which is harder to solve than a Rubik's cube! Released on iOS and Android platforms.



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FLIPPING TILES

Flipping tiles is a 3D twist on the classic 'do not touch the white tiles' genre. This game will challenge you as you try and beat the best scores on the net.



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TIME TO MEASURE

A game inspired by the inaccuracy of human perception. A series of time-based games to see how well you measure time. Released on iOS and Android.



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ESCAPE THE TOMB

Created as for Egyptian Mummies exhibition at Powerhouse Museum. Run on the spot to escape the tomb. A fast experience designed to allow high turnover.

DESIGN

collateral

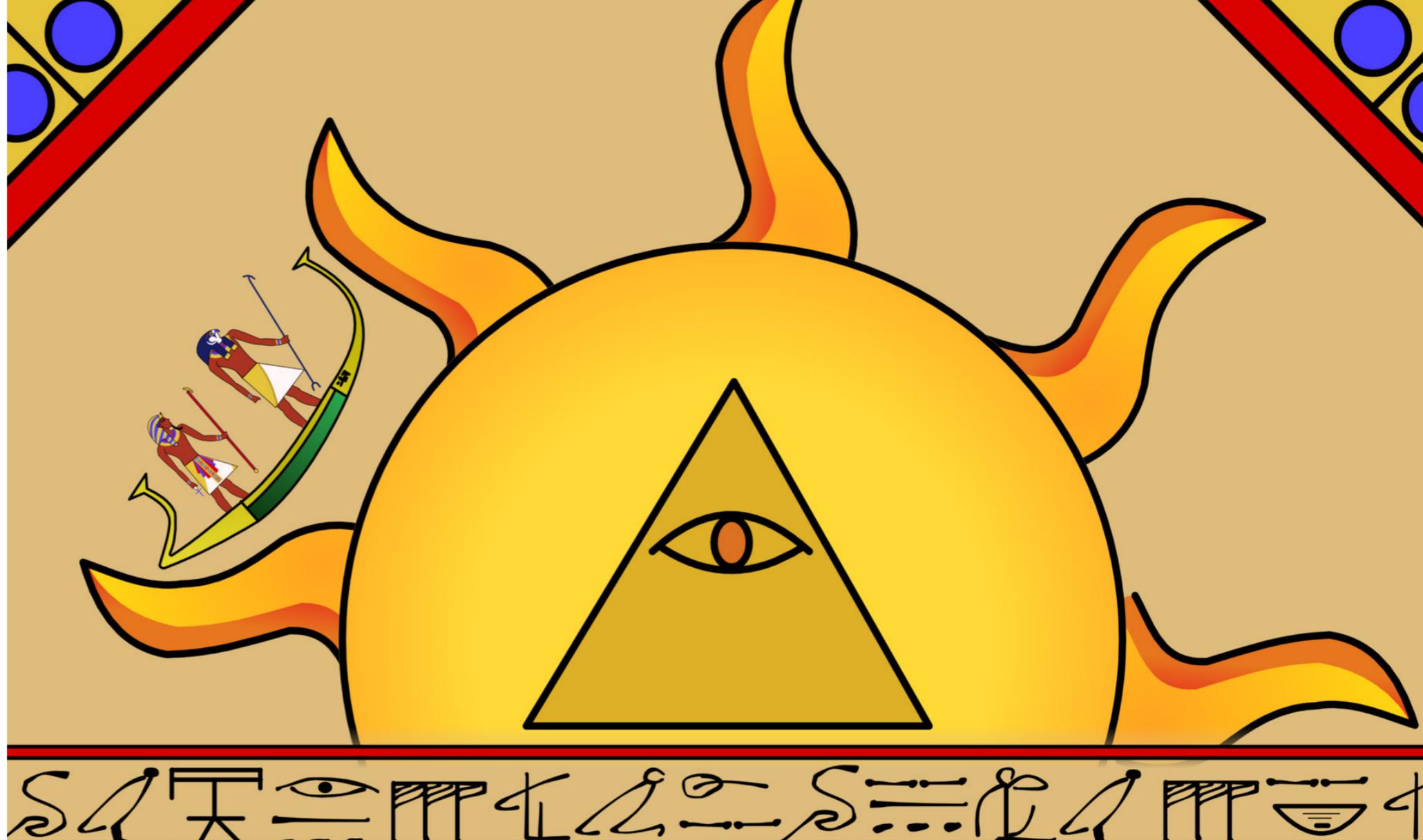
Category
Art

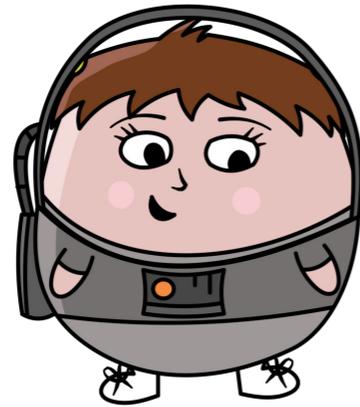
Platforms
2D

Destined

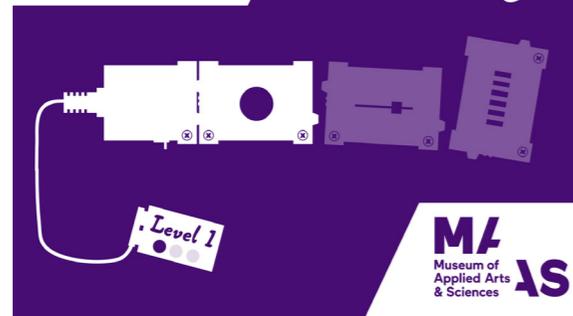
BOOK OF THE DEAD

Created for a YouTube video for a song based on the Book of the Dead.
Using traditional and cut-out animation techniques.





littleBits Challenge



Destined

GAME ART

2D game art created for games including sprite sheets and rigs designed for easy animation.

