



# Australia Virtual Masterclass Report



LAUNCHING AUSTRALIA VIRTUAL  
MASTERCLASS SERIES FOR  
CBSE SCHOOL LEADERS

Six exclusive masterclasses  
delivered by leading Australian  
Universities experts

JUNE 15 ONWARDS



Australian Government

Australian Trade and Investment Commission



Australian  
National  
University



BRISBANE  
AUSTRALIA



MACQUARIE  
University  
SYDNEY-AUSTRALIA



THE UNIVERSITY  
OF QUEENSLAND  
AUSTRALIA  
CREATE CHANGE



THE UNIVERSITY OF  
WESTERN  
AUSTRALIA



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

Rajeev Tripathi, PGT Physics

## Introduction

CBSE in association with Australian Trade and Investment Commission(Austrade) has launched “ VirtualMasterclass Series” from 15th June 2020. Six masterclasses are scheduled specifically forCBSE Schools. This is an opportunity for school leaders to learn from Australian academics gaining the latest industry knowledge

In this series a Masterclass on the topic ‘**The Future of Space - Turning Science Fiction into Reality in the Classroom Speakers’** by Dr. Brad Tucker, Mount Stromlo Observatory, Australian National University was conducted.

## Objective

- To ensure professional development of school leaders and enable smooth transition to online teaching.
- To open up the minds to the possibilities of science.

## Participation

The Masterclass was organised by CBSE in collaboration with Australian Trade and Investment Commission(Austrade) via CISCO Webex.

Dr. Brad Tucker, Mount Stromlo Observatory, Australian National University was the educator in charge. He holds a Ph.D in Astrophysics (ANU), B.Sc. in Physics (Notre Dame), B.A. in Philosophy and Theology (Notre Dame). The areas of his expertise are Cosmology And Extragalactic Astronomy, Astronomical And Space Instrumentation, Stellar Astronomy And Planetary Systems and General Relativity And Gravitational Waves.

The Masterclass was attended by science teachers, especially Physics teachers from hundreds of CBSE affiliated schools.

## Highlights from the Masterclass

The session kicked off with Dr. Biswajit Saha's, Director CBSE, opening remarks. He thanked the Australian government and AUSTRADE for agreeing to hold the Masterclass series and encouraged the teachers to get the maximum benefit from this golden opportunity.

The session kicked off with Dr. Biswajit Saha's, Director CBSE, opening remarks. He thanked the Australian government and AUSTRADE for agreeing to hold the Masterclass series and encouraged the teachers to get the maximum benefit from this golden opportunity.

Dr Brad Tucker then took over. He started off by thanking everyone who has joined in and then talked a bit about the cooperation between India and Australia. He remarked that India is emerging as one of the world's biggest powers in space. He took time to honour his native place and its contribution in the field of science.

He then talked about earth and space and how they have been exploring the space by taking pictures through attaching telescopes to balloons and launching them to space. He also talked about the legal definition space which was quite interesting and about the first crime committed in space and that it actually was a cybercrime made it even more interesting. He shared the idea how educators herein India can conduct that short duration experiment as well. He also shared a list of materials required to conduct the experiment.



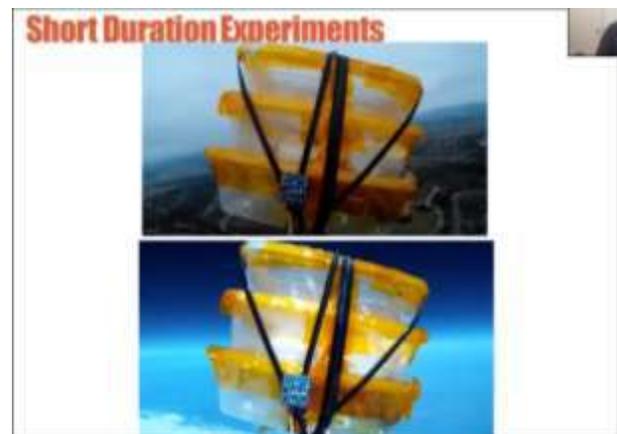
### Short Duration Supply List

- Helium tank rental in the desired city
- 600g -1kg balloon
- String spools
- thick insulation foam board
- fiberglass tape
- nitrile gloves for handling balloons
- GPS
- Antenna UHF + VHF + receiver
- GoPro camera + 16GB SD card
- Radar reflector
- CASA Flight approval

Dr Tucker talked about how science students can be encouraged to find new planets and how we can know about the atmosphere of the newly discovered planets. He gave the example of Mars and the way to learn about the density and composition of its atmosphere and that this could be done by our students.

He shared the valuable information that by going up 30 kilometers into space the atmospheric changes that are experienced are very similar to Mars' atmosphere and how that can be used to conduct experiments such as growing vegetable there. He also shared a very interesting experiment conducted by five year old who wanted to know how candies will change into space.

