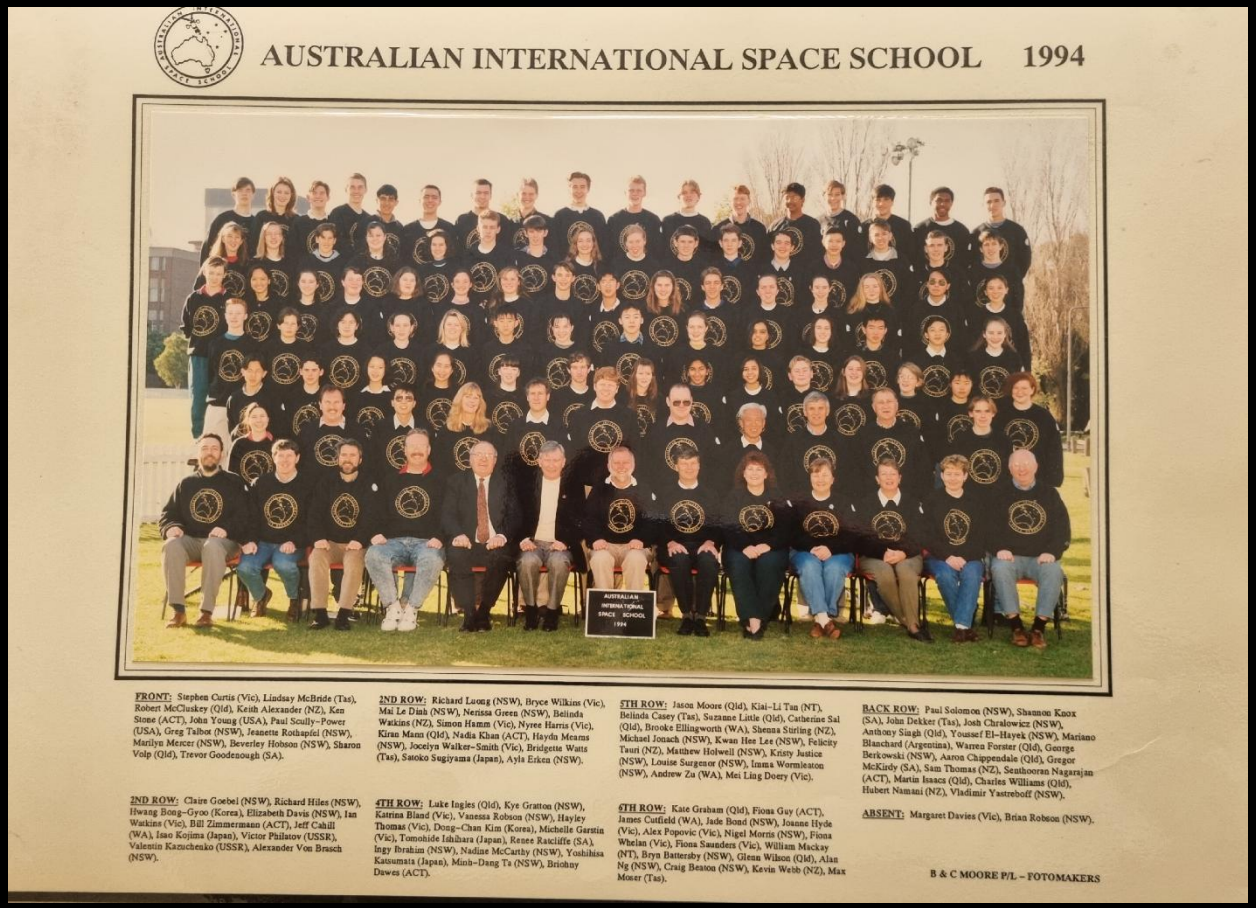
Get your students into Space!

Ideas, Activities and Experiments to address Space Science and Astronomy in the Australian Curriculum 2023

- mike@spaceschool.com

Space Schools in Australia 1992 - 2023

1992
The International year of Space



U.S. Space & Rocket Center

1992

INTERNATIONAL SPACE CAMP

U.S. Space and Rocket Center

Huntsville, Alabama

INTERNATIONAL DELEGATES

ARGENTINA
Ricardo Alcides Malvasio
Lucia Gagliardini
Jose Jorge Lipovetzky*

AUSTRALIA
Emma Ryan
Paul Davies
Mike Roach *

AUSTRIA
Alexander Damianisch
Christian Mondre
Christoph Rainer Hancl*

BELGIUM
Anthony Guépin
Caroline De Vos
Jean-Marie Renard*

BULGARIA
Dessislava Tchaparov
Nickolai Ganchev
Zhivodar S. Terziev*

CANADA
Isabelle Anderson
Veronica Ciolfi
Stewart Craven*

COLOMBIA
Lisa Karina Nabors
Jaime Rodriguez Gutierrez
Liliana Ospina*

FINLAND
Mark Mehtonen
Jussi Oskari Torppa
Juha Pirttila*

FRANCE
Barbara Lepecheur
Olivier Mare
Michel Touzan*

GERMANY
Alexander Oskar Siffrin
Stefan Eggers
Ursula Oesterholz - Kraemer*

GREECE
Joannis Roussos
Paschopoulos*
Panagiotis Martinis
Tina Stamatia Tolis
Konstantinos Tanis*
Agapi Christaki
Panos Sinopoulos

