NEW ZEALAND SPACE AGENCY

Patch to the Future - Kids Space Design Competition (Years 1–8)

Background Resources: Mission Patches, Space, and New Zealand in Space

What is a mission patch?

A mission patch is a fabric badge designed for a space mission team to represent their mission. It usually includes pictures, colours, and symbols that show what the mission is about, such as a rocket, Earth, the Moon, a planet, or a meaningful design. Each part of the patch is chosen carefully to tell the mission's story and goals.

Astronauts wear mission patches on their flight suits or keep them as special keepsakes. The patches help people remember the teamwork, challenges, and achievements of the mission, and they are an important part of space history and tradition.

Below you can see all the patches that the Artemis II mission crew has:

Source: Reuters, Lexi Parra

What is Artemis II?

Artemis II was a crewed space mission that took place earlier in April this year. Astronauts travelled in the Orion spacecraft around the Moon and back to Earth. The mission helped scientists and engineers test important systems, such as life support, communication, and navigation, while astronauts were on board. Artemis II was a major step forward in returning people to the Moon.

What is space?

Space is the vast area beyond Earth's sky where stars, planets, and galaxies exist. It is where the Moon orbits the Earth and where rockets and spacecraft travel to explore and learn new things.

In space we find:

The Moon

The Moon is a large, rocky object that orbits the Earth in space. We can see it at night because it reflects light from the Sun, not because it creates its own light. The Moon is Earth's only natural satellite. It is very far away, about 384,000 kilometres from Earth, which is like stacking Earth side-by-side about 30 times!

Stars

Stars are enormous, glowing balls of hot gas located far away in space. They may look like tiny, sparkling dots in the night sky, but that is only because they are so far from Earth. Our Sun is actually a star too; it appears much bigger and brighter because it is much closer to us. Groups of stars form patterns called constellations, which people have used for thousands of years to tell stories, track time, and help navigate across land and sea.

The planets

Planets are large, nearly round bodies that travel in paths called orbits around a star due to the force of gravity. In our solar system, all eight planets orbit the Sun, but each planet takes a different amount of time to complete one full orbit, which is known as a year. The planets can be grouped into different types: rocky planets like Earth and Mars have solid surfaces, while gas giants such as Jupiter and Saturn are made of gases and do not have solid ground. Planets do not produce their own light; instead, we see them because they reflect sunlight, which is why they shine in the night sky.

Satellites

A satellite is anything that orbits a planet or a star. For example, Earth is a satellite because it orbits the Sun, and the Moon is a satellite because it orbits Earth.
When you launch a spacecraft into orbit around Earth, that is also a satellite. These satellites play an important role in everyday life.

Satellites help us learn about...

Our planet

People use space to learn more about Earth and how it works as a whole system. Satellites orbiting Earth allow scientists to observe the oceans, land, ice, and forests at the same time, giving a global view that isn't possible from the ground. By collecting images and data over long periods, satellites help scientists understand how Earth changes over time

Weather

People use space to learn more about Earth's weather. Satellites high above the planet observe clouds, winds, temperatures, and storms as they move around the globe. This information helps scientists understand what the weather is doing right now and predict what might happen next, such as heatwaves, heavy rain, or cyclones. Studying the weather from space helps people prepare for extreme conditions, plan daily activities, and stay safe during dangerous weather events.

Satellites also help us with...

Communication

People use space to help us communicate with one another. Satellites orbiting high above Earth transmit signals that carry phone calls, text messages, internet data, and television broadcasts across long distances. When you make a video call, send a message, or watch a programme from another country, satellites help move that information around the world at incredible speeds. Space-based communication allows people to stay connected globally, even when they are thousands of kilometres apart.

Navigation

People use space to help with navigation, which means knowing where you are and how to get where you want to go. Groups of satellites orbiting Earth work together as part of systems like GPS to calculate the exact location of phones, cars, planes, and ships. This technology helps people use digital maps, find directions, and travel safely.

But what does space mean to New Zealand...

New Zealand and space

The New Zealand Space Agency:

- Supports space science and technology
- The Agency makes sure space activities from New Zealand follow national laws and international rules, helping manage things like satellite launches, orbits, and space debris.
- The Agency promotes space activities that are safe, sustainable, and peaceful, so space can be used responsibly now and in the future without harming people, Earth, or the space environment.

New Zealand has a growing space sector:

- Rocket Lab had 17 successful rocket launches from New Zealand in 2025, launching rockets from the Mahia Peninsula on the east coast of the North Island.
- In June 2025, the University of Auckland launched New Zealand's first satellite, called TPA-1.
    - TPA-1 is a 3U CubeSat, which means it measures 10 × 10 × 34 cm. Even though it is very small, it is still powerful and capable of doing important work in space.

- Space Operations New Zealand Ltd (SpaceOps) was one of many volunteer organisations worldwide that helped track NASA's Artemis II as it travelled around the Moon.

What jobs could you have in space:

Scientists

Scientists use space to learn more about how the universe and our planet work. They study planets, stars, and Earth from a distance using satellites, space telescopes, and spacecraft. These tools allow them to collect information that can't be seen from the ground.

Engineers

Engineers work with space by designing, building, and testing rockets, satellites, and spacecraft. They use maths, science, technology, and creativity to solve complex problems and make sure space equipment is safe, reliable, and works as planned. Engineers play a key role in sending astronauts into space, keeping satellites operating correctly, and developing new technologies.

Software developers

Software developers work with space by controlling and managing space technology using computer programs. They write computer programmes that tells satellites, and spacecraft what to do and when to do it. Their work helps send messages, collect images and data from space, and monitor systems to make sure everything is working correctly.

Designers

Designers work with space by planning how things look and how they are used, such as spacecraft screens, space suits, and mission patches. They focus on making space tools clear, easy to understand, and safe to use, especially in challenging environments like space. Designers combine creativity, problem-solving, and careful thinking to support astronauts and space missions.

And many more...

- Psychologists help astronauts manage stress, teamwork, and mental health during long missions.
- Journalists explain space missions and discoveries so the public can understand why space science matters.
- Doctors study how space affects the human body and help astronauts stay healthy.
- Policy advisers help governments create rules about how space should be used responsibly. That's what we do at the New Zealand Space Agency!
- Financial planners help space agencies and companies' budget for expensive space missions.
- Lawyers work on space laws, such as who owns satellites and how countries work together in space.

There is no single 'space job' - it's a team effort.