

Kia pai tō haere

Pūtaiao

Possible contexts for kaupapa: Keeping whānau safe on a journey is everyone's work. Safe journeys. Safe: spiritually, physically and mentally.

O Ahupungao - The Physical world: Light Sources: How light reflects, refracts.....be seen be safe.....light sources

Ngā putanga ako tauwhāiti – whāinga paetae achievement objective	Aromatawai: intended learning outcomes/learning intentions
<p>Ka tāea e te ākonga te:</p> <p>Taumata 1/2</p> <p><u>Te Ngaru me te Ngotangota</u></p> <p>2. Ka torotoro me te whai wāhi atu ki te aho, te ātārangi, te kano, te hanga oro, me te pōkākā.</p> <p>Taumata 3</p> <p><u>Te Ngaru me te Ngotangota</u></p> <p>2. Ka torotoro, ka whai wāhi atu ki ngā tītōhunga ā-rongo o te hanga i ngā orotahi me ngā hā o te oro,</p> <p>te kawē me te ārai pōkākā.</p> <p>Taumata 4</p> <p><u>Te Ngaru me te Ngotangota</u></p> <p>2. Ka tūhura, ka whakamahi i te tauira pūtaiao hei whakaatu i te aho, te oro me te pōkākā.</p>	<p>Level 1</p> <p>Identify light sources.</p> <p>Explain items that reflect light.</p> <p>Classify objects as see through or not.</p> <p>Level 2</p> <p>Identify which colours reflect light more effectively.</p> <p>Explain that light travels in a straight line.</p> <p>Classify objects as transparent, translucent or opaque.</p> <p>Level 3</p> <p>Observe and record the properties of light.</p> <p>Explain that light reflects at an angle.</p> <p>Define reflection and refraction.</p> <p>Level 4</p> <p>Research the laws of light.</p> <p>Describe and explain the light spectrum.</p> <p>Compare and contrast natural and man-made light sources.</p>

Raupapa mahi: possible learning intentions and learning experiences

Your school will have its own criteria for developing learning intentions. Emphasise the learning intentions that best match the abilities of your students.

LI: Define Light (and Dark) [Unistructural]

LE: Complete a post box activity to gather information about tamariki's existing knowledge about light. Possible questions:

- a.) Where does our primary light source come from? What do you know about this source?
- b.) What is a reflection?
- c.) How are shadows formed?
- d.) Name two purakau that have a light theme.

Demonstrate (by switching off lights) that it is harder to see in the dark. Complete a sensory graphic organizer for responses about light and dark.

Use the following Thinker's Keys:

- The Reverse Key – List 10 things you could not do with a light.
- The What If Key? – What if it was always night?
- The Question Key – If "Reflected light" is the answer. Write 5 possible questions.

Play with torches in a darkened space. Walk in the dark - under the night sky - how is it similar or different to taking the same walk in the daytime? Brainstorm everything you know about light.

Use these experiences to form a class definition - "We think light is ..." We think dark is ... " Come back to these definitions and revise them as you learn more about light and dark.

LI: Identify light sources [Unistructural]

LE: List as many light sources as you can. Recall light sources that have helped you see where you are (or find things) in the dark. Name light sources in the classroom and the playground. Draw different light sources. Learn about light & dark as well as light sources & reflections as you experiment with different objects. Does a mirror ball give out light or does it just reflect light from another source? What about a lamp, torch, animal or jacket? Play around with the objects and see what results you get. Differentiate between light sources and reflections (light emitters and light reflectors), which light sources give the brightest light, properties of sunlight and how wearing reflective strips can make cyclists stand out more so they are less likely to be hit by cars.

Complete a KWHL chart about light sources: man-made and natural

[KWHL chart \(WorksheetWorks\)](#)

LI: Describe light sources [Multistructural]

LE: Observe a light source. Sketch a light source identifying the significant attributes of a light source. Write a description of a light source. (What is it like?). Help students by letting them experiment with different light sources - investigate, discuss light from many sources.

