

BREAKING IT DOWN

with Dr. Michelle Dickinson



ASTRONOMY

Welcome to Breaking It Down with Dr Michelle Dickinson.

This worksheet is to help you to support your teaching (ako) after your students (taura) have watched the 'Astronomy' episode. It contains a summary of the science knowledge (pūtaiao), experiment instructions, topics for further inquiry, and links to the NZ curriculum at levels 3-4.

Use this sheet alongside the video for the astronomy episode of "Breaking It Down with Dr Michelle Dickinson" to help with your teaching around the science of the Moon, the planets and our solar system. During the episode, Dr Michelle Dickinson will cover the planets in our solar system, lunar cycles, and how the light from both the Sun and the Moon is seen from Earth. She will talk with Dr Haki Tuaupiki from the University of Waikato and Dr Ian Griffin from the Otago Museum, and conduct an experiment which students can follow along with.

For this session, your students will each need:

- **Light source, e.g. torch or lamp**
- **Stick or pencil**
- **Sheet of tin foil**
- **Plain A4 paper**
- **Notebook to draw in and write down their observations**

Achievement Aims

NZ Curriculum Strand: Planet Earth and beyond

Astronomical systems (L3-4): Investigate the components of the solar system, developing an understanding of the distances between them

Learning Outcomes

- Understand the phases of the moon which make up the lunar month.
- Understand that light from the Sun is reflected from the moon, and that the light we see from the moon changes depending on the relative positions of the earth, Sun and moon.
- Understand how gravity influences the orbits of moons around the different planets in our solar system.
- Be able to name the different planets in our solar system, and develop an understanding of their relative distances, compositions and surface conditions.
- Carry out an experiment to demonstrate how the shape of The Moon in the night sky changes depending on the lunar phase.

BREAKING IT DOWN: Science of Astronomy

The sky at night (Rangi) contains lots of points of light, which might be stars (whetū), planets, or the Moon (marama) which is the largest object we can see at night.

Moons stay in orbit around a planet due to its gravitational pull. Earth has one moon, but other planets can have more, or fewer, depending on the mass of the planet and therefore the strength of its gravitational field.

Our moon does not produce its own light. Moonlight is reflected sunlight, and the shape of the moon in the sky at night depends on how much reflected light we can see. As the Moon orbits and the Earth rotates, the

position of the Moon relative to the Earth and Sun changes, giving us the phases of the Moon which make up one lunar cycle.

Our Solar System is made up of eight planets all orbiting the same star, our Sun. In order of distance from the Sun, they are; Mercury; Venus; Earth; Mars; Jupiter; Saturn; Uranus; and Neptune. Pluto is now classified as a 'dwarf planet' rather than as a 'planet.' The closest four planets are known as the terrestrial planets. They tend to be small, with a rocky core and a hard surface. The outer four planets are known as 'gas planets.' They have a small, solid core but are made mostly of gasses such as hydrogen and helium. The orbits of each planet also vary in length; Mercury's orbit is only 88 days whereas Neptune's is 165 days.

EXPERIMENT INSTRUCTIONS

Experiment: Phases of the Moon

- Scrunch up a piece of paper into a ball.
 - Cover the ball with kitchen foil so that it has a shiny surface. This is your moon.
 - Push one end of a pencil or stick into the ball to help you hold it.
- Using the light as your 'Sun' and your head as the earth, move the moon around your head and observe the shape of the lit-up part of the moon you can see.

EXPLORE FURTHER

(Use these prompts to start a discussion or further inquiry on the topic of astronomy)

- Is light-speed travel possible?
- Which planet has the most moons?
- Why isn't Pluto a planet anymore?
- Why do astronauts eat dried food?
- How many people are in space at the moment, and what are they doing?

FURTHER EXPERIMENTS & INFORMATION

Astronomy resources from Otago Museum

<https://otagomuseum.nz/education/bundle/astronomy>

Find some amazing space-themed experiments by NASA

<https://www.jpl.nasa.gov/edu/teach/resources/>

Learn more about the people who make space travel possible

<https://www.sciencelearn.org.nz/videos/119-working-as-a-spacecraft-systems-engineer>



Thank you to
our Sponsors

EXPLORE | DISCOVER | SHARE



MARSDEN FUND

TE PŪTEA RANGAHAU
A MARSDEN

If you have any questions, please contact info@nanogirllabs.com.
For more science adventures for children visit [Nanogirl's Lab](#).