



# EYRE PENINSULA SPACE EXPLORERS

## TEACHER GUIDE



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# OVERVIEW

This Teacher Guide provides you with a range of resources to support your implementation of the **Eyre Peninsula Space Explorers** project.

It outlines the in-app **Challenge Course** designed for the project. In this Challenge Course students will learn about Australia's role in the space industry and the exciting and diverse career opportunities this field offers. Students will explore some of the problems scientists need to solve to enable space exploration to occur, including the ethical considerations this creates. Students will develop a greater understanding of how we use and benefit from space technologies on Earth. The final video focusses on the space industry on the Eyre Peninsula.

For each topic across the 6 videos, we have included a video transcript, further reading and an optional design challenge related to the content of each video.

As students progress through the Challenge Course, they respond to video content by participating in in-app quizzes and design tutorials related to the information shared. The Challenge Course concludes with a Design Thinking Challenge in which students are asked to design something that might help astronauts to work and live in space or use space technologies to design something that will help solve a problem on Earth.

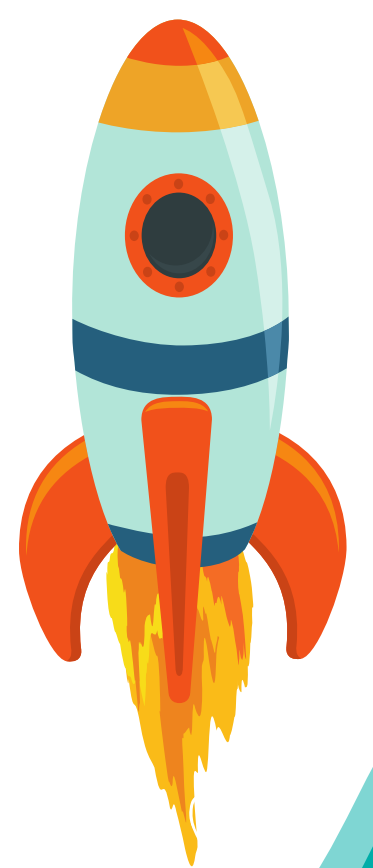
This Teacher Guide also includes:

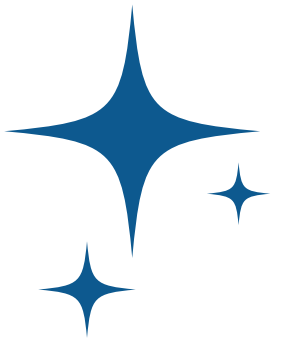
- **Glossary of Terms** used throughout the Challenge Course
- **Extension Activities** you may wish to explore with students
- **Additional Resources** you may find helpful.

Teacher Guide and videos can be accessed here:

<https://www.makersempire.com/eyre-peninsula-space-explorers-resources/>

If you have any queries regarding the support materials contact us any time at [info@makersempire.com](mailto:info@makersempire.com)





# GLOSSARY OF TERMS

## Look out for these terms in the Challenge Course

**Constellation:** a group of stars. These are often given names, sometimes based on the shape of the stars, such as the hunter, the emu or the Southern Cross.

**Hemisphere:** half of a planet (the Earth is divided in the Northern and Southern Hemispheres).

**Lunar soil (or regolith):** a fine dust covering the surface of the Moon.

**Orbit:** the path of an object around a point in space such as the planets orbiting the Sun or the Moon orbiting the Earth.

**Probes:** an unpiloted device (with no crew) which are sent to explore space or planets

**Rover:** a device that is designed to travel over the surface of a planet. It can be remote controlled, programmed or driven by a human and may be used to take readings, send photographs or collect samples.

**Solar system:** the Solar System consists of the Sun and everything that travels around it. This includes 8 planets, including Earth, along with objects like comets, meteors, moons and asteroids.

**Space:** the area beyond the Earth's atmosphere. Space begins approximately 100km above the Earth's surface.

**Space Junk:** human made items that are floating uncontrolled in space.

**Satellite:** an object that orbits a planet or star. It could be natural (like a moon) or made by humans (such as GPS satellites that are launched into space).

**Sustainable:** doing something in a way that means the resource you use can regenerate and not be completely used up.





# CHALLENGE COURSE OUTLINE

	COMPONENTS
1	Video #1 - History of Australia and Space
2	Quiz #1 - History of Australia and Space quiz
3	Pro-Training Design Tutorial #1 - Stylish Space Suit
4	Video #2 - Problem Solving in Space
5	Quiz #2 - Problem Solving in Space quiz
6	Pro-Training Design Tutorial #2 - Space Junk Collector
7	Video #3 - Ready to Launch
8	Quiz #3 - Ready to Launch quiz
9	Pro-Training Design Tutorial #3 - Spaceport
10	Video #4 - Australian Jobs and Careers
11	Quiz #4 - Australian Jobs and Careers quiz
12	Pro-Training Design Tutorial #4 - Cupola module
13	Video #5 - Beyond Earth
14	Quiz #5 - Beyond Earth quiz
15	Video #6 - Eyre Peninsula Space Explorers
16	Quiz #6 - Eyre Peninsula Space Explorers quiz
17	Design Thinking Challenge: Design something that could help astronauts work and live in space or use space technologies to design something that will help solve a problem here on Earth.





# HISTORY OF AUSTRALIA AND SPACE

## VIDEO TRANSCRIPT

For thousands of years the inhabitants of Australia have looked to the stars. People from many of the First Nations used stars and constellations to keep track of the seasons, understand the movement of animals or tell stories.

*'Aboriginal people in Australia used astronomy and space to be able to understand the cosmos and understand connections between sky and the land. The Uralarai and Kamilaroi people would use this emu in the sky to know the right time of year to go out and collect emu eggs in a sustainable way so that there could be more eggs for future generations.'*

Brenan Dew, Australian Space Discovery Centre

Their understanding of the locations of the stars also played an important part in being able to move around this vast land.

Some of the constellations identified by the First People of Australia have been combined together into the logo for Australia's new space agency.

Australia's location in the southern hemisphere, along with our wide open spaces and dark skies makes it an ideal place to explore space from a distance.

Radio telescopes like this one in Murchison, Western Australia probe the sky and are used for research into topics like black holes and dark matter.

During the moon landings in 1969 Australian sites played an important role in making sure the Apollo 11 crew could stay in touch with the earth. In fact most of the live footage of the first moon landing that was beamed around the world came from Australian radio telescopes!