HONG KONG
Ming-Keung Lee
Mon Ching Wong
Kwok Choy Yue*

HUNGARY
Tamas Bartal
Aida Farkas
Elod Both*

INDIA
Dilip K. Pathak*
Poonacha D. Baduyanda
Bitupamo Goswami

IRELAND
Nollaig Donnabhain*
Heber McMahon
Jacqueline Flynn

ISRAEL
Yaron Levy
Zohab Misinai

ITALY
Emiliano Greganti
Francesca Filippini
Daniela Magnanini*
Christina Corradetti*

JAPAN
Takashi Nomura
Kumiko Yamane
Takashi Fujita*

KOREA
Jin Ho Jung*
Yong Suk Chung
Kyu-Baek Oh

MEXICO
Monica Martel
Mauricio Sanders
Constantino A. Medina*

NIGERIA
J.U. Idachaba
Augustine Ugwamba Okoronka*
Emem Okon Effanga
Abimbola Babatunde Olajubegan

NETHERLANDS
Dr. Willem J.H. Braakman*
Jeroen Vernooij
Mark Bleekemolen

NEW ZEALAND
Belinda Wilkinson
Louise Parsons
Pat Quaid*

NORWAY
Mrs. Berit Brusevold*
Ms. Maren Kolle Riis
Mr. Trond Karsten Varlsot

RUSSIA
Olga Leonidovna Ginesina*

SAUDI ARABIA
Nouf Salma
Mohammed Salma
Faisal Salma*

SINGAPORE
Mr. Kwek Hiok Chuang
Mr. Lee Lui Shiong
Miss Sharon Lau

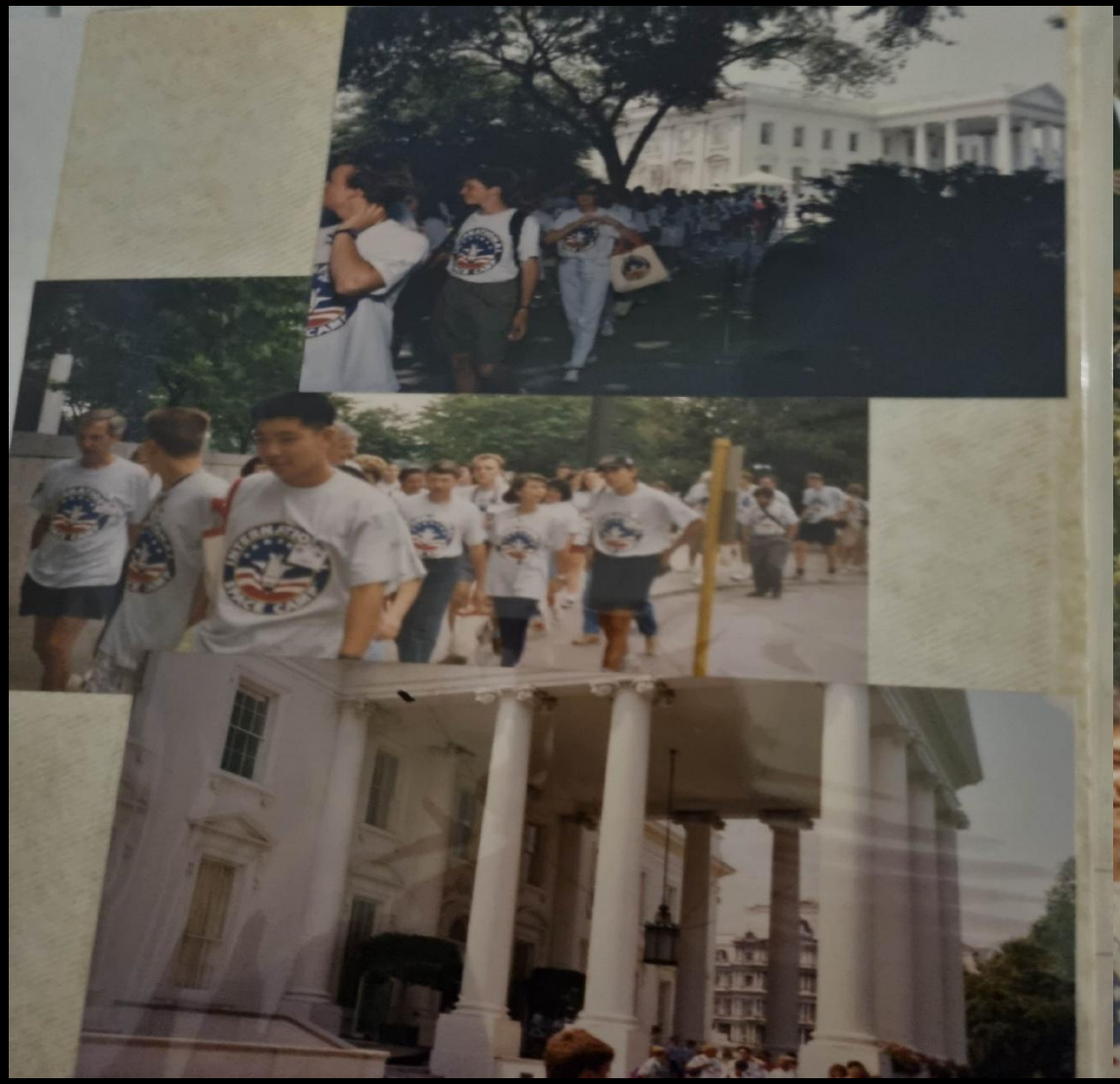
SOUTH AFRICA
Mr. Nikita Cindi*
Mr. Jacobus Fourie
Gugu Sziba

SPAIN
Ernesto Frutos*
Ignacio B. Blasco
Ana Comellas

UNITED KINGDOM
Elizabeth Alderson
Ian Hall
Jennifer Lockwood*

https://astronomy.swin.edu.au/staff/eryan.html

At the White House




U.S. Space &
Rocket Center

Based in Sydney 1992-1996
Initially funded by the Australia Government for the International Year of Space with excursions to Coonabarabran, Siding Springs, Canberra, Mt. Stromlo,Canberra Deep Space Complex





Australian International Space School

A five-day residential program for high school students in Year 11.
Woomera, South Australia

South Australian Space School

A three-day residential program for high school students in Year 10.


