**Using binoculars to view the Moon**

**Levels:** 3-4  
**NoS achievement aims:** Understanding about science   
**Contextual strands:** Planet Earth and beyond   
**Topic:** Space

**Rationale**

Technology can be used to enhance our view of distant objects.

All science knowledge is, in principle, subject to change. It can change over time as we have access to new technologies.

**What you need**

* Binoculars and telescopes – a variety if possible.
* Access to information about telescopes (from early examples to modern space telescopes) and/or stories of famous astronomers and how telescopes aided their discoveries.
* SLH resource – The Night Sky <https://www.sciencelearn.org.nz/resources/2263-planet-earth-and-beyond-the-night-sky>
* Hall, R. (2004). *How to gaze at the southern stars*, The Ginger Series 02. Wellington: Awa Press, 27–28. (ISBN 095 82 50 995). May be helpful

**Notes on viewing the Moon**

* Telescopes are used by scientists to view the features of the Moon. Binoculars can be easier to use and are often easier to access for student viewing.
* Ideally, Moon observations should be done with a clear view of the night sky (for example, on a school camp).
* The Moon is most easily observed just before and just after first quarter (check a Moon table, almanac or calendar for this information).
* At this time, the Moon is easily visible in the evening. At or near full Moon, the Moon is very bright, and the angle of sunlight on the Moon means there are no shadows or only slight shadows to help define the areas.
* While it is possible to view the Moon during the daytime, the features are more difficult to pick out.

**Prior to this activity**

* Make sure students have access to binoculars and telescopes and they know how to use them.
* *How to Gaze at the Southern Stars* (02 The Ginger Series), Richard Hall (Awa Press, 2004) gives excellent instructions on how to use binoculars to view stars and other heavenly bodies.
* Get students to view distant objects with and without the aid of binoculars and telescopes. Warning: Do not view the sun.
* Have them share their experiences of the differences that the binoculars make (for example, the restriction of peripheral vision, finding what you want to look at).

Note: Supporting activity resources are suggested below.

**Focus**

* Why would a scientist use a telescope rather than binoculars?
* Why is night the best time to carry out this activity?
* Will you be able to see the whole surface of the Moon if you view the Moon during the day?
* Will your view of the Moon be affected if you are in a large town or city, or out in the country?
* What different ways do scientists find out about the Moon?
* What different ways do we (teachers and students) have for finding out about the Moon? (For example, photos from telescopes, Moon landings.)
* Get the students to draw the Moon and describe what they think the surface looks like, and why they think it looks like that.

**Exploration**

1. Get students to view the Moon with and without the aid of binoculars and telescopes.
2. Have them write down their experiences and illustrate them with drawings of objects viewed with and without binoculars.
3. Get the students to research the development and application of telescopes for exploring space.
4. Have them draw up a timeline of telescope development, indicating the times when major discoveries were made.
5. If they are able to find photographs taken through new and old telescopes, add those to the timeline to illustrate how picture clarity has improved.

**Reflection**

* What do you think scientists might know about the Moon in 100 years time that they don’t know today? How would they get that knowledge? What might limit them? (Consider how observations are linked to science ideas, and the different methods scientists might use to look for patterns.)
* What did you know about the Moon before you did this activity? What did you look for when you used the telescope?
* Did using a telescope/binoculars change your ideas about the Moon? If so, in what way(s)?
* What things could you observe about the Moon with a telescope that you couldn’t see without the telescope?