*'America wasn't in line of sight of Neil and Buzz on the moon at the time because as the earth rotates, it gives us day and night. Australia then was privileged to not only receive those first images from the moon, but help broadcast them to the entire world. So if it wasn't for Australia and our space capabilities, uh, the world wouldn't have seen live images of the first footsteps on the moon.'*

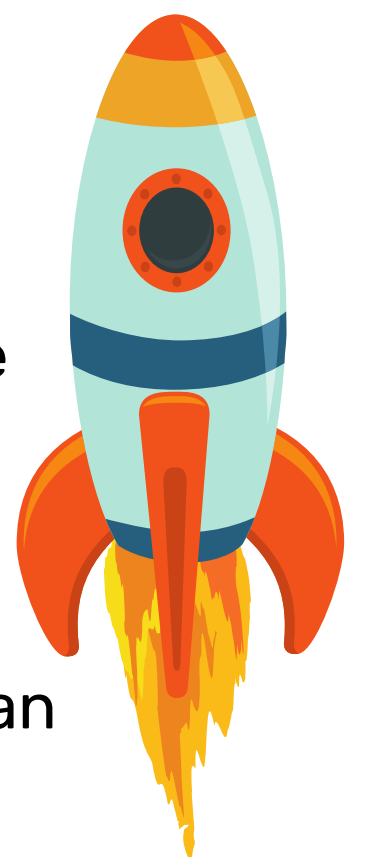
Nathan Wildy, Australian Space Discovery Centre

Australia played another important part in the history of space exploration when NASA's first Space Station Skylab fell to earth in Western Australia in 1979.

Thousands of fragments of Skylab rained down on the land and ocean, as people scrambled to find pieces of the space station.

Australians are not just looking up at the stars, some of us have even travelled to space. Several Australians including Andy Thomas have become astronauts. Thomas flew many space shuttle missions and also spent 130 days on the Russian Space Station, Mir.

Australia has a rich history in space, and with many more exciting things happening here, it's a great time to be interested in space exploration and experimentation.





# HISTORY OF AUSTRALIA AND SPACE

## DESIGN CHALLENGE

Dress your avatar and get it ready for space.

## FURTHER READING

[Future Adelaide Dark Sky at Night, Astronomer's Delight](#)

[Australia and the first Moon landing. | Department of Industry, Science and Resources](#)

[Identifying Seasonal Stars in Kurna Astronomical Traditions](#)

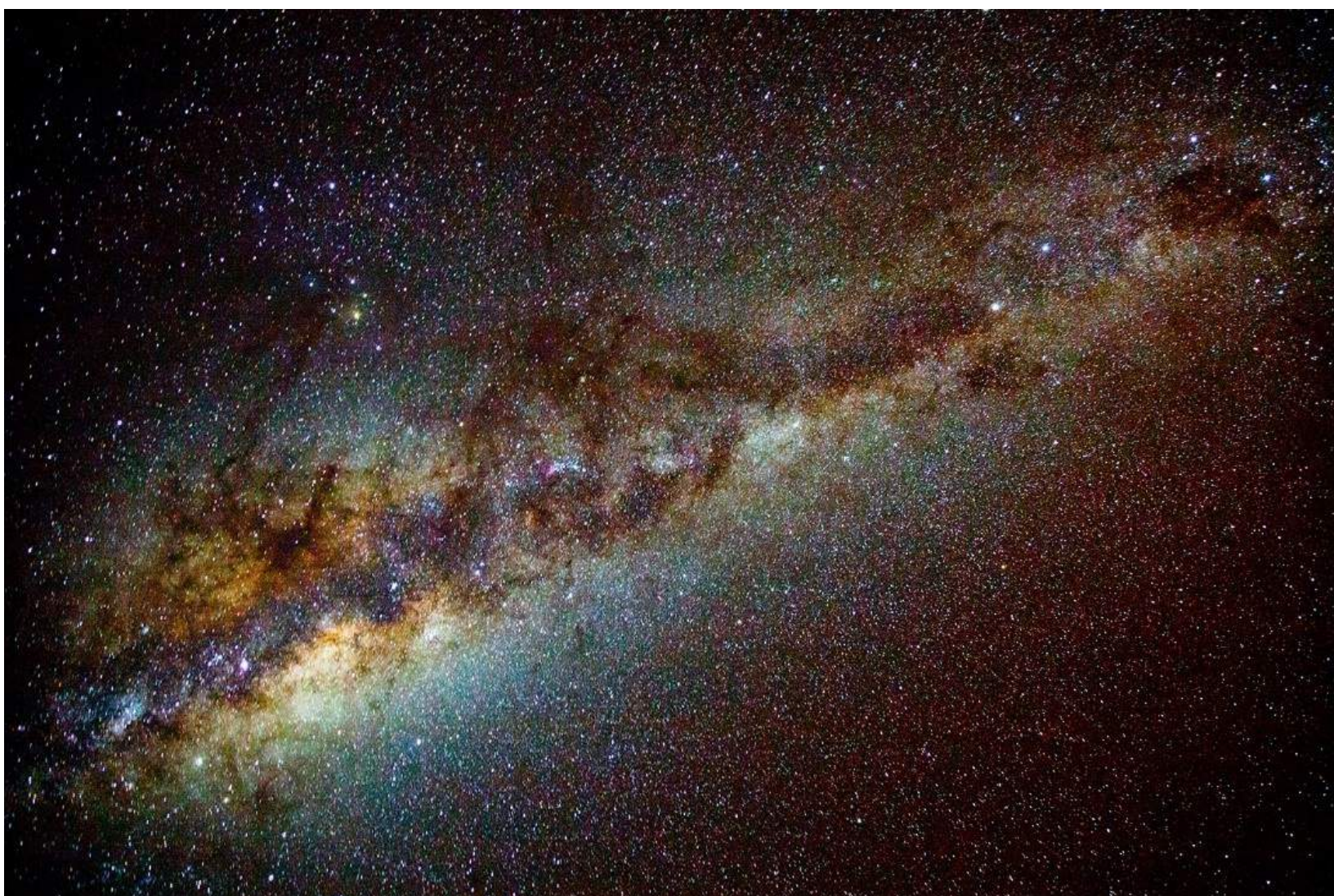
[Apollo 11 Moon landing - CSIRO](#)

[Skylab - Wikipedia](#)

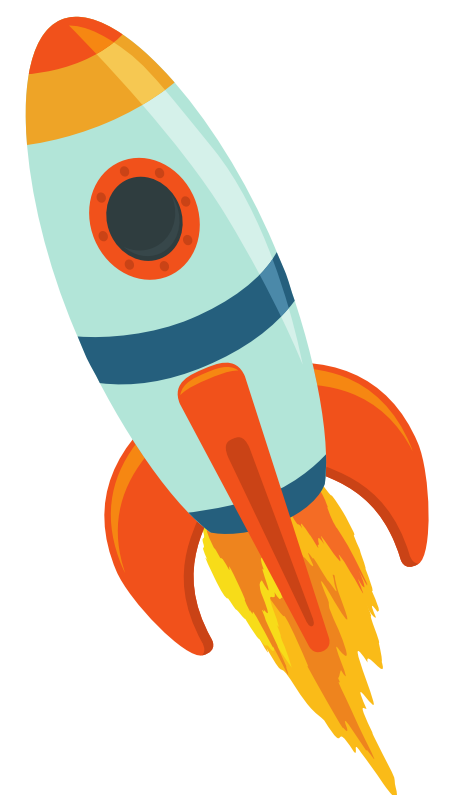
[Space debris fragment from Skylab space station - MAAS Collection](#)

[Murchison Radio-astronomy Observatory - CSIRO](#)

[Aboriginal Astronomy](#)



*Emu in the sky*



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# PROBLEM SOLVING IN SPACE

## VIDEO TRANSCRIPT

Working in space requires lots of clever thinking and problem solving.