Interested in a career in space science and technology?

www.spaceschool.com


www.spaceschool.com

My Journey from 1992

- 1992-1999 AISS facilitator
- 1993 CRA Fellowship investigation of Astronomy
- 1992 Space Science & Astronomy Course 8-10
- 1995 $8K STAP Grant Satellite Technology
- 1997 Established SA Space School
- 1997 STAP $6K grant to bring Rocketry into SA
- 1999 Convenor Tasmanian Space School
- 2001 Churchill Fellowship to NASA Education

Staff and Sponors SA Space School 2003







PETER
LEHMANN
WINES
Weighbridge Platter
20 07 2003 13:10

NT Spaceschool

Jim’s Catch

The journey continues

Sir Ross & Sir Keith Smith Fund

Astronauts to South Australia

Students sponsored to USA

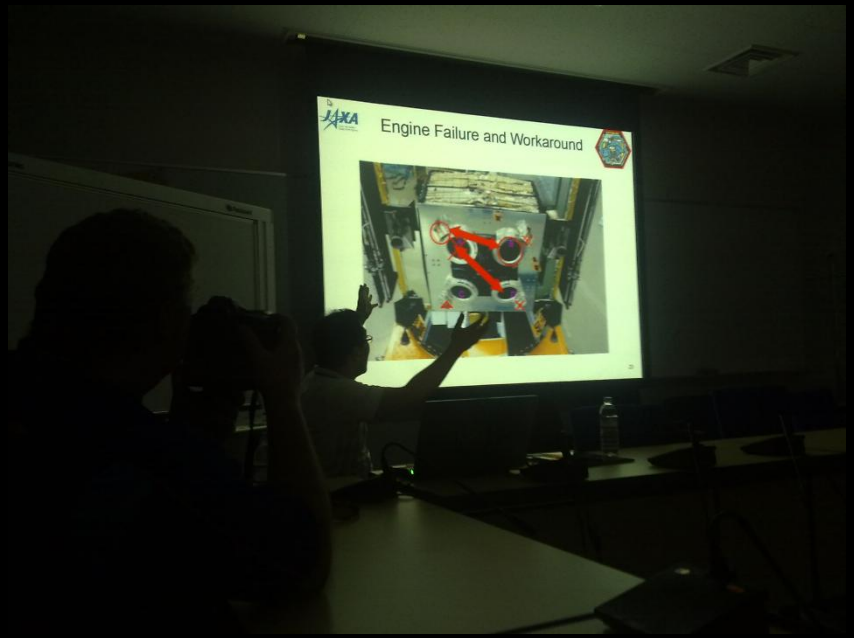
Woomera 2004-2010

Canberra 2007 and VSSEC 2011-16

$10k JAXA Australia Japan Foundation with VSSEC and ASTA 2010


鹿児島空港から見た霧島の山なみ
The Kirishima mountain range viewed from Kagoshima Airport
東野岳
韓国岳
新燃岳
高千穂峰
白鳥山
中岳
大浪池
霧島神宮


Proudly Supported By
Australia Japan Foundation
Victorian Space Science Education Centre
Japan Aerospace Exploration Agency
Australian Science Teachers Association
Australia National Committee for Space Engineering


JAXA
Engine Failure and Workaround

SA Space School visits Victorian Space Science Education Centre

National Space Camp VSSEC 2011

National Space Camp VSSEC 2011

National Space Camp VSSEC 2011

National Space Camp VSSEC 2011

National Space Camp VSSEC 2011

National Space Camp VSSEC 2011

HAMILTON SECONDARY COLLEGE Space SCHOOL

The Andy Thomas Space Foundation

Teacher Space Science Education Programme

OUR PLACE IN SPACE

Workshops for science Teachers 2010 -

HAMILTON SECONDARY COLLEGE Space SCHOOL

The Andy Thomas Space Foundation

Teacher Space Science Education Programme

Teaching and learning about Our Place in Space

Misconceptions

- Prior knowledge
- Activities to address misconceptions

Science / Year 7 / Science **Understanding** / *Earth and space sciences*

Curriculum content descriptions

Predictable phenomena on Earth, including seasons and eclipses, are caused by the relative positions of the sun, Earth and the moon (ACSSU115)

Elaborations

- investigating natural phenomena such as lunar and solar eclipses, seasons, and phases of the moon
- comparing times for the rotation of Earth, the sun and moon, and comparing the times for the orbits of Earth and the moon
- modelling the relative movements of the Earth, sun and moon and how natural phenomena such as solar and lunar eclipses and phases of the moon occur
- explaining why different regions of the Earth experience different seasonal conditions