Museum of Applied Arts and Sciences

CHALLENGE CARDS

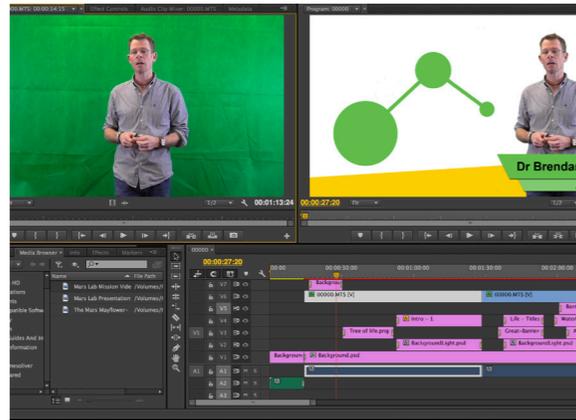
Designed for use in the classroom with littleBits to create a framework for safe play.



Museum of Applied Arts and Sciences

PLAYING CARDS

Created for use in the industrial revolution game. A complete set of unique cards to allow a game to be played with groups of up to 120.



UNSW VIDEO DESIGN

Created custom theme including background, graphics, animations and straps.



Thinkspace 2D ART

Created 2D art for the Thinkspace AR targets displayed in museum.

“My students had never programmed before, but with the Thinker1 they were controlling the LEDs and the buzzer in just a few minutes. It is a great way to introduce students to the internet of things.”

James Oliver | Peter Mahony | **MAAS**
Museum of Applied Arts & Sciences

Year 8 DesignTech Teacher. After students completed a Thinkspace Thinker1 session

- 1 Original Prototype**
Designed to remove the need for a breadboard normally used with Arduino microcontrollers. Built in-house at MAAS with the prototype going through several redesigns to suit education market.
- 2 Thinker1 Mark I**
Over 500 of the Thinker1 boards were made with the majority ending up in the hands of young learners of MAAS holiday programs.
- 3 Learning material**
Learning material designed to ensure and users can continue to code with the Thinker1 without educator help. Materials provided free on museum website.
- 4 Thinker1 Mark II**
The board was redesigned to include additional features such as keyboard emulation. Research showed additional functionality made it less user friendly.
- 5 Thinker Shield**
In partnership with Feathercon the board was turned into a shield capable of extending the functionality of any standard Arduino board.

The Thinker1
Transforming electronics education

The Thinker1 was designed at the Museum of Applied Arts and Sciences to fill an educational need in physical computing. It is made up of a unique blend of on-board components and can also be easily expanded using standard Arduino compatible components.

Often in the classroom where physical computing is taught it requires a circuit to be created and then connected to the board before you can even start coding the microcontroller. The Thinker1 streamlines this complicated setup and allows students to get outcomes quickly. It is easy to setup and works on Mac, PC and Linux.

This allows learners of ages 9 and up to code in a professional language. Within 10 minutes learners are able to control, using the Arduino language based on C, a row of LEDs. At the end of a 50-day workshop learners are able to write music with the buzzer and control persistence of light activities with the LEDs.

The learning materials have been refined over time based on real classroom experience. It has been used in schools, at home, workshops, design studios and teacher professional development. Based on feedback, activities have been refined to have less steps and have more powerful outcomes.

Not only have the learning materials been updated over time but the actual hardware configuration has been adapted. The initial board was stand alone and included a dedicated microcontroller. The design being mass produced is a shield which is compatible with any Arduino board with a standard header setup.

The Thinker1 Shield, known as the ThinkerShield, opens up physical computing to an even wider age range. It can be programmed from visual programming languages such as Scratch and TouchDesigner.

The biggest problem MAAS has had with the development process has been struggling to meet the demand of teachers who would like a set of the boards for their own classroom and are completing a wish-list in the museum.

For further information on our Thinker1 kit visit the learn section of the MAAS site: maas.museum/learn

Learning Materials
The learning materials are all freely available from the museum website. They are designed to allow a parent with no knowledge to assist their child. All activities have an outcome in 5 steps or less.

Classroom tested
The Thinker1 has been used in both school and holiday workshops at MAAS for the last 2 years. It has become part of maker spaces in classes and is in schools in 3 different states.

Expandable
Learners once they have mastered the on-board components can add additional components via the breakout headers. In this example a learner controls a Microsoft character using the Thinker1.

Learn@maas.museum

ThinkerShield POSTER

Designed poster for Museums Australia conference to tell the story of the ThinkerShield.

JAMES OLIVER

Digital Creator

<https://www.destined.com>