One major problem that people need to deal with in space is space debris. This might be natural objects such as meteors, but there are also plenty of human made objects that contribute to the space junk problem. These objects include destroyed space craft, satellites that no longer have power and even tiny objects like paint flecks. A tiny fleck of paint might not sound that dangerous, but objects that are orbiting around the earth can reach speeds of up to 29,000 kilometres an hour!

*'There's a lot of things orbiting earth. About 27,000 objects larger than five centimetres cubed. And so it's quite dangerous if any of those collide with each other because that could create more pieces of debris and that could lead to more collisions that would make space really unusable in the future.'*

Tash Moy

If space debris came into contact with an object like the International Space Station it could put astronauts in danger. For that reason it's important to keep track of any space debris and if it's coming close to the space station the station can make small movements to avoid it. If there's real danger then the astronauts may even need to be moved to a ship so they can escape.

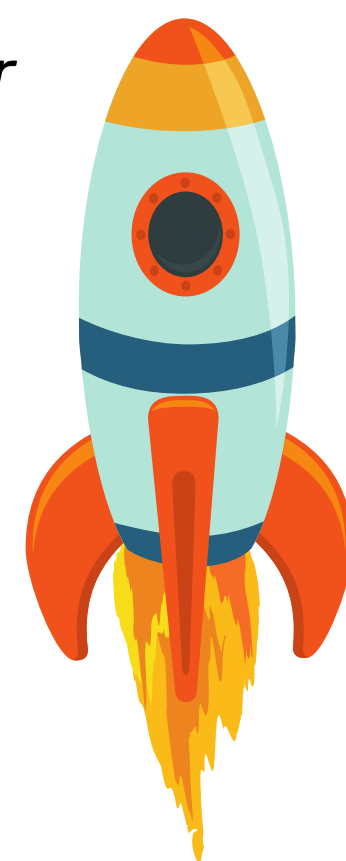
Some of the problems that need to be solved in space could also have an impact on earth. Plenty of the technology that we use today was developed as part of our space exploration missions. Items like camera phones, LEDs, CAT Scans and baby formula may not exist today if not for the research done into space travel.

Of course, we may also be able to solve major problems on earth using space technology. Research is continuing into technology that could be used to divert objects that will collide with the earth. The work involved in making other planets liveable may also help us combat the effects of climate change or build more sustainable structures on earth.

*'So, it's not all about how we interact with space, but also what space can do for us to make life better for everybody here on Earth.'*

Jelena Fabri- Space Archaeologist

While we may still be a long way off from everyday people being able to travel to other planets, there's no doubt that the work that goes into space travel and exploration also can help to make life on earth better for everyone.





# PROBLEM SOLVING IN SPACE

## DESIGN CHALLENGE

Design a spacecraft that can be used to protect the International Space Station from space debris, or design a spacecraft that could be used to collect space junk. Remember that space debris can be very dangerous so your spacecraft will have to be designed to survive any impact from fast moving objects.