ACTIVITIES: *Workshop 1 "Our Place in Space "*

- Addressing misconceptions about Our Place in Space (ppt)
- Post Box Activity
- A walk through the Solar System
- Bringing the Earth Down to Size (activity and worksheet)
- Pipehenge and Daytime Astronomy. Building a mini Pipehenge.
- The Night sky in June
- Phases of the Moon and the Seasons
- Shadow measurements and the Noonday project
- Who is really "Down Under"?
- The Earth at Night

SCOOTLE

- **http://www.scootle.edu.au/ec/search?accContentId=ACSSU115**

- **Science / Year 7 / Science Understanding /**
- **Change to an object's motion is caused by unbalanced forces, including Earth's gravitational attraction, acting on the object** (ACSSU117)
- **Elaborations**
- investigating the effects of applying different forces to familiar objects
- investigating common situations where forces are balanced, such as stationary objects, and unbalanced, such as falling objects.
- exploring how gravity affects objects on the surface of Earth.
- considering how gravity keeps planets in orbit around the sun.

- ACTIVITIES **Workshop** ***2 Gravity gets me Down***
- Addressing Misconceptions
- Post box activity
- Gravitational forces in the Solar System
- Air resistance, mass and weight
- Gravity in space.
- Activity “How high can you Jump?”
- Building the First Moon Base
- Microgravity experiments, activities, and demonstrations
- Launching into orbit, activities, and experiments on the International Space Station
- **SCOOTLE**
- **http://www.scootle.edu.au/ec/search?accContentId=ACSSU117**

Science / Year 10 / Science understanding / Earth and space sciences

View on Australian Curriculum website

acara AUSTRALIAN CURRICULUM, ASSESSMENT AND REPORTING AUTHORITY

- **Curriculum content descriptions**
- describe how the big bang theory models the origin and evolution of the universe and analyse the supporting evidence for the theory (AC9S10U03)
- **Elaborations**
- describing the major components of the universe using appropriate scientific terminology and units including astronomical units, scientific notation and light-years
- constructing a timeline to show major changes in the universe which are thought to have occurred from the Big Bang until the formation of the major components such as stars and galaxies.

- examining how stars' light spectra and brightness is used to identify compositional elements of stars, their movements and their distances from Earth.
- explaining how each different type of evidence, such as cosmic microwave background radiation, red or blue shift of galaxies, Edwin Hubble's observations and proportion of matter in the universe, provides support for the acceptance of the big bang theory.
- researching First Nations Australians' knowledges of celestial bodies and explanations of the origin of the universe
- identifying the different technologies used to collect astronomical data and the types of data collected.
- exploring recent advances in astronomy, including the Australian Square Kilometre Array Pathfinder, and astrophysics, such as the discovery of gravitational waves, dark matter, and dark energy; and identifying new knowledge which has emerged.

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The Andy Thomas Space Foundation

Teacher Space Science Education Programme

How Students Learn

- form new concepts by combining what they believed and what teacher tells them
- need to “unlearn” misconceptions before they can learn new concepts
- need to observe and record what they see, look for patterns, make predictions and formulate explanations for their observations

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Our Place in Space

ACTIVITY ONE

Walk through the Solar System

(Pluto is included in the activity but students should be reminded that it is no longer regarded as a planet)

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Teacher Space Science Education Programme

A Walk through the Solar System

Compare the size of the planet and the distance away from our Sun. The Sun is 109 mm in diameter.

OBJECT	DIAMETER	DISTANCE from Sun
Sun	109mm	
Mercury	0.33 mm	5 m
Venus	1 mm	8.5 m
Earth	1 mm	12 m

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A complete set of sheets that can be laminated for display.

The SUN 109 mm diameter

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ACTIVITY TWO

Bringing Earth Down to Size

This activity could also be extended to include the interior of the Earth

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ACTIVITY THREE

The Earth at Night
Night Light Poster

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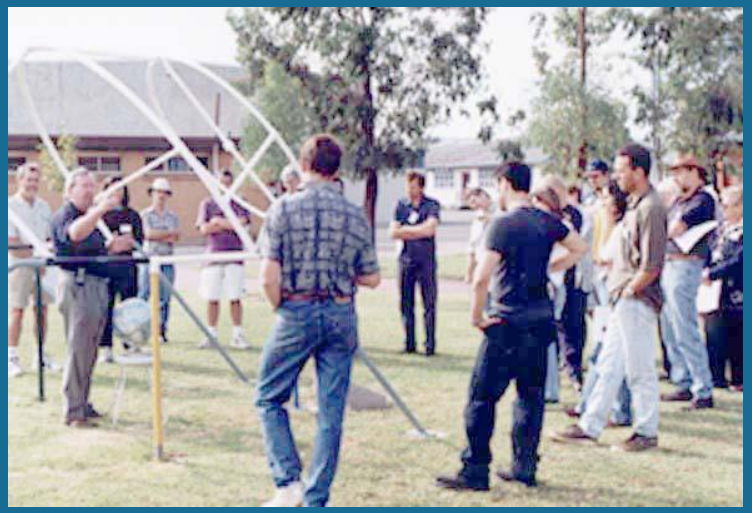
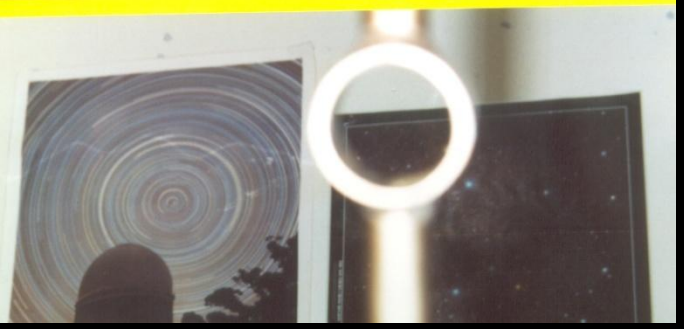
- Pipehenge if you are lucky enough to have one helps understanding of our place in space.





