



*SunSmart Fact
and Fiction
SunSmart Scientists*

Learning from and about the natural world

Curriculum Level 2 Unit Plan

Introduction

SunSmart Schools Aotearoa

SunSmart Schools Aotearoa is a programme run by the Cancer Society of New Zealand.

The Cancer Society supports workplaces, early childhood centres and primary, intermediate and secondary schools to be SunSmart.

There are both risks and benefits from Sun exposure. In New Zealand our sunlight is very harsh as it contains high levels of UV rays. Skin cancers are the most common form of cancers in New Zealand. From an early age our children need to have the knowledge and behaviours that will protect them from the harmful rays of the Sun. The Cancer Society encourages all New Zealanders to be SunSmart and to 'slip, slop, slap and wrap'.



The SunSmart Schools Programme

The Cancer Society SunSmart programme in schools supports the findings of the [Community Preventive Services Task Force](#).¹ The Task Force [recommends](#) that primary- and middle-school interventions are put in place to prevent skin cancer, based on strong evidence of their effectiveness in increasing Sun-protective behaviours and decreasing ultraviolet exposure, sunburn incidence, and formation of new moles.



The SunSmart schools programme provides:

- * website information for teachers, students and parents on how to be SunSmart
- * Cancer Society-approved guidelines on how to make your school a safe place for students and the school community
- * highly engaging resources for students, parents, teachers and principals.

1 <https://www.thecommunityguide.org/sites/default/files/assets/Skin-Cancer-Primary-and-Middle-School.pdf>

SunSmart Teaching Resources

These four cross-curricular SunSmart teaching resources address why we need to be SunSmart, how we can be SunSmart, and how science and scientific knowledge can inform and underpin the SunSmart choices we make. The units cover the New Zealand Curriculum Levels 1–4 and aim to:

- enhance youth numeracy and literacy development and provide assessment tasks to assess the National Standards
- embed key science concepts and experiences in relation to the Sun, energy and protection
- support the principles of SunSmart and the New Zealand Curriculum
- use different examples/contexts to ensure appropriateness to different ethnic groups (particularly Māori, Pāsifika and Southeast Asian)
- use Te Reo Māori concepts and language that will be woven into the resource
- take an inquiry-based learning approach
- utilise the SunSmart Schools Website – www.sunsmartschools.co.nz, and www.niwa.co.nz



Level 2 Unit Overview

Overview Planning Tool

The overview diagram explains how the lessons for Level 2 have been organised to scaffold the teaching and learning experiences. The overview document can also be used as a planning document for teachers.

By using the Comment tool on your Adobe Acrobat tool bar, you can make notes on your students' progress or next steps. You will find an example of how the overview can be used for planning purposes over the page.

Science Explorations

These units include a number of science explorations that can be adapted/differentiated to suit learning experiences and outcomes at any other level.

Overleaf is an overview of the unit that shows the links between the curriculum, assessments, teaching and learning approaches, key concepts and ideas.

Key



A

Front loading through different sources of information



B

Front loading through hands-on experiences



C

Synthesis: Developing new understandings and knowledge through inquiry

Health



Science



Science Experience



Technology



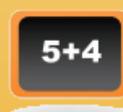
Literacy



Mathematics -
Geometry and Measurement



Mathematics -
Number and Algebra



Mathematics -
Statistics



Sun is the major source of energy

Energy makes things happen

Energy changes things

The Nature of Science

Planet Earth & Beyond

Living World Plant Earth and Beyond Physical World Material World

The amount of sunlight determines the type of animal and plant life

Lesson 11 - We are investigating the effect that sunlight has on - black paper - green plants

Lesson 12 - We are investigating how quickly sunlight can heat water in different coloured containers

Lesson 13 - We are investigating whether different colours affect how quickly heat from the Sun melts ice

Lesson 14 - We are investigating how the Sun makes shadows

Lesson 15 - We are investigating how the Sun can help us to tell the time. We will make a sundial using a paper plate



Lesson 1-2 Hauora



Lesson 3-6 Living things adapt to their habitat



Lesson 3-6 Compare and contrast different parts of the world, e.g., desert and Iceland, Ocean (top level and deep sea) and investigate the different plants and animals and the ways they have adapted to the environment.

Lesson 3-6

Investigate the ways humans have adapted to living in different habitats e.g., dark, medium, light skin colour.

Lesson 7-8

Chinese Ten Suns Hawaiian Kapu

Lesson 7-8

Maui & the Sun

Lesson 7-8

Icarus

Humans have Sun stories because the Sun is so important to us.



Facts and fiction about the Sun and skin Lesson 7-10



What have we learnt about the Sun and humans? Why is the Sun so important in our lives? Why do we respect the Sun's energy? Lesson 7-10



Lesson 16-20

Inquiry using:

What we have learnt from myths and legends about the power of the Sun.

What have we learnt from our science experiences about the energy the Sun provides.