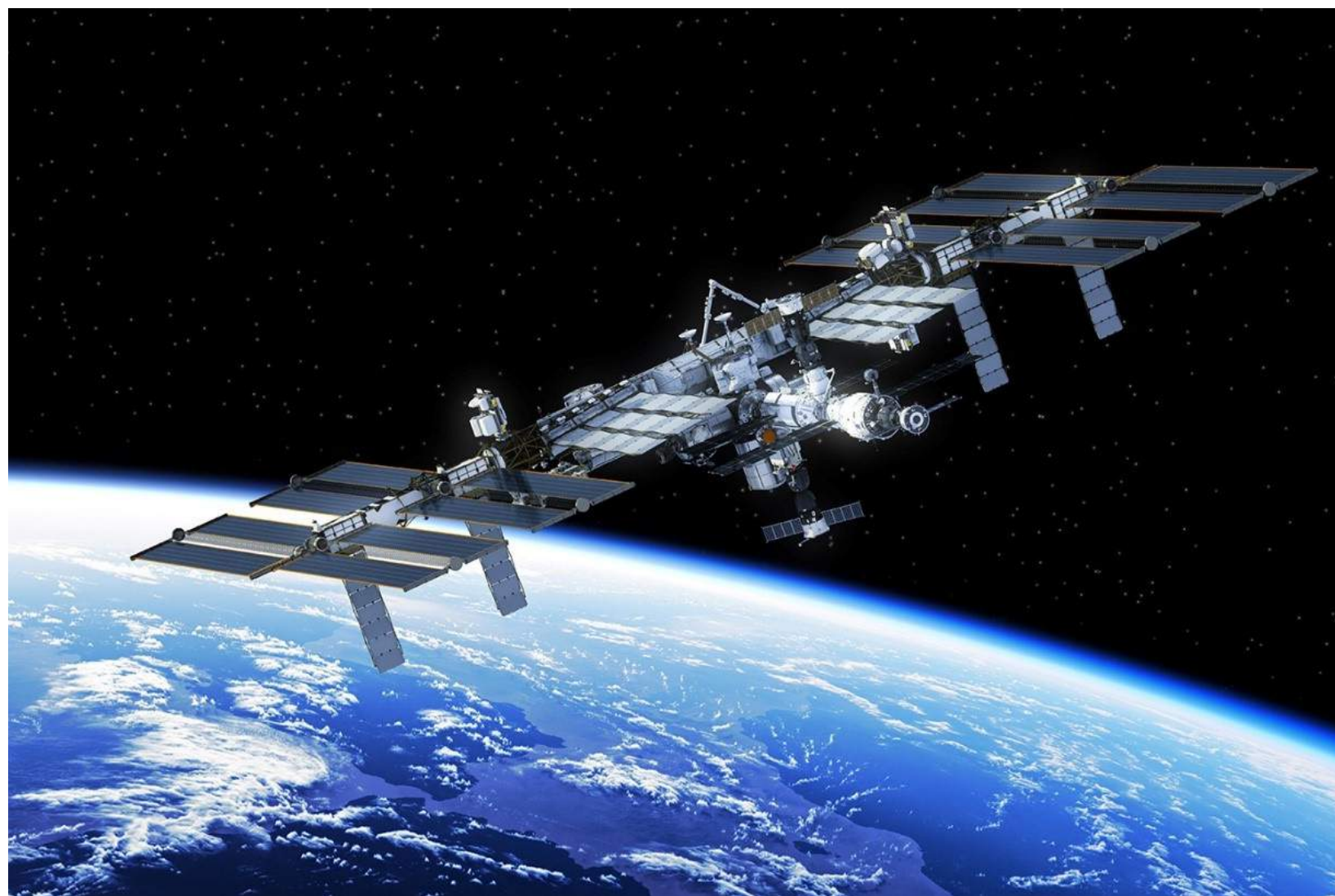
## FURTHER READING

[20 Inventions We Wouldn't Have Without Space Travel](#)

[Space race: Inventions we use every day were created for outer space](#)

[ESA - Space Debris](#)

[NASA successfully shifted an asteroid's orbit - DART spacecraft crashed into and moved Dimorphos](#)



*International Space Station*







# READY TO LAUNCH

## VIDEO TRANSCRIPT

Australia is home to lots of interesting technology that helps humans explore and understand space.

*'Australia has always been a really important player in the global space sector. At one point in time Australia had one of the busiest launch facilities for sending things up into space in the whole world.'*

Alice Fairey, Australian Space Discovery Centre

The Woomera test range in South Australia played an important part in the development of rocket technology and saw many rockets launched into space.

Australia is now home to several modern spaceports that are helping launch missions to space. Spaceports at locations like Whaler's Way, Arnhem Space Centre and Koonibba Test Range have been home to several successful rocket launches. These spaceports will play an important role in ensuring spaceflight becomes more widespread. Who knows, maybe one day flying to space will be just as easy for people as getting on a plane is now for us!

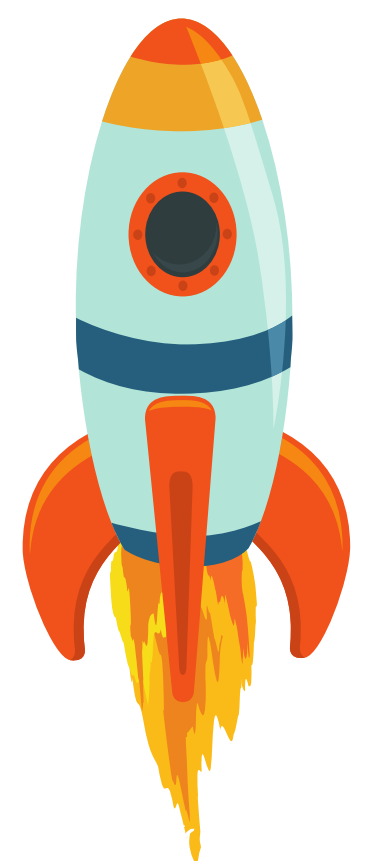
In July 2022 NASA launched three important missions from the Arnhem Space Centre. The launch of these Sounding Rockets could only be completed from Australia as they were exploring particular stars which can't be seen in the Northern Hemisphere. NASA received plenty of great data about the stars and considered these missions a great success.

Many Australians are working on space launches at these Australian spaceports. There are plenty of interesting and challenging jobs in this exciting field.

*'Teamwork is absolutely critical. Space is really big. So working with lots of people can actually help make space a bit more manageable.'*

Hannah Vine Hall

Whether it's designing and building space technology, researching space, launching rockets or providing support, there will be plenty of chances for smart, passionate Australians to help build the space industry.



# READY TO LAUNCH

## DESIGN CHALLENGE

Design a futuristic spaceport that will be located somewhere in Australia. For this challenge you should think about what space travel might be like in the future. What will launch craft look like? How will passengers visit the spaceport? And where will the spaceport be located? Annotate your design and explain some of your choices.

## FURTHER READING

[NASA- Australia Sounding Rocket Campaign Press Kit](#)

[NASA Rockets Launch from Australia to Seek Habitable Star Conditions](#)



*Rocket launch*





# AUSTRALIAN JOBS AND CAREERS

## VIDEO TRANSCRIPT

Australians are playing an important role in the space industry. We are designing, building, and launching rockets & satellites, and also monitoring these objects as they orbit the earth or travel great distances.

Australia was only the third country in the world, behind the US and USSR, to be able to build and launch a satellite into orbit from our own soil. This satellite was called the WRESAT and was launched in 1967. It was just the first of many satellites to be built and launched by Australia.

Today Australian satellites orbit the earth and send back vital information to help with scientific research and communication. These satellites are probably much smaller than you might think- several tiny Australian made Cube Satellites, or Cubesats, have been sent into orbit by teams in Australia.

It's also important to keep track of what is happening in space, and at the Responsive Space Operations Centre in Adelaide people are doing just that.

*'My name is Tash. I'm a Space Operator Intern at Saber Astronautics. I work in the Responsive Space Operation Centre, which is Australia's first publicly viewable mission control. So from the Responsive Space Operation centre, that's where satellite commands are sent to the satellite. And so we work monitoring the activities of other satellites and seeing if there's any likely conjunctions, making sure that satellites are staying away from each other really.'*

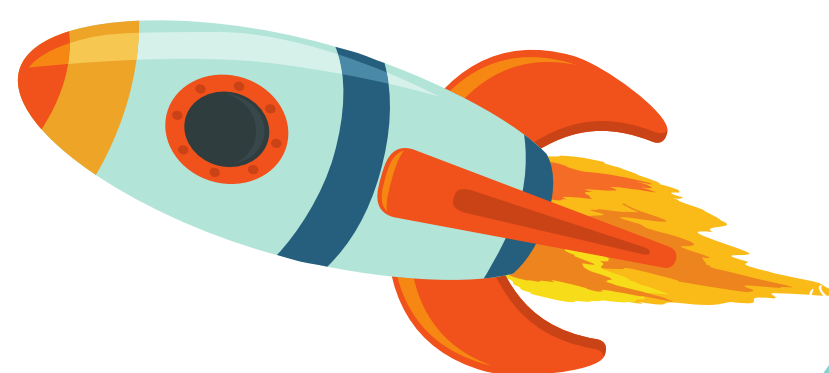
Tash Moy

It's estimated that there will be around 30,000 people working in the space industry in Australia in 2030, so it's an exciting time for anyone who wants to get involved in space. There will be lots of different jobs for people who are able to draw, model, solve problems, communicate, and most importantly, think creatively!

