SPACEWARD BOUND NEW ZEALAND FOR YOUTH 2016: AN EDUCATIONAL, FIELD-BASED PROGRAM WITH SPACE FOR WOMEN & GIRLS
A PILOT EXPEDITION USING A MĀTAURANGA MĀORI APPROACH TO TEACHING ASTROBIOLOGY IN NEW ZEALAND

Mount Tarawera – volcanic rift
SBNZ for Youth was developed with funding from the New Zealand Government (MBIE’s Unlocking Curious Minds program) in collaboration with the educational arm of the iwi Ngāti Whakaue (one of the guardian tribes from the Te Arawa confederation of the Rotorua region, which hosts geothermal areas and active volcanoes) – Te Taumata o Ngati Whakaue.
ROTORUA IS SITUATED IN A SLUMBERING VOLCANIC CALDERA WITHIN THE TAUPO VOLCANIC ZONE, A REGION REPLETE WITH HOT SPRINGS, EXTREMOPHILES, HYDROTHERMAL ERUPTIONS AND ACTIVE VOLCANOES. IT IS ALSO HOME OF THE NGATI WHAKAUE PEOPLE.
MĀTAURANGA MĀORI

IS THE MĀORI (NEW ZEALAND’S INDIGENOUS PEOPLE) SYSTEM OF KNOWLEDGE & UNDERSTANDING OF ALL THINGS, PASSED ORALLY FROM GENERATION TO GENERATION, AND WHICH INCLUDES MĀORI WAYS OF RELATING TO THE ENVIRONMENT.
1. CONNECTIONS
2. SHARING
3. GUARDIANSHIP
Te Tākinga marae (meeting house)

CONNECTIONS
The teachings of mātauranga Māori are based on the connectedness of knowledge with the environment from which it was derived.

Māori trace their ancestry to the Universe itself, the Sun and Planets, which, according to their traditions, were created in a process similar to the modern Big Bang.
SHARING
WANAGA – IMMERSIVE HANDS-ON LEARNING

- Pilot Spaceward Bound for Youth expedition, based on the worldwide and successful NASA program and the philosophy of the Māori educational trust.

- 20 students (10 boys, 10 girls, ages 8-16) & their families were engaged in immersive learning about astrobiology reflected in the ancient unwritten teachings of Mātauranga Māori, in a hands-on experience that traced their origins within the geologically and dynamically active local environment of Rotorua.

November 2016
A FIVE-DAY EXPEDITION – BASED IN FIELD AND ON MARAE

- **To explore extremophile life forms and geological processes** relevant to possible settings for the origins of life.

- Activities: examining plates of extremophile strains from hot, acidic, and alkaline pools in Rotorua collected a month prior to the expedition by the same group. Field trips to hydrothermal springs and alteration sites, past and present.

- In addition, the students learned about and discussed Māori *Astronomy, stars and the origins* of the Māori people as taught by tribal leaders and tohunga (learned experts).

- An **expedition to Mount Tarawera**, the eruption of which in 1886 destroyed the world-famous Pink and White Terraces (hot springs) and killed ~120 people, was also undertaken to appreciate the relationship among hazards, hot water & volcanism, with parallels drawn to exploration for surface- or groundwater on other planetary bodies.
GUARDIANSHIP

Champagne Pool, Wai-O-Tapu geothermal area
THE STUDENTS PRESENTED THEIR INTEGRATED LEARNING TO A PUBLIC AUDIENCE AT THE MARAE UPON COMPLETION OF THE WANANGA (IMMERSION LEARNING MĀORI WORKSHOP) – AN EXERCISE THAT DYNAMICALLY INCORPORATED THE MĀORI CULTURE IN STEM SUBJECTS, A MAJOR GOAL OF TE TAUMATA O NGATI WHAKAUE.