Essential Question:

What can we do to protect our heads and faces from the Sun?



Design survey around sunhats and the materials they are made from.

Analyse Results



Plan Action



Evaluate Outcome



Share Information and Conclusions

Links to the New Zealand Curriculum

Purpose: To investigate the facts and fictions about the Sun and how humans can protect themselves from the Sun.

Curriculum Level 2

Curriculum Areas Incorporated		Achievement Objectives Relevant to the activity, including possible links	Specific Learning Outcomes Students will be able to
Health and Physical Education	Health	Safety Management Identify risks and use safe practices in a range of contexts.	<ul style="list-style-type: none"> understand that skin is the largest organ in our body recognise that our skin protects our internal organs from chemicals, infections, cuts, sunlight and water. identify ways that we can limit the damage the Sun can do to our skin.
		Healthy Communities and Environments <i>Societal attitudes and values</i> Explore how health care and physical activity practices are influenced by community and environmental factors.	<ul style="list-style-type: none"> consider the ways in which the school community can control the Sun's harmful effects on our skin.
		Community Resource Identify and discuss obvious hazards in their home, school, and local environment and adopt simple safety practices.	<ul style="list-style-type: none"> identify and discuss the need for Sun protection at home, school and in the local environment. Identify and utilise simple SunSmart practices so as to create a Sun-safe environment at home, school and in the local environment.

Science

Scientists investigate and use observation to ask questions about The Living World, Planet Earth and Beyond, Physical World and Material World.

	Understanding in Science	Investigating in Science	Communicating in Science	Participating and Contributing
Nature of Science Achievement Objectives Levels 1 & 2	Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation.	Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models.	Build their language and develop their understandings of the many ways the natural world can be represented.	Explore and act on issues and questions that link their science learning to their daily living.
Living World Achievement Objectives Levels 1 & 2	Life Processes Recognise that all living things have certain requirements so they can stay alive.			
	Ecology Recognise that living things are suited to their particular habitat.			
Planet Earth and beyond Achievement Objectives Levels 1 & 2	Astronomical Systems Share ideas and observations about the Sun and the Moon and their physical effects on the heat and light available to Earth.			
Physical World Achievement Objectives Levels 1 & 2	Physical Inquiry and Physics Concepts Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound waves, and heat.			
Material World Achievement Objectives Levels 1 & 2	Properties and Changes of Matter Observe, describe, and compare physical and chemical properties of common materials and changes that occur when materials are mixed, heated, or cooled.			

Curriculum Areas Incorporated		Achievement Objectives Relevant to the activity, including possible links	Specific Learning Outcomes Students will be able to
English	Literacy	<p>Listening, Reading and Viewing <i>Processes and Strategies</i></p> <p>Select and use sources of information, processes, and strategies with some confidence to identify, form and express ideas.</p> <ul style="list-style-type: none"> integrates sources of information and prior knowledge with developing confidence to make sense of increasingly varied and complex texts. <p><i>Ideas</i></p> <p>Show some understanding of ideas within, across, and beyond texts.</p>	<ul style="list-style-type: none"> demonstrate an ability to listen, gather, read, understand and effectively use information to express ideas or draw conclusions.
		<p>Speaking, Writing, and Presenting <i>Processes and strategies</i></p> <p>Select and use sources of information, processes, and strategies with developing confidence to identify, form and express ideas.</p> <ul style="list-style-type: none"> show some understanding of the connections between oral, written and visual language when creating texts creates texts by using meaning, structure, visual and graphophonic sources of information, and processing strategies with growing confidence seeks feedback and makes changes to texts to improve clarity and meaning is reflective about the production of texts; monitors and self-evaluates and describes progress, with some confidence. 	<ul style="list-style-type: none"> form and express ideas and information with some clarity organise and sequence ideas and information with confidence use a variety of sentence structures, beginnings and lengths.

Curriculum Areas Incorporated		Achievement Objectives Relevant to the activity, including possible links	Specific Learning Outcomes Students will be able to
Mathematics and Statistics	Statistics	In a range of meaningful contexts, students will be engaged in thinking mathematically and statistically. They will solve problems and model situations that require them to: Statistical Investigation Conduct investigations using the statistical enquiry cycle: <ul style="list-style-type: none"> • posing and answering questions • gathering, sorting and displaying category and whole number data • communicating findings based on the data. 	<ul style="list-style-type: none"> • gather, sort, analyse, compare and summarise data on the ways to protect our skin • display data in an appropriate form.
Te Aho Arataki Marau mō te Ako i Te Reo Māori	Taumata	Students should be able to: <ul style="list-style-type: none"> • 2.1 communicate about relationships between people • 2.2 communicate about possessions • 2.3 communicate about likes and dislikes, giving reasons where appropriate • 2.5 communicate about physical characteristics, personality and feelings. 	<ul style="list-style-type: none"> • discuss whānau, relationships and their impact on health and wellbeing • associate words with pictures of different parts of the world • interview peers and survey participants about their favourite sunhat • identify words that describe feelings/opinions.

