**ACTIVITY: Māui and the Sun**

**Activity idea**

In this activity, students are introduced to the concept of harnessing the Sun’s energy for our use on Earth. They will appreciate that the early Māori were also thinking about the Sun in relation to the Earth as depicted in the legend Māui and the Sun. The students will explore nuclear fusion (the nuclear reaction that releases energy in the Sun) and the electromagnetic spectrum (the energy waves that reach the Earth).

By the end of this activity, students should be able to:

* explain why the Sun is essential for life on Earth
* explain nuclear fusion and the release of energy from the Sun
* explain that the electromagnetic spectrum represents energy waves radiated from the Sun to the Earth.

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**Introduction/background**

Students are introduced to the concept of harnessing the Sun’s energy for our use through the Māori legend Māui and the Sun.

The legend, as a focal artefact, can be used to help students consider the importance of the Sun.

Through discussion, students should understand that:

* without the Sun, there would be no life on Earth
* the Sun gives energy in the form of light and heat
* energy is formed through nuclear fusion and then radiated (as rays) to us through space.

You should be familiar with the articles [Solar energy](https://www.sciencelearn.org.nz/resources/1746-solar-energy) and [Using solar energy](https://www.sciencelearn.org.nz/resources/1747-using-solar-energy) that cover the Science ideas and concepts.

**What you need**

* Copies of the Māori legend Māui and the Sun – there are numerous versions around (for example, <http://crash.ihug.co.nz/~rickja/page5.htm>) and books that have great illustrations

Depictions of nuclear fusion from books or websites (for example, [www.youtube.com/watch?v=TOErr4xntHE&feature=related](http://www.youtube.com/watch?v=TOErr4xntHE&feature=related))

* Access to the interactive [The electromagnetic spectrum](https://www.sciencelearn.org.nz/image_maps/63-the-electromagnetic-spectrum)

**What to do**

1. Introduce the legend of Māui and the Sun. The students will most probably already be familiar with the story. Ask them to think about why you might be reading it – especially in a science context. Some questions to consider while reading:

* What might be the purpose of this story?
* What might have been a problem for the Māori people at the time the story was first told? (They wanted more daylight to get their work done.)
* What and who are involved in the story? (Establish the relationship between the Sun and people on the Earth.)

1. Read the story to the students.
2. Discuss the story in terms of the Sun and its relationship to the Earth.

* What was Māui trying to do?
* Why did Māui and his brothers want to keep the Sun in the sky?
* Why do people like sunny days? (Get warmth and light.)
* What would happen if it stayed night and we had no Sun? (Get students to think about getting up in the morning in the dark, getting breakfast in the dark, going to school in the dark, being in the dark all day.) What would you have to do? What would you need? What would happen if the dark continued for a week? A month? A year? (Develop ideas about plants needing the Sun to survive because they get their food (energy) from sunlight through photosynthesis. Without plants, animal and ultimately human life could not be sustained because we make use of the chemical energy stored in plants.)
* What’s great about the Sun? (Without it we would all die. The Sun is essential for life on Earth.)
* What do we get from the Sun? (Develop the idea that light and heat energy come from the Sun in waves – there are different kinds of waves, and some of the waves cannot be seen. Conclude that the Sun is indeed vital for our existence, and the early Māori as depicted in the legend of Māui and the Sun had some awareness of this. Reiterate that we get light and heat energy (necessary for life) from the Sun.)

1. Show pictures of the Sun to discuss nuclear fusion. Explain that nuclear fusion occurs in the core (centre) of the Sun where there are huge pressures and temperature. You may need to explain what atoms are before explaining that they are moving at incredible speeds. Hydrogen atoms collide and fuse together to form helium atoms, and in the process, light and heat energy are released.
2. Ask students to draw their depiction of nuclear fusion and write a paragraph to describe it.
3. Explain that some of the energy released finds its way through space and our atmosphere to reach us on Earth. This energy comes to us as waves. Scientists have discovered that the waves that reach us are different lengths and have different amounts of energy. The smallest waves have the most energy. The waves have been categorised into 7 main groups. We call this range of wavelengths the electromagnetic spectrum.
4. Ask students in pairs to explore the interactive [The electromagnetic spectrum](https://www.sciencelearn.org.nz/image_maps/63-the-electromagnetic-spectrum) and discuss. Point out that only one group of wavelengths is visible to us (visible light). The energy from visible light (blue and red light) is the energy that plants need to make their food. All the waves in the electromagnetic spectrum, however, reach the Earth and are all around us.
5. Students could take turns at explaining the electromagnetic spectrum to each other in pairs:

* What is the electromagnetic spectrum?
* What does it represent?
* Name the wavelength groups and say something about each group.