[The Science of Glow Sticks \(YouTube\)](#) Find out what really happens with glow sticks.

LI: Describe the colour of light [Multistructural]

Investigate the colour of light. Ask your students what colour they think light is. A silly question? Sunlight or light from a lamp may look "white" but it is really made up of different colours. Red, blue, and green are the primary colours of light. That means you can make any colour from combinations of these three. We see an object in a certain colour because that colour is reflected from the object to our eyes, while other colours are absorbed by the object.

LI: Classify light sources [Relational]

LE: Make a list of light sources - Sort the light sources into "light emitters and light reflectors". Next sort them into two groups based on whether they were used from our tipuna's day and/or used today. Give examples of how the light sources were used. Sort the light sources used by our tipuna into "light emitters and light reflectors". Explain any differences between the groups.

LI: Compare and contrast light sources [Relational]

LE: Compare and contrast light sources from our tipuna's day with what we have now.

LE: Compare and contrast "light emitters" with light reflectors".

[Compare and Contrast Chart \(WorksheetWorks\)](#)

LI: Explain the source of light - how a light emitter emits light [Relational]

LE: Draw a diagram clearly showing how a light emitter emits light.

LI: Explain the source of light - how a light reflector reflects light [Relational]

LE: Draw a diagram clearly showing how a light reflector gets and reflects light. Use mirrors to show the concept of reflection. Have students draw the other half of pictures using mirrors. Use think, pair, share to discuss how a light reflector like the moon gets light.

LI: Explain how different light sources help people be seen (or see others) at night and low light. [Relational]

LE: Brainstorm as many ways as possible that people use to be seen while travelling in the dark. Draw pictures to show your ideas. Explain why the light source helps people be seen at night. Brainstorm as many ways as possible to encourage people to be seen while travelling in the dark.

Student inquiry

Your task

Design and carry out an experiment to evaluate a light source used to make people safer by making them visible in the dark and low light.

e.g. Design an experiment to test a light source (e.g. reflective tape) used to make things more visible in the dark

e.g. Design an experiment to see to see which colours and objects are easier to see in the dark.

Design and carry out an experiment to evaluate a technology to make people safer by helping them see better in different light conditions.

e.g Design an experiment into the use of polarised sunglasses – if you rotate a pair of polarizing sunglasses, you will find that they cut road glare much better in some positions than in others. When light reflects from water, asphalt, or other non-metallic surfaces, it becomes polarized. That is, the reflected light is usually vibrating more in one direction than in others. Polarizing sunglasses reduce this reflection, known as *glare*, but only when the polarizing lenses are oriented properly.

[Polarized sunglasses \(Exploratorium\)](#)

Ngā rauemi: resources

[Mirrors and images \(Optics for kids\)](#)

[Light and colour investigations \(Kindergarten-lessons.com\)](#)

[Light for Kids | Where does light come from? \(YouTube\)](#)

Assessment for learning: teacher/peer/self

Teachers to highlight learning experiences above that will be used for assessment for learning throughout the unit. These can be recorded in portfolios/school management systems.

Example self-assessment rubric

Teachers to code in the first column the symbols that they use in the school for assessment.

These could be against levels, MOE guidelines or internal criteria. The rubric can be written against the AOs or rewritten as success criteria for children depending on the preference of the school.

Highlight the relevant phrases at each step. This is an example of one dimension only.

Example: Describe the properties of light in the context of keeping safe when travelling

Extended Abstract	My description lists several relevant properties of light AND explains why they are relevant to safe travel. I make a generalisation about the properties of light and safe travel.
Relational	My description lists several relevant properties of light AND explains why they are relevant to safe travel.
Multistructural	My description lists several relevant properties of light.
Unistructural	My description lists one relevant property of light. e.g. light travels in a straight line.
Prestructural	I need help to explain that light travels in a straight line