*'We need people with different skill sets, different backgrounds, different knowledge, and there's so much room and opportunity to grow as a person, as well as professionally in the space industry.'*

Nate Taylor, Australian Space Discovery Centre

Whatever your interest, there's probably a role for you in the space industry. There will be plenty of interesting jobs using skills like design, problem solving, and teamwork. It's a great chance to have plenty of fun and work on exciting new technology. And just maybe you'll be able to follow in the footsteps of people like Andy Thomas and make it into space!



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# AUSTRALIAN JOBS AND CAREERS

## DESIGN CHALLENGE

Work in a group to design modules for a space station. Use the Makers Empire Notes tool to annotate your design. [Notes Help article](#)

## FURTHER READING

[Australian Space Discovery Centre](#)

[ASDC\\_Pathways for a Career in Space](#)



*Space Operator*



*Cube satellite*



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## VIDEO TRANSCRIPT

Whether it's to find a new home for humans, or just to see what is out there, the next great challenge is to move people beyond Earth. It's now been over 40 years since humans last set foot on the moon, but now we begin to think about returning there, and then maybe even setting out even further.

Within the next few years Australian companies will work with NASA to build a Moon rover which will be used to collect soil from the Moon. It is hoped that oxygen will be able to be extracted from the lunar soil, meaning that humans could be one step closer to being able to live on the moon. Just imagine that! Of course, building a moon rover is challenging and takes lots of clever people working together to solve problems, test their designs and make sure things go to plan.

But why would humans want to live on the moon?

*'So, we've managed to actually grow plants in lunar regolith, or lunar dust, which is a huge step. But we are also thinking about how we can have it support the really long missions, like the ones going to Mars that are gonna be at least a three year return trip.'*

Jelena Fabri, Space Archaeologist

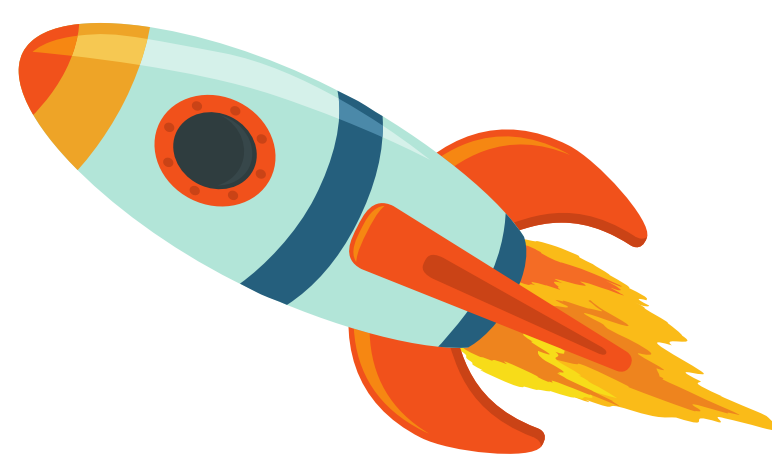
Many people believe that Mars will be the next planet that humans will be able to explore and maybe even live on. There could be many benefits to living beyond Earth, but it won't be easy. Planets that might be habitable could still have very difficult conditions such as harsh weather, difficult terrain or lack of oxygen. It will be important to know as much as possible about our new destinations before we arrive so we can be prepared to make a new home. This is where probes, telescopes and rovers help us to understand the planets and perhaps find new homes for humanity.

Of course, with this new technology, and ability to explore space, we also have to think about the benefits or negatives of travel.

*'Through doing this research and sending people out beyond Earth, we can sort of get better idea of just how small we are and how much we need to care for our world.'*

Hannah Vine Hall

As new opportunities become available, we will need to consider all of the consequences of space travel and solve many technical or ethical problems. That's where smart and enthusiastic people like you might come in, to ensure that our adventures in space are fair for all.



# BEYOND EARTH

## DESIGN CHALLENGE

Design a moon rover.

## FURTHER READING

[G'day Moon: Australia's boldest adventure yet](#)

[Research centre to grow space food expertise](#)

[The Moon's top layer alone has enough oxygen to sustain 8 billion people for 100,000 years](#)

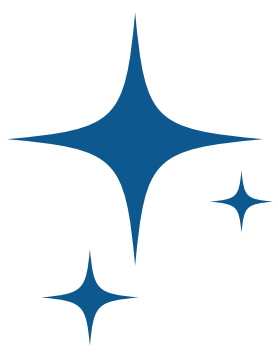


*Moon rover*



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# EYRE PENINSULA SPACE EXPLORERS

## WHAT DOES THE EYRE PENINSULA MEAN TO SPACE?

The Eyre Peninsula in South Australia is a great place to live, work and grow up. There are many interesting places to live and visit, ranging from beaches, national parks, bushland, towns, and cities.

Nearly 59,000 people live on the Eyre Peninsula. Most of these people live in the cities of Whyalla and Port Lincoln, or in smaller towns along the coast. But you'll find people living in other areas too. It's a big peninsula! 170,000 square kilometres in fact. That's around two and a half times bigger than Tasmania!

There are some important industries that help the Eyre Peninsula thrive - Agriculture, Fishing, Mining and Tourism. And now the Eyre Peninsula is taking its place in the Space Industry too.

The Eyre Peninsula boasts many important qualities that make it an ideal place to help grow Australia's space capabilities. There are many wide-open spaces that are ideal locations for launch sites. The Eyre Peninsula's southern location is very important too.

*'So the Eyre Peninsula has a lot of advantages when it comes to creating a spaceport out of there, and a lot of those advantages come from its geographic location. So with the Eyre Peninsula, we launch our rockets out into the Great Australian Bight. So what that means is we minimise the risk and the impact of our rocket vehicles landing on inhabited land. So no one lives on the ocean so we minimise the risk by launching our rockets out into the wide open. Now, another reason why the Eyre Peninsula is so beneficial as well is because of the range of orbits it allows us to access with our launch vehicles. Because we are so far south, we can access high inclination orbits so basically what that means is we can send satellites up into orbit that go around the poles of the earth. And this is very strategic for a wide range of applications. So think of climate monitoring satellites. These are typically satellites that are relatively close to the ground so they can get high resolution images. The Eyre Peninsula allows us access to that market.'*

Nathan Drummond, Launch Engineer, Southern Launch

The most important asset that the Eyre Peninsula has is its people. People living and working on the Eyre Peninsula have many diverse skills. They are passionate about the industries they work in and are used to using innovative ideas and creative thinking to solve problems.