Short Duration Experiments	
<p><b>MARTIAN SURFACE</b></p>  <p>Pressure: 0.008 bar</p> <p>Average Temperature: -55 °C</p> <p>Gravity: 3.7m/s<sup>2</sup></p> <p>Magnetic Field Strength: ~0.01 μT</p> <p>Galactic Cosmic Rays: ~0.01 /cm<sup>2</sup>/s</p> <p>Solar Proton Radiation: ~1 /cm<sup>2</sup>/s for energies up to 1 MeV</p> <p>Ultraviolet Intensity: ~0.02 W/cm<sup>2</sup></p> <p>Total Solar Intensity: ~0.001 W/cm<sup>2</sup></p> <p>Atmospheric Composition: 95% CO<sub>2</sub>, 2% N<sub>2</sub>, 1.9% Ar</p>	<p><b>EARTH AT 30km ALTITUDE</b></p>  <p>Pressure: 0.003-0.01 bar</p> <p>Average Temperature: -50 °C</p> <p>Gravity: 8.80m/s<sup>2</sup></p> <p>Magnetic Field Strength: ~0.01 μT</p> <p>Galactic Cosmic Rays: ~0.01 /cm<sup>2</sup>/s</p> <p>Solar Proton Radiation: ~1 /cm<sup>2</sup>/s for energies up to 1 MeV</p> <p>Ultraviolet Intensity: ~0.02 W/cm<sup>2</sup></p> <p>Total Solar Intensity: ~1.0 W/cm<sup>2</sup></p> <p>Atmospheric Composition: 78% N<sub>2</sub>, 21% O<sub>2</sub>, 1ppm O<sub>3</sub></p>



Dr Tucker talked about how science students can be encouraged to find new planets and how we can know about the atmosphere of the newly discovered planets. He gave the example of Mars and the way to learn about the density and composition of its atmosphere and that this could be done by our students. He also talked about shockwaves in exploding stars and gravitational waves.

Dr Tucker talked about how science students can be encouraged to find new planets and how we can know about the atmosphere of the newly discovered planets. He gave the example of Mars and the way to learn about the density and composition of its atmosphere and that this could be done by our students. He also talked about shockwaves in exploding stars and gravitational waves.

He then talked about moon as he said that the next step to go above the earth is to go to moon. He talked about returning to the moon and how Australia is planning to land on moon in near future. He also talked about the work that is being done in this sphere.

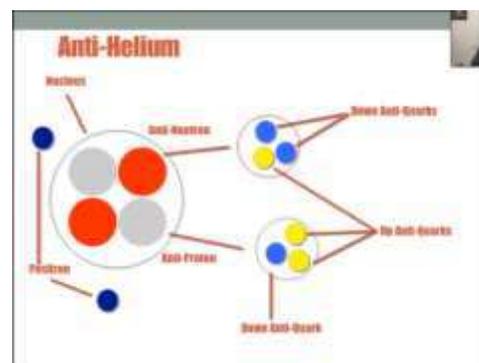
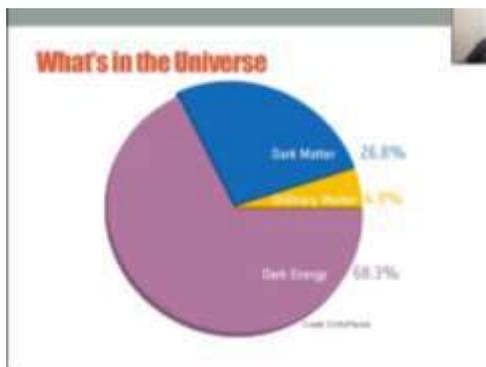


He also talked about water on the moon and the endless possibilities that there are or can be. He also talked about that how science is making it possible going to the moon cheaper than making a big budget movie. He also praised India for showing the world that how we can go to space without burning a hole in the pocket.

He also talked the possibilities of going to Mars, Martian lakes, giant volcanoes one of which is as big as 500 kilometers in diameter and 3.5 times bigger than the Mount Everest, and Marsquakes. He then talked about mining in space and space laws as to secure it from exploitation.



He also talked about the universe, its beginnings and time travel. He talked about space-time as well. He then drew the attention towards composition of Universe such as dark matter, ordinary matter, anti-matter and dark energy and how the ordinary matter, the matter we know about only occupies a meager 5% of the Universe.



The Masterclass concluded with a Q&A session. Dr. Tucker enthusiastically answered all the queries.

## **Conclusion**

The webinar was wonderful. It was one of the most enjoyable and interesting one and half hour I have experienced in past three months. I guarantee this Masterclass will surely enable the educators to look at physics in a different light and would help them in classroom teaching-learning process.

I am deeply thankful to AUSTRADE and CBSE for taking such a great initiative. I would also like to extend my gratitude to school management, school's principal. I hope to get more such opportunities in future.

Regards

**Rajeev Tripathi**

PGT Physics, Bal Bharati Public School, Neelbad