



### Land and Sky Programme

Mangere Mountain Education Centre has partnered with Stardome Observatory to create a uniquely engrossing educational experience.

Tailored to Primary-Intermediate students, Land and Sky takes place during a four-hour visit to the mountain. It integrates science, nature, and the Māori world to open up new vistas in learning. Each session includes:

- A 1.5-hour guided walk over Mangere Mountain, focusing on farming, the seasons and Māori lore regarding the sun and universe.
- Creating human or paper sundials with the guidance of Stardome educators.
- A sun bracelet workshop, integrating traditional knowledge of medicinal plants, traditional flax weaving and a modern UV bead that changes colour in the sun.
- Daytime astronomy with Stardome's portable Pipehenge – a special installation that traces the sun's arc throughout the seasons.

Weaving together Te Ao Māori and astronomy, natural history and mythology, this programme is an innovative way to enrich your students' learning. Curriculum learning areas include Science, Social Sciences, Technology and Official languages

It's affordably priced at just \$15+ GST per student. We provide all learning materials and resources – all you need to arrange is your own transport and lunch.

Land and Sky is a four-hour programme that starts with a guided walk over Mangere Mountain, showing how our ancestors worked the land and understood the seasons. There's information about traditional crops, agricultural methods, and the influence of the sun and weather systems.

Then we come back to the Education Centre and explore daytime astronomy with educators from Stardome Observatory. We make a human sundial, or a paper one. Stardome will also set up their portable Pipehenge, which shows the arc of the sun as it changes throughout the year.

Finally we get hands-on, with a flax-weaving workshop for students to create Land and Sky bracelets. These include a modern UV sunbead that changes colour when exposed to sunlight.

### Practical details:

It's a four-hour, interactive programme running from 6<sup>th</sup> March -31<sup>st</sup> March 2017 The cost is just \$15 per student.

All materials and learning resources are supplied – just arrange your transport and bring lunch. We'll take care of everything else.

**Overview:** A joint initiative that combines Mangere Mountain Education Centre Staff with Stardome Educators . Takes place at Mangere Mountain Education Centre. 100 Coronation road Mangere Bridge. A four-hour experience that comprises a guided walk of Mangere Mountain combined with a hands on Stardome experience; product detail in table below. The theme that combines the two product elements is seasons and the sun - how they occur celestially and the impact they have terrestrially. How knowledge of the skies was known and used by Te Wai o Hua in relation to their farming and living



practices, the stories they told to explain the seasons. How in the present day we still require knowledge of the sky to understand the seasons, how the movement of our solar system works and how it impacts on our daily lives, the power, and dangers of the sun. Learning activities and outcomes include, a one hour, fifteen-minute walk with rich informational content on agrarian practices, visual education of the solar system, how the seasons work, what impact they have on the land, Maori language and cultural beliefs, Maori stories. Make and keep a sun dial, weave and keep a flax sun bracelet.

Curriculum learning areas Science, Social Science, Mathematics, Technology and Official Languages

Product element	Time	Duration	Content
Mihi Whakatau	0930	10 minutes	Traditional welcome to MMEC. Dual language. Explanation of the significance of the place and space.
Briefing		10 minutes	Contextual history of the land, its settlement. Introduction to Te Wai o Hua and its traditions of sustainable agricultural. Importance of understanding the seasons in this process
Guided walk		1.5 hours	1.5 hour guided walk. Mix of history of early settlement. Visual picture of living on the maunga -what the settlement would have looked like. Focus on agriculture and farming. How, where, food was grown. When harvested, and stored. Importance of knowledge of the seasons, and weather. What would our ancestors have known of the seasons, how they would have worked with them, weather conditions and their respect for the land. Tell the story of Maui and the sun. Other early beliefs about how the heavens were formed.
Refreshments			
Making Sundials		15 min	In small groups the students will be creating paper or human sundials. Then we will mark down the length and direction of shadows. At the end of the session, we will come back to this and see if there are any measureable changes. If so, what we do with that information? (In case of bad weather, we will create sundials, and simulate the movement of the sun with a lamp.)
Experimenting with Sun Beads		35 min	In this activity we will discover that the Sun emits UV radiation by experimenting with different types of light, and testing to see if sunblock will protect against those rays. (This activity works regardless of if the sky is clear or cloudy.) Students will weave a flax bracelet and thread on a UV bead- as a personal UV alert
Simulating the Distance Between the Earth and Sun		20 min	Students will measure out the length of one astronomical unit (AU) on a scale of 1m being 2.6 million km. Then, using our scaled down version of the Sun, they will walk to the Earth, placing scaled versions of Mercury and Venus along the way
Pipehenge		25 min	Stardome educators will setup our portable pipehenge to use as a teaching tool for daytime astronomy. Sitting in the centre of pipehenge, students will get a chance to see how the Sun's arc through the sky changes between the seasons, as well as how the Southern Cross can tell us how to find south. (Pipehenge is about 2 meters high by 4 meters' width and can be placed indoors or outdoors.)
Revisit sundial		5 min	Take a look at the sundials and see how the shadows have changed over time.