Space Science and Astronomy at the Technology School of the Future

Portable Pipehenge

Daytime Astronomy

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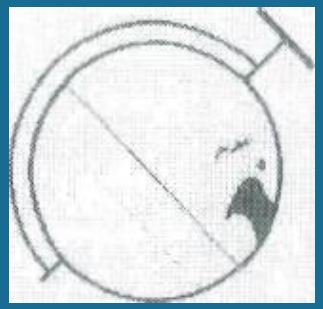
Who is Down Under?

This article was published in the SASTA Journal



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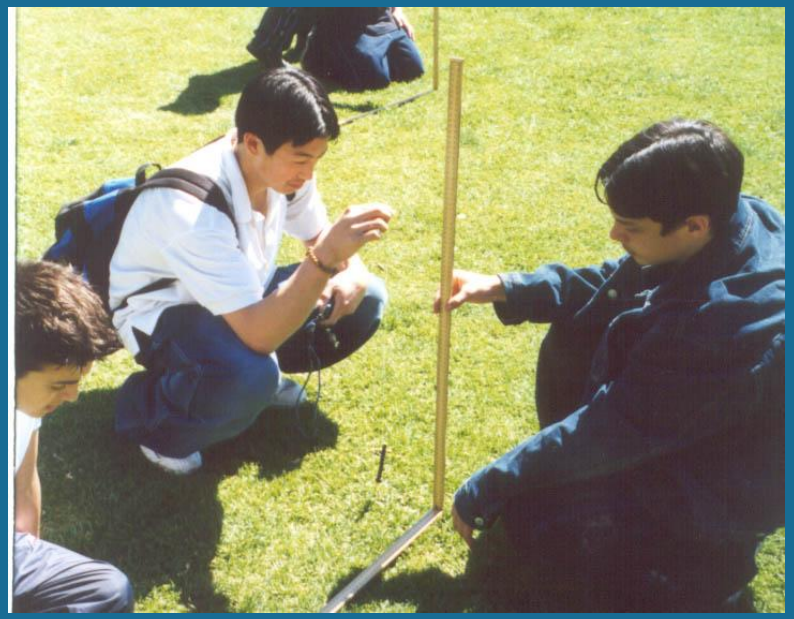
Drawing shadows, shadow sticks and observations

Bringing the earth down to size



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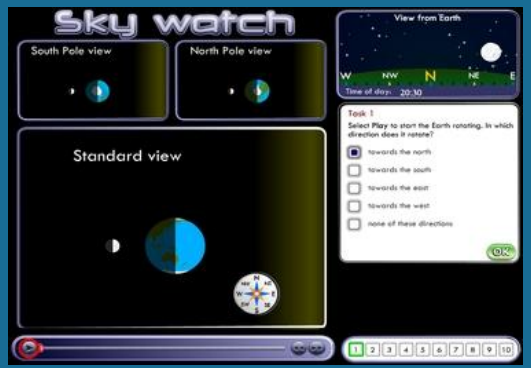
Learning objects from SCOOTLE

scootle



Teaching and learning about gravity and space science

Understandings about gravity

- The meaning of the word gravity
- Meaning of “vertical” and “horizontal”

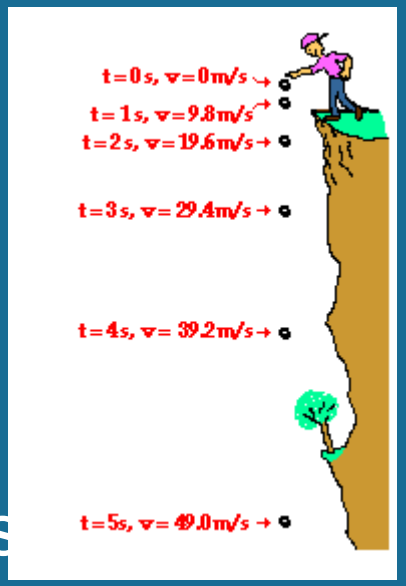
- Air and gravity (Demonstration)
- Meaning of “vacuum”