*'One of the big key factors that the Eyre Peninsula will bring to the space industry in Australia is the different mindsets and perspectives of coming from a regional area. I myself grew up in a small country town and I know the value and benefits that country thinking can bring to big industry. So if we're operating in a space industry from the Eyre Peninsula, it's incredibly exciting to see how local people and young people like yourselves can have an impact on the future of space exploration.'*

Amy Featherston, Media & Communications Manager, Southern Launch



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# EYRE PENINSULA SPACE EXPLORERS

## EYRE PENINSULA PEOPLE

They care about the environment and the future of their communities. Many young people develop these skills and important values at an early age by living and working on farms, small towns, or coastal areas, and through the subjects they study at school, for example, Ag Studies.

First Nations peoples have lived sustainably on the Eyre Peninsula for many thousands of years and have important traditional knowledge and wisdom about the land and sustainable practices. Eyre Peninsula's people, including First Nations people, hold skills, deep local knowledge, and experience that help reduce issues, solve problems, and push towards sustainable practices in their communities and local environments.

## WHAT DOES SPACE MEAN TO THE EYRE PENINSULA?

The space industry opens up new opportunities to solve problems impacting the everyday lives and livelihoods of Eyre Peninsula's people. I bet you've seen or used space technology already today! Perhaps you noticed someone buying a coffee using their phones today. This is made possible through space technologies. Nathan what else impacts our everyday lives?

*'So think of this as an example. When was the last time you jumped in your car or jumped in a car and drove to someplace new that you'd never been before without GPS. To me, that's unheard of. I always rely on the GPS, and the only reason that is possible is because of the space technologies out there, the satellites that enable us to have GPS navigation.'*

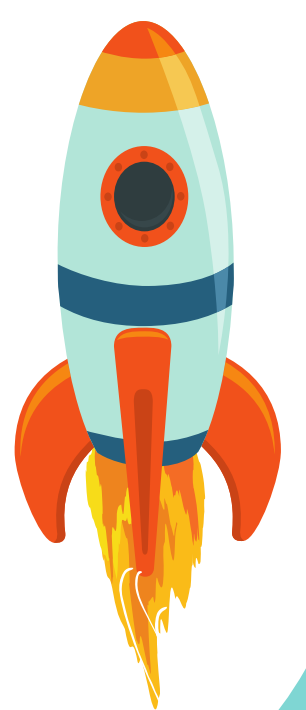
Nathan Drummond, Launch Engineer, Southern Launch)

Not only does space makes our lives easier, but it can help solve problems in Eyre Peninsula's key industries of agriculture, fishing, and mining. Satellite technologies can help track and monitor crops, weather, and livestock. They can help people find innovative, efficient, and sustainable ways to keep their industries growing and generate income. The space industry will also bring new jobs to the Eyre Peninsula. Southern Launch is a great example of a space company employing local people. But what do they actually do?

*'Southern Launch is a bespoke launch service provider, so that means we are kind of like an airport. So different rocket companies will come to us to launch their rockets into space, from either our Whaler's Way Orbital Launch Facility or the Koonibba Test Range over near Ceduna.'*

Amy Featherston, Media & Communications Manager, Southern Launch

The space industry will also attract more tourists to the area and boost the tourism industry. Space technologies can help with issues faced by Eyre Peninsula communities such as droughts, bushfires and other natural disasters. Together with local skills, traditional knowledge and innovative thinking, space technologies can help predict natural disasters, minimise the risks and aid the recovery of communities impacted by these disasters.







# EYRE PENINSULA SPACE EXPLORERS

## WHAT DOES SPACE MEAN TO ME ON THE EYRE PENINSULA?

It is an exciting time to be a young person living and learning on the Eyre Peninsula. There are going to be many job and career opportunities that come with the space industry but we need local people doing these jobs.

No matter what you are interested in, there's bound to be a role for you in the space industry. We've all heard about becoming an Astronaut and an engineer, but there are so many other jobs needed for space.

*'There's law, media, marketing. So I think even if you're not an engineer or STEM inclined, there are still lots of opportunities to work in space.'*

Christopher Norton, Aerostructural Engineer Southern Launch

Wow, lots of opportunities to explore! Lets see how our friend, Amy, found her place in space.

*'Can I tell you guys a secret? I'm not actually that interested in space, or I wasn't until I got this job. Space has always been there. You always look up into the stars, but it was never a driving passion of mine growing up. But then suddenly I realised the opportunities that are available in South Australia and it ignited a passion in me, that I've now gone on to discover so many wonderful things about the space industry. So yeah, don't tell anyone, but I didn't really love space when I got the job. So it's my role at Southern Launch to tell the stories about what we do. So I work with the media. I do a lot of social media. So yes, social media is a job!'*

Amy Featherston, Media & Communications Manager, Southern Launch

In the past, Australians had to move to America or Europe if they wanted a career in the space industry. Now, you can study, train and work for space industry roles right here in South Australia. You could even end up working in a space-related job somewhere on the Eyre Peninsula. It's a great time to be learning more about the space industry and thinking about your place in space.



*Nathan Drummond  
Launch Engineer  
Southern Launch*



*Amy Featherston  
Media & Communications Manager  
Sothern Launch*



*Christopher Norton  
Aerostructural Engineer  
Southern Launch*



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# EYRE PENINSULA SPACE EXPLORERS

## DESIGN CHALLENGE

Humans use and benefit from space technologies on Earth in areas such as farming, climate change and wildlife conservation. Design something that uses space technologies to benefits people, flora or fauna.

## FURTHER READING

[Why Space Matters by the Australian Space Discovery Centre](#)

<https://www.southernlaunch.space/>

[https://www.youtube.com/results?search\\_query=southern+launch](https://www.youtube.com/results?search_query=southern+launch)

[Soth Australian Space Industry Centre](#)

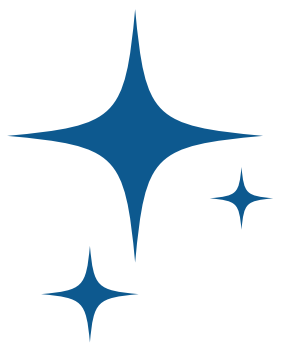


*Eyre Peninsula's spaceports*



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# EXTENSION ACTIVITIES

## AUSTRALIANS IN THE SPACE INDUSTRY

[Interview supercut video link](#)

Watch the Interview supercut video featuring some Australians who work in the space industry. They are:

**Alice Fairey:** Science communicator at the Australian Space Discovery Centre

**Tash Moy:** Space Operator Intern at Saber Astronautics

**Hannah Vine Hall:** Mechatronics Engineer and Mathematician

**Jelena Fabri:** Space Archaeologist

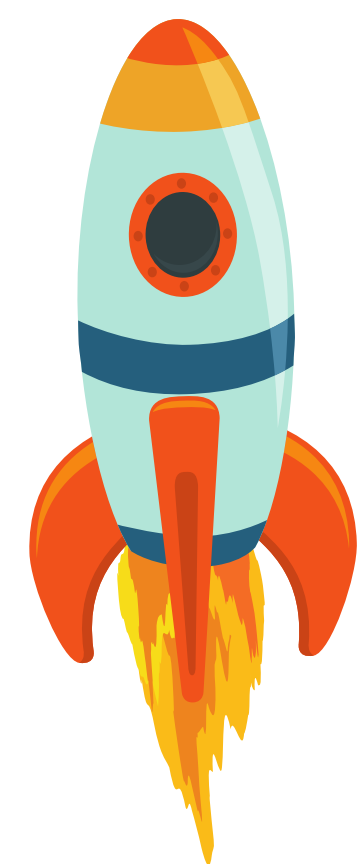
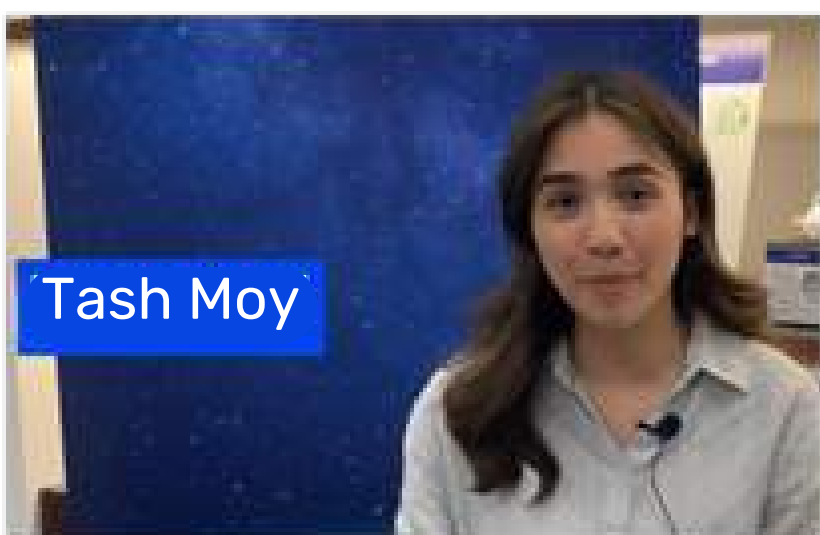
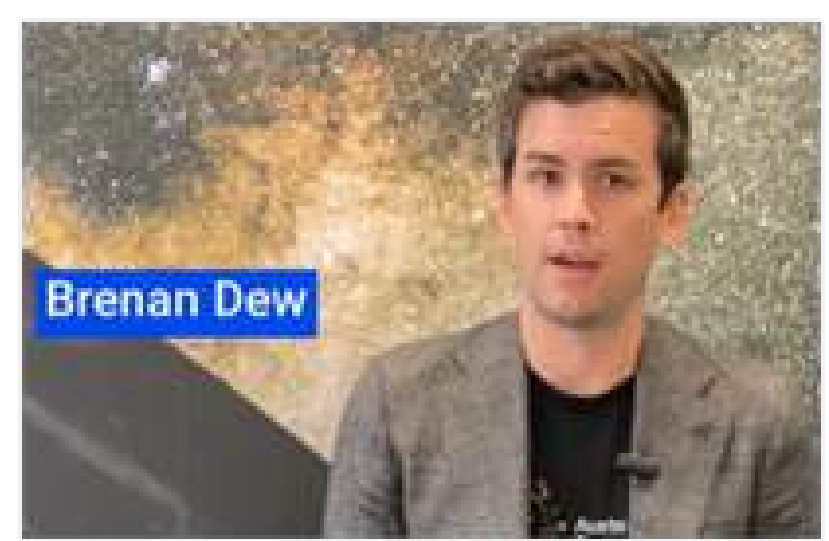
**Nathan Wildy:** Space Communicator at the Australian Space Discovery Centre

**Nate Taylor:** Senior Programs and Operations Officer at the Australian Space Discovery Centre

**Brenan Dew:** Manager of the Australian Space Discovery Centre

Discuss the following questions with your students:

- What are some of the jobs that people can do in the space industry?
- What are some of the skills needed to be successful?
- What is happening in Australia's space industry?
- What does the future hold for space travel and Australians working on space?



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# EXTENSION ACTIVITIES

## BOTTLE ROCKETS

While launching jet fuelled rockets can be a dangerous business, there is a safer way to explore rocket flight.

Bottle rockets like this one are a relatively safe and exciting way to explore some of the design thinking that goes into space flight. These kits turn plastic drink bottles into rockets that can fly up to 30 metres in the air.

### Design Process

Start by launching some rockets and observing how they fly. This might include using different types of bottles, filming the results and analysing what happens during flight.

Now consider how traditional rockets are shaped and discuss the features, such as the pointed nose cone, the fins on the side etc. Discuss with students what the purpose of the items might be.

Take some measurements on the plastic bottle and start to design some improvements to your bottle rocket. You might use cardboard first just to rapidly design and test, then move to 3D printed objects designed with the Makers Empire app to create add-ons for your rocket. Attach these with superglue.

For every test make sure your students are observing different elements such as:

Launch angle: Did the rocket fly straight up or go on an angle?

Height achieved: Estimates are fine

Stability: Does the rocket wobble or stay steady?

Velocity: Does the rocket seem to be going faster or slower with your changes?

### Safety Tips

Ensure that you follow the safety instructions on the rocket kit. Work in a clear area such as a school oval and make sure you set up an exclusion zone around the launch area. It's a good chance to talk about real life rocket launches and how they can be done safely and with minimised impact on people, animals and the environment.



