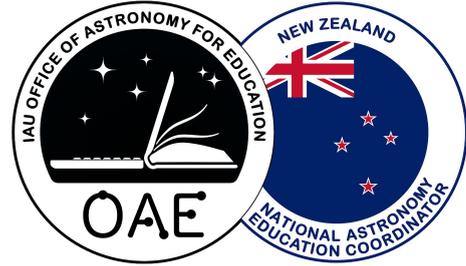


Astronomy Education in New Zealand



This overview is part of the project "Astronomy Education Worldwide" of the International Astronomical Union's Office of Astronomy for Education.

More information: <https://astro4edu.org/worldwide>

Structure of education: Schooling is compulsory from age 6–16 and consists of early childhood education (age 3–5), primary (age 5–12, year 1–8) – this includes intermediate for larger urban areas (year 7–8), and secondary education (age 13–18) from 5 to 19 years of age, and tertiary and vocational training. The education system has 13 Year levels¹, instruction is primarily in English followed by Māori. New Zealand State Schools are secular, and teach the national curriculum. State integrated schools teach specific philosophies or religion values and parents pay some fees. Private schools get some government funding and develop their own learning programmes. In Māori education schools students are taught all or some curriculum subjects in Te Reo² for at least 51% of the time. Remote students can also learn through New Zealand's correspondence school³.

One of NZ's challenges is to reverse the widening gap between the highest and lowest performing students, especially at secondary level. To NZ's discredit, Māori and Pacific students are over-represented in the lower performing educational statistics.

Education facilities: School facilities are good and are generally well maintained in State Schools by government funding⁴. They have running water and enough toilets. Primary schools have enough classrooms, libraries, and playgrounds plus specialist classrooms such as technology or music rooms when needed. Secondary schools have general and specialist classrooms and learning areas reflecting the wide range of subjects that are taught. Most schools have good internet access and are equipped with digital devices. State schools have adequate operating grants which fund the resources needed to run the schools' programs. The average ratio is 17 students per teaching staff in primary schools and 13 students per teaching staff in lower secondary school. Class sizes can reach up to 35 at times but in specialised rooms such as technology – based workshops the class sizes are lower⁵.

Governance and organisation: The Ministry of Education and expert panels made up of teachers and subject experts set the National Curriculum⁶ which is not prescriptive, and gets revised and updated every 12 years. Primary education focuses on foundation learning across a range of subjects and competencies but especially in literacy and numeracy. Secondary school education has a broad and balanced curriculum, with some specialisation possible in Years 11–13. English language schools use the New Zealand Curriculum. Māori language schools use Te Marautanga o Aotearoa (a curriculum based on Māori philosophies). The National Certificate of Educational Achievement (NCEA) is the national senior secondary school qualification; assessments are taken during the last 3 years at school (Years 11–13) on 3 levels in a wide range of courses and subjects.

Teacher Training: Teachers generally do an undergraduate degree followed by a Graduate Diploma of Teaching, Postgraduate Diploma in Teaching or Learning or a Master of Teaching and Learning. To become a secondary school teacher the undergraduate degree needs to be a specialist subject one. Colleges of Education are usually part of Universities.

Astronomy in the curriculum: Astronomy (and Planetary Science) appears at every one of the eight levels of both the New Zealand Curriculum (NZC) in the Science Learning Area and Te Marautanga o Aotearoa, in Pūtaiao (Science). Te Marautanga o Aotearoa only is only taught at Primary and Junior Secondary level after which students take subjects based on the NZC so they can be assessed by NCEA. Astronomy is part of the Planet Earth and Beyond (PEB) curriculum strand of Science from Levels 1–8, and at Level 8 Physics, and can be taught at all ages. 15–18 year old students are taught and assessed substantial Astronomy topics as part of a subject called Earth and Space Science, a new Science subject formed in 2012 at the request of the Ministry of Education. Primary school students are taught varying amounts of Astronomy and Planetary Science, depending on the enthusiasm and knowledge of individual teachers and the school.

Astronomy educators may come into schools if asked, and run short modules of work. At secondary level Chemistry, Biology and Physics are the preferred sciences so not all schools offer Astronomy courses at each year level. Astronomy, Astrobiology, Astrophysics and Cosmology are offered at University as undergraduate and postgraduate programmes or courses⁷.

Astronomy education outside the classroom: 3 major astronomy centres with digital planetaria educate outside of the classroom. In addition, University of Canterbury Mount John Observatory, 1 analog planetarium and 9 portable (6 delivering NZ curriculum science and 3 delivering Te Marautanga O Aotearoa education) and one fully functional open-air astronomical observatory, Stonehenge Aotearoa, also offer educational opportunities. Pacific Navigation star compasses are being erected throughout the country. An online learning system is being developed through NewZealand.Slooh.com.

The 100+ years old Royal Astronomical Society of New Zealand (RASNZ) has an education group. 26 Astronomical Societies and local organisations such as Scouts run education events and viewing nights. A NZ team attended the International Olympiad for Astronomy and Astrophysics in Greece in 2015 but there is no structure in NZ to support an Olympiad selection currently. Various teacher workshops have been held at conferences on topics such as teaching Astrobiology, plus a talk on Astronomy education was presented at the RASNZ conference in 2019.

An important part of the Māori lunar calendar is Matariki. Matariki (the Māori name for Pleiades) reappears on the horizon in June, and this event, combined with the first crescent moon after Matariki reappears, signals the start of the Maori New Year. Matariki is celebrated nation-wide, and is a huge opportunity for students to learn about the phases of the Moon, the passage of constellations and the Māori lunar calendar.

¹ Ministry of Education NZ, 2019. How does New Zealand's education system compare?

(https://www.educationcounts.govt.nz/_data/assets/pdf_file/0011/195860/EAG-2019-NZ-Summary-Report.pdf)

² Te Reo is the name for the Māori language

³ Te Aho o Te Kura Pounamu (Te Kura)

⁴ Pollock, J, 2020 pers correspondence

⁵ OECD report 2017 Ministry of Education NZ, 2019. How does New Zealand's education system compare? p27)

(https://www.educationcounts.govt.nz/_data/assets/pdf_file/0011/195860/EAG-2019-NZ-Summary-Report.pdf)

⁶ NZC covers 8 learning areas, Science, Learning Languages, the Arts, Health and Physical Education, Mathematics and Statistics, Social Sciences, Technology and English plus Values and Key Competencies. These are taught at primary, intermediate and secondary schools and the curriculum states the standards students should reach in each subject.

⁷ Astronomy, Astrophysics and Cosmology is taught at university level, usually within the Science and Engineering disciplines. Two universities (University of Canterbury and AUT) offer undergraduate courses majoring in Astronomy and Astrophysics and operate observational facilities at the University of Canterbury Mt John Observatory and the AUT Radio Telescope at Warkworth. Several New Zealand universities offer undergraduate courses and also offer postgraduate degrees and diplomas in Astronomy, Astrobiology, Astrophysics and Cosmology.

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