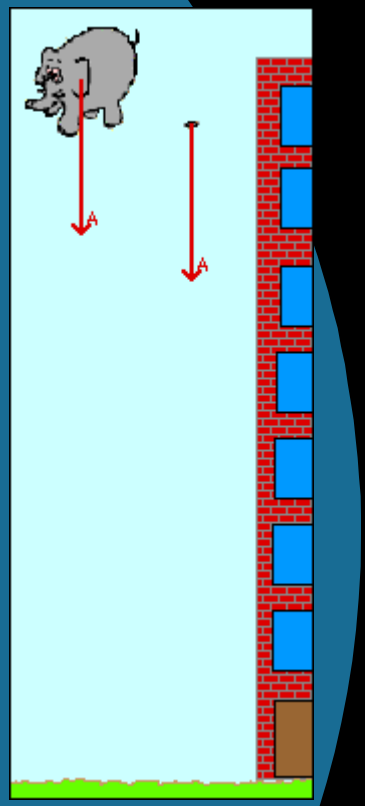
The feather and the coin

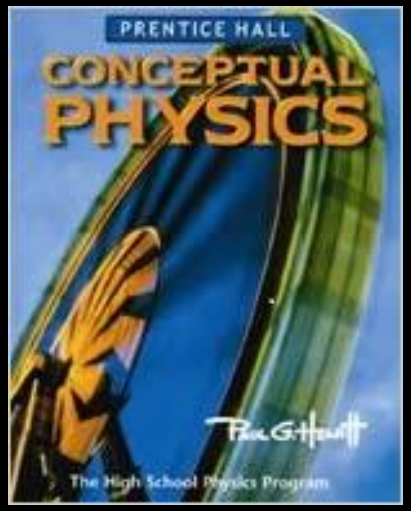
Brian Cox in a vacuum

More Understandings

- Meaning of “g”
- “Feeling” the weight
  (Pressure or Mas
- Weight and weightlessness
- Free fall and projectile motion







Help with Physics Concepts

https://www.sdavies.com/video/he
ntml

https://www.youtube.com/watch?v=jB6UBlzpklc

Hewitt activities and Worksheets

- Linear Motion
- Projectile Motion
- Bronco Billy

International Space Station

- https://www.nasa.gov/mission_pages/station/main/index.html
- https://storytimefromspace.com/free-fall/

MICROGRAVITY Activities

Microgravity Experiments at
Space School You Tube

DEMONSTRATIONS of MICROGRAVITY

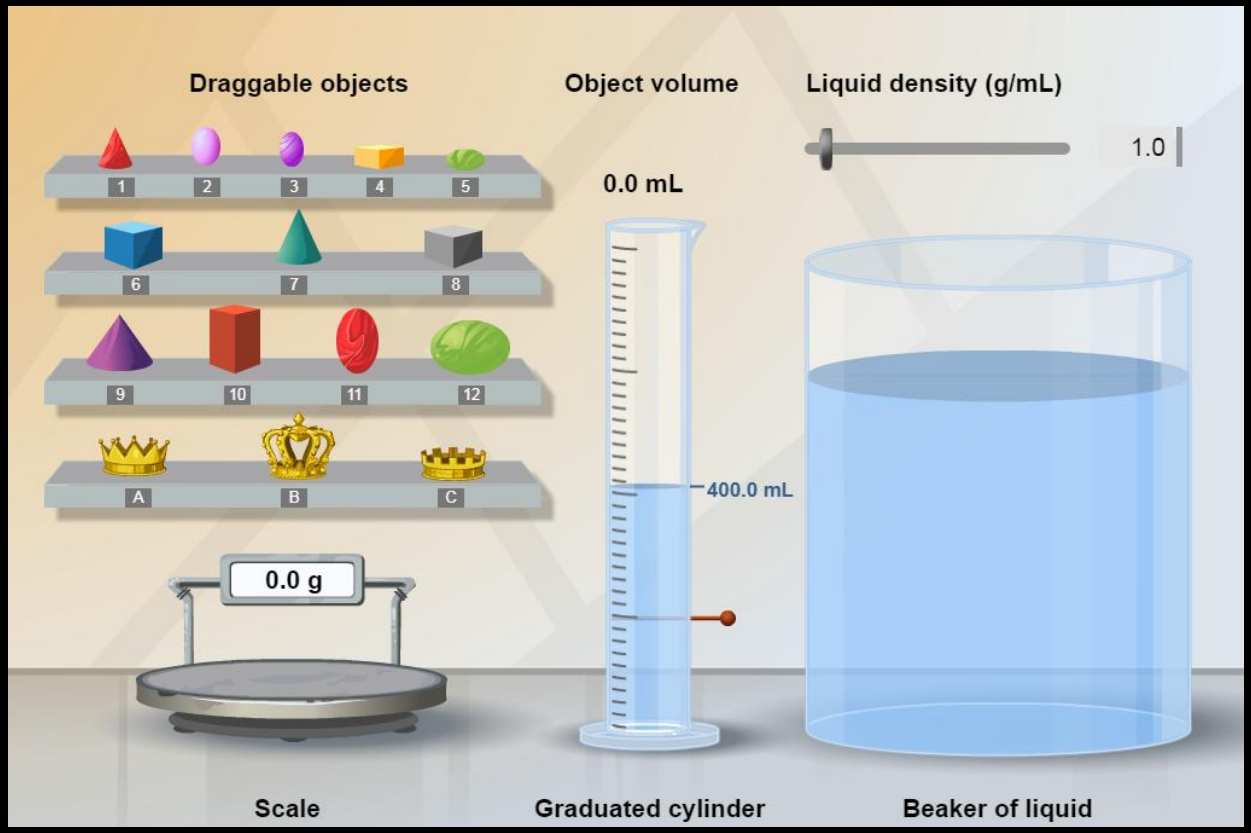
- Drop Cup and others
  - Microgravity 101
- Mission Science Booklet
- Microgravity Concepts