*Bottle rockets*





# EXTENSION ACTIVITIES

## BUILD A MARTIAN TOWNSHIP

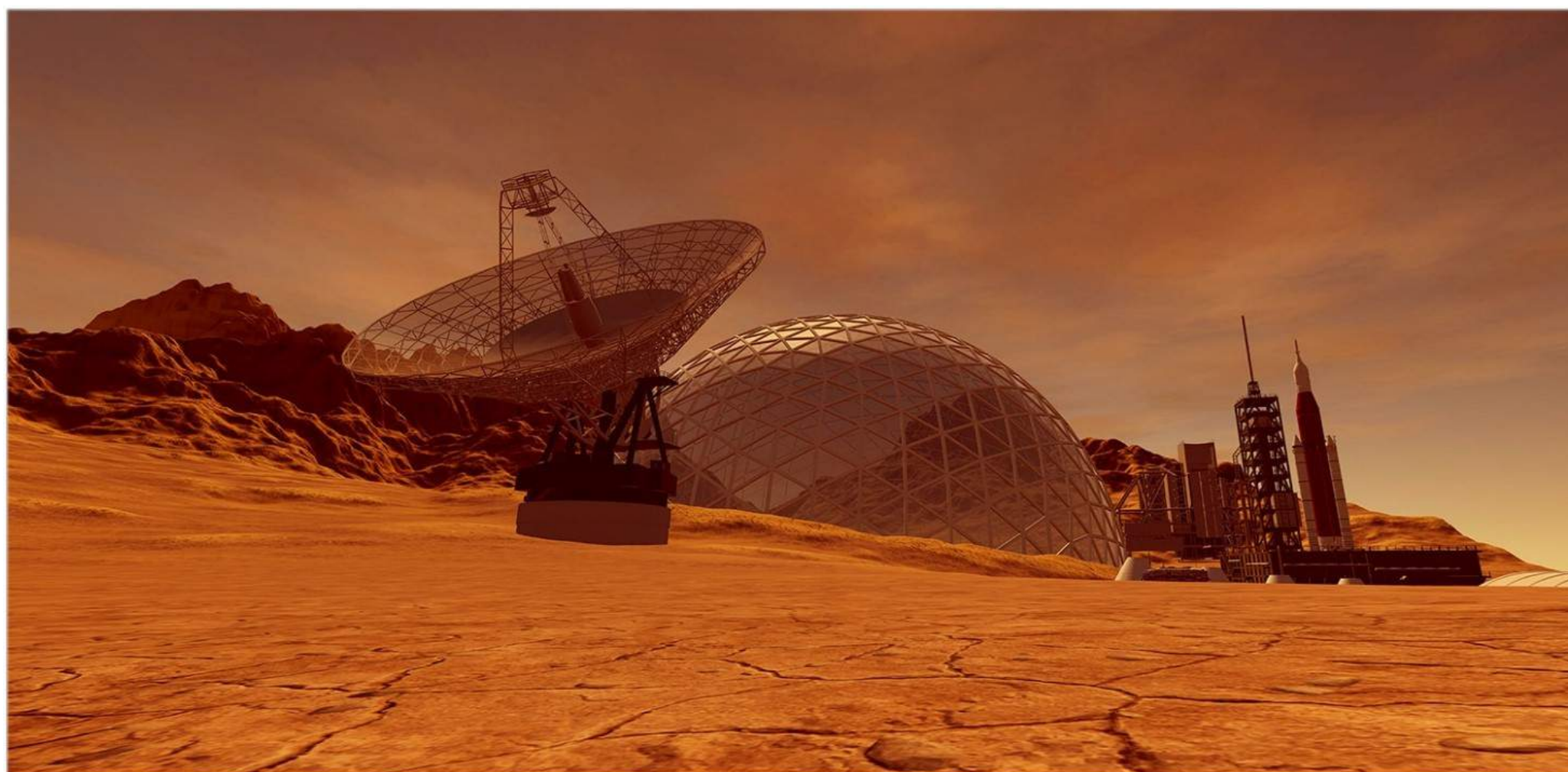
If Mars is to become the next home for humanity, then someone will need to build that home for people to inhabit. In this challenge have the entire class work together to individually design elements of the first new township on Mars.

Students can start by discussing what is needed in a township. Facilities like hospitals, personal quarters, and food supply areas will be critical, but what about libraries, exercise facilities and theatres? It's a good chance to discuss what is needed to not just make a place to live, but to make a proper home.

Students can now use these discussions to negotiate what is to be built and to each build a tile with a building on it. Place the tiles together to create your own Mars township. (Establish the size of these tiles with students beforehand to make sure the final product is manageable).

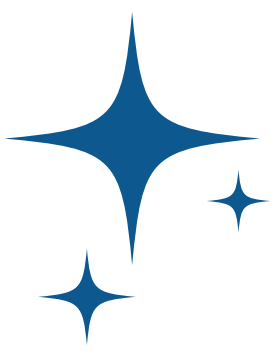
Also consider the harsh environment on Mars to make sure buildings are designed to survive. Maybe even do some research into the best place to start a new township on Mars.

Students could take this further by creating a map of the town with explanations for each building, or using an AR app to record a video about the building they designed.



*Martian township*





# ADDITIONAL RESOURCES

Andy Thomas Space Foundation  
<https://andythomas.foundation/>

Australian Space Agency  
<https://www.industry.gov.au/australian-space-agency>

Australian Space Discovery Centre  
<https://www.industry.gov.au/australian-space-discovery-centre>

Australian Space Discovery Centre (Pathways for a career in space)  
<https://www.industry.gov.au/australian-space-discovery-centre/pathways-career-space>

Jarli video: Royal Australian Air Force  
<https://youtu.be/YoijfjK-J8>

Australia in Space Magazine  
[https://issuu.com/apsm/docs/australia\\_in\\_space\\_magazine\\_issue\\_4\\_digital](https://issuu.com/apsm/docs/australia_in_space_magazine_issue_4_digital)

ABC Education: Space Resources  
<https://www.abc.net.au/education/topic-space-and-our-solar-system/13651184>

Scoutle Earth and Space Resources  
<https://www.scoutle.edu.au/ec/search;jsessionid=1450E5A8133D9519629DF735414693F3?q=%22Earth+and+space%22>

NASA K-12 STEM Resources  
<https://www.nasa.gov/stem/foreducators/k-12/index.html>

NASA JPL eyes  
<https://eyes.nasa.gov/apps/orrery/#/home>

NASA Live Stream from ISS  
<https://www.youtube.com/watch?v=86YLF0og4GM>

Gateway to Astronaut Photography  
<https://eol.jsc.nasa.gov/>

Australian Space Weather Forecasting Centre (BOM)  
<https://www.sws.bom.gov.au/>

BBC Bitesize Learner Guides  
<https://www.bbc.co.uk/bitesize/topics/zkbbkqt>

International Space Station Explorers  
<https://www.issnationallab.org/stem/>

International Space Station Education Kit (UK)  
<https://www.stem.org.uk/resources/elibrary/resource/25900/international-space-station-iss-education-kit-primary>

European Space Agency Education Resources  
<https://www.esa.int/kids/en/teachers>

National Geographic Kids: Space Resources  
[https://www.natgeokids.com/au/?s=space&post\\_type=primary-resource](https://www.natgeokids.com/au/?s=space&post_type=primary-resource)

UN Sustainable Development Goals: Student Resources  
<https://www.un.org/sustainabledevelopment/student-resources/>

UN Sustainable Development Goals Action Kit  
[http://cdn.worldslargestlesson.globalgoals.org/2018/09/SDG-Action-Kit\\_Final.pdf](http://cdn.worldslargestlesson.globalgoals.org/2018/09/SDG-Action-Kit_Final.pdf)

