

This assessment is based on a now-expired version of the achievement standard and may not accurately reflect the content and practice of external assessments developed for 2025 onwards.

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92046



Mana Tohu Mātauranga o Aotearoa  
New Zealand Qualifications Authority

## Level 1 Physics, Earth and Space Science 2024

### 92046 Demonstrate understanding of the effect on the Earth of interactions between the Sun and the Earth-Moon system

Credits: Five

## ASSESSMENT TASK

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of the effect on the Earth of interactions between the Sun and the Earth-Moon system.	Explain the effect on the Earth of interactions between the Sun and the Earth-Moon system.	Analyse the effect on the Earth of interactions between the Sun and the Earth-Moon system.

Refer to this document to respond to the task for Physics, Earth and Space Science 92046.

Make sure that you have Resource Booklet 92046R.

Check that this document has page 2 and that the page is not blank.

Do not use chatbots, generative AI, or other tools that can automatically generate content.

**DO NOT TAKE THESE ASSESSMENT MATERIALS OUT OF THE ASSESSMENT ROOM.**

This report is about how interactions between the Sun and the Earth-Moon system affects Earth. There are three parts that cover three different effects. Use specific evidence from Resource Booklet 92046R and your own knowledge to respond to all parts of the report.

### **PART ONE: CHANGES IN SHADOW LENGTH IN A DAY**

The length and direction of shadows change throughout the day.

Explain why the length and direction of shadows change.

Your explanation should include:

- How the Sun's height changes throughout a day.
- Why the shadows at 9 a.m., midday, 3 p.m., and 6 p.m. have different lengths.
- Why the shadows at 9 a.m., midday, and 3 p.m. have different directions.
- Why Auckland and Invercargill have different shadow lengths during the same day.

### **PART TWO: SEASONAL CHANGES BETWEEN CHRISTCHURCH AND SCOTT BASE**

Many research scientists fly out from Christchurch Airport to research stations such as Scott Base in Antarctica. These two places experience different day lengths in different seasons.

Explain why there are seasonal changes between Christchurch and Scott Base.

Your explanation should include:

- How the tilt of the Earth creates differences in day length between the seasons.
- The differences between equinoxes and solstices.
- How the Sun's path appears to change throughout the year.
- Why daylengths are different between Christchurch and Scott Base throughout the year.

### **PART THREE: ECLIPSES**

Explain the conditions necessary to observe **solar** and **lunar eclipses** using the figures provided in the resource booklet as needed.

Your explanation should include:

- The relative positions of the Sun, Moon, and Earth during solar and lunar eclipses.
- The relevant phases of the Moon for solar and lunar eclipses.
- Why solar and lunar eclipses do not occur every month.
- Why a lunar eclipse lasts longer than a solar eclipse.