article by Mike Roach

South Australian Space School 2014

Density Lab

explorelearning.com




South Australian Space School 2004

South Australian Space School 2014

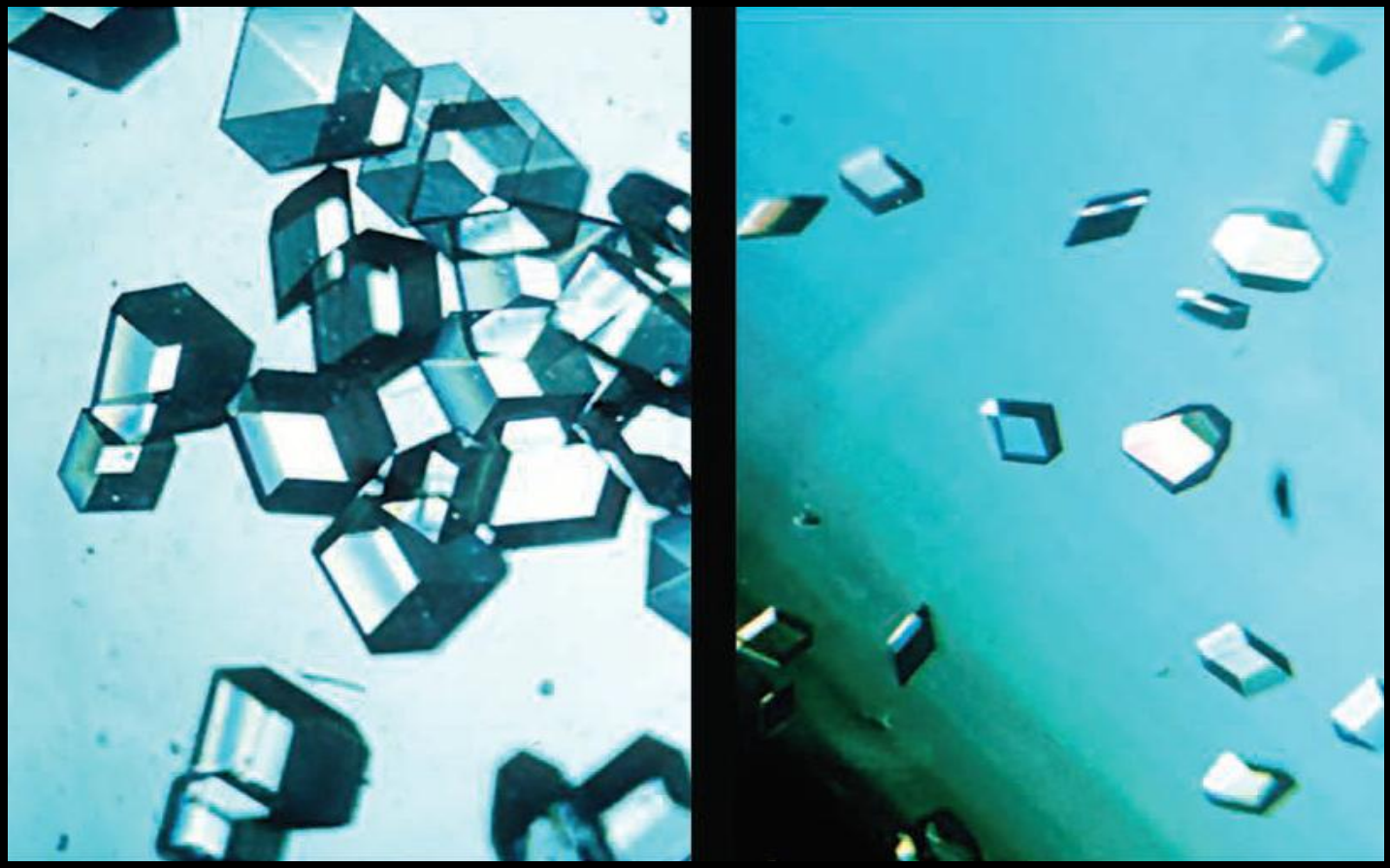

South Australian Space School 2008


South Australian Space School 2008

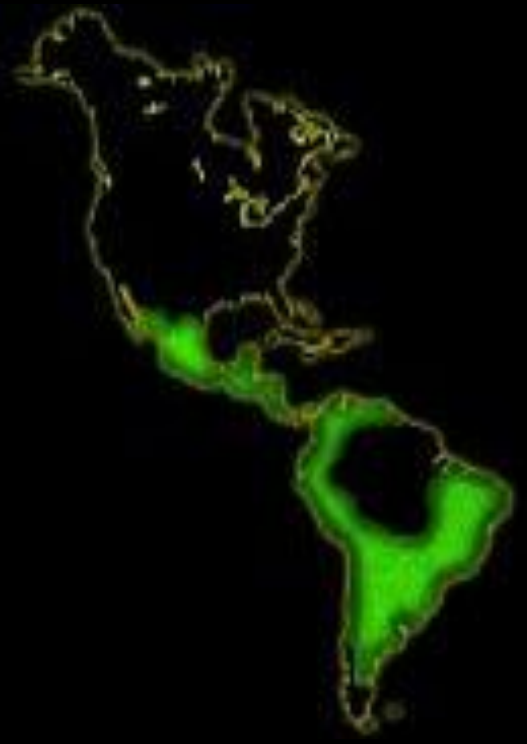

South Australian Space School 2014


South Australian Space School 2014

CRYSTAL GROWTH on INTERNATIONAL SPACE STATION



THE KISSING BUG



International Space Station

- Experiments and activities in Microgravity Science Missions

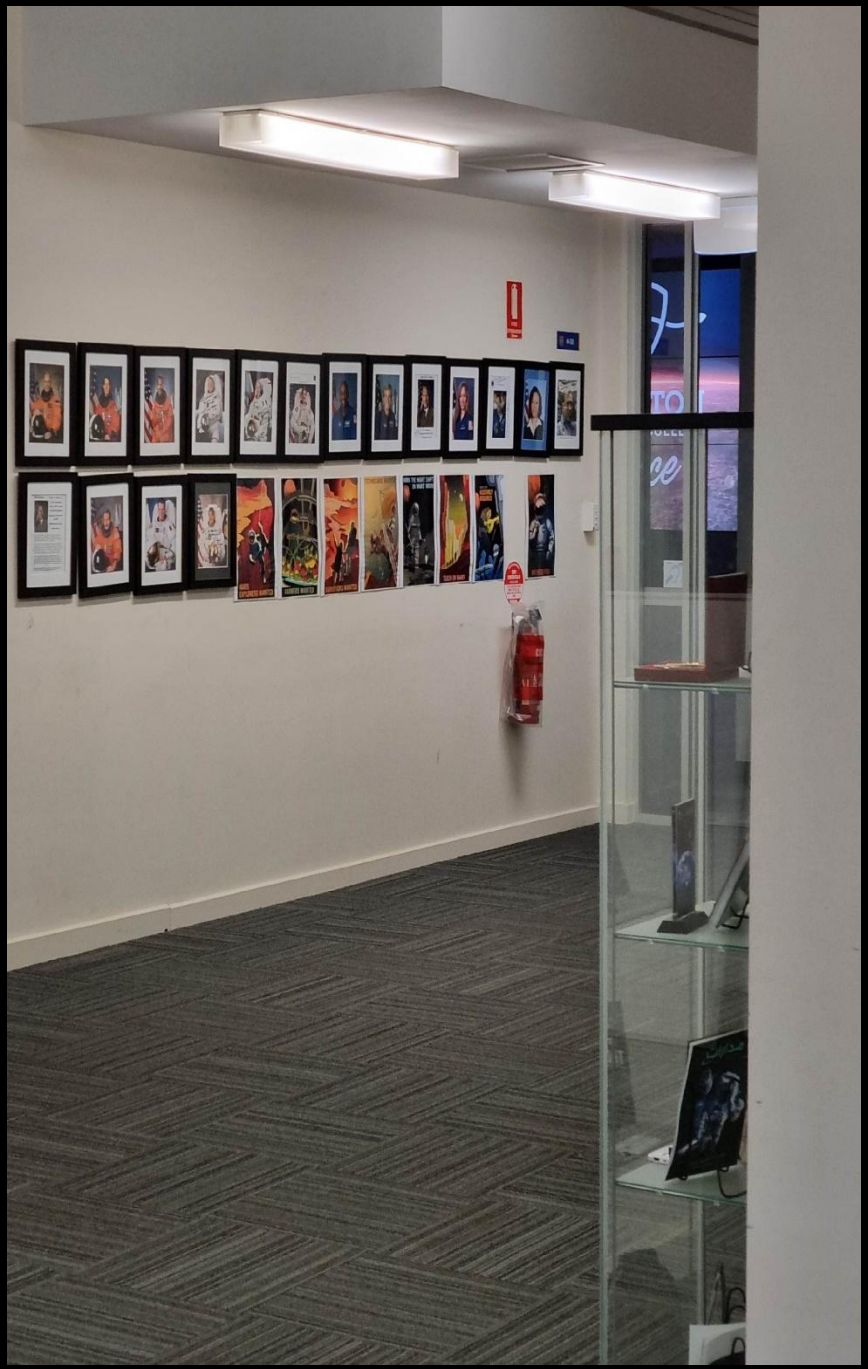
NASA will land the first woman and **next** man on the Moon by 2024

NASA EXPRESS Sign on

https://youtu.be/5u2-jqPTKyk


1991
HAMILTON
SECONDARY COLLEGE
Space
SCHOOL

SASS April 2023

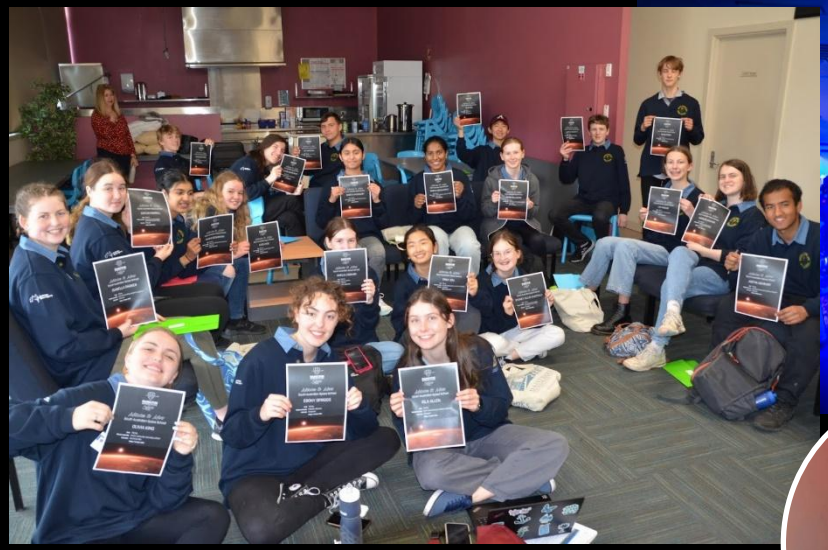


MISSION CONTROL

Visit to ASA Discovery Centre

HAMILTON SECONDARY COLLEGE | Space SCHOOL

Government of South Australia
Department for Education



Come along tomorrow for a guided tour of the facilities at Hamilton Secondary Space School!

Please book in with either Sarah Baker or myself so we know how many will be attending.

THANK YOU