Taumata:

Levels 1–4 AO and assessment activities depending on ability of individuals (pp. 56–61)
Students being able to greet, farewell, acknowledge and respond to simple classroom language and politeness conventions in Te Reo is **dependent on the teacher integrating and modelling this in their everyday practice within the classroom.**

Te Reo:

Ongoing opportunities to assess Te Reo - ko au (I, me, myself)
<http://hereoora.tki.org.nz/Unit-plans/Unit-1-Ko-au/Assessment-opportunities>
Te wa Kai: <http://hereoora.tki.org.nz/Unit-plans/Unit-5-Hauora>

Group Work:

See **Resource 27** for activities and assessment grid.

Links to Curriculum

To be encouraged, modelled and explored (NZC pp. 9-11). What aspects of the values does this activity explore, encourage or model?

Vision	Principles	Values	Key Competencies	Pedagogical Approaches
What we want for our young people <ul style="list-style-type: none"> • confident • connected • actively involved • lifelong learners 	Beliefs about what is important <ul style="list-style-type: none"> • high expectations • Treaty of Waitangi • cultural diversity • inclusion • learning to learn • community engagement • coherence • future focus 	Expressed in thought and actions <ul style="list-style-type: none"> • excellence • innovation, inquiry and curiosity • diversity • equity • community and participation • ecological sustainability • integrity 	Which of the key competencies (NZC pp. 12-13) <ul style="list-style-type: none"> • thinking • using language, symbols and texts • managing self • relating to others • participating and contributing 	Based on the HPS Inquiry Model (see attached); all units follow this process. Aspects of effective pedagogy (NZ pp. 34-36) are highlighted in the activity. <ul style="list-style-type: none"> • Creating a supportive learning environment • Encouraging reflective thought and action • Enhancing the relevance of new learning • Facilitating shared learning • Making connections to prior learning • Providing sufficient opportunities to learn • E-learning • Engaging Māori and Pāsifika students and their communities

Taken from the New Zealand Curriculum.

Specific Learning Objectives – for this unit of work, specific learning objectives have been derived from the achievement objectives in the New Zealand Curriculum

Learning Outcomes – are successfully achieved when students can demonstrate the specific learning processes, skills and knowledge detailed for each lesson in the left-hand column.

It is our expectation that teachers will adapt these specific learning objectives and learning outcomes to meet the needs of their diverse learners.

Note: The suggested websites on the following pages are not all maintained by the Cancer Society of New Zealand. We only suggest sites that we consider offer credible and reliable information, but we cannot guarantee that the information on such websites is accurate, up to date or evidence based.

Links and Resources

TKI

Curriculum documents <http://nzcurriculum.tki.org.nz/>

Te Reo Māori In the curriculum guidelines, [Te Aho Arataki](http://tereomaori.tki.org.nz/Curriculum-guidelines/Levels-1-8-Curriculum-Guidelines-for-Teaching-and-Learning-Te-Reo-Maori/Levels-1-and-2-Beginning-to-use-te-reo-Maori) here are suggestions for possible learning and assessment activities for [Curriculum Levels 1–2](http://tereomaori.tki.org.nz/Curriculum-guidelines/Levels-1-8-Curriculum-Guidelines-for-Teaching-and-Learning-Te-Reo-Maori/Levels-1-and-2-Beginning-to-use-te-reo-Maori). In addition, there is helpful material collected online in [Te Whakaipurangi Rauemi](http://tereomaori.tki.org.nz/Teacher-tools). This collection elaborates on some of the communicative tasks outlined in [Tasks and activities](http://tereomaori.tki.org.nz/Teacher-tools), including cloze tasks, dycomm tasks, information transfer tasks, multichoice tasks, strip stories, same-different tasks, dictocomps, listen-and-draw tasks, true-false-make it right tasks, and 4-3-2 tasks.

Wellbeing, Hauora <http://health.tki.org.nz/Teaching-in-HPE/Curriculum-statement/Underlying-concepts/Well-being-hauora>

Links to resources about the Sun and skin

The Sun, Atmosphere, Radiation explained <http://www.windows2universe.org/sun/sun.html>

UV radiation activities book <http://www.cancerwa.asn.au/resources/2013-04-10-uv-radiation-learning-activities-book.pdf>

Sun protection in schools (WHO) <http://www.who.int/uv/publications/en/primaryteach.pdf>

WHO Intersun programme <http://www.who.int/uv/intersunprogramme/activities/en>

SunSmart animals <http://www.foundation.sdsu.edu/sunwisestampede/meetanimals.html>

Skin information and facts <http://science.nationalgeographic.com/science/health-and-human-body/human-body/skin-article/>

All about skin (animated video) <http://www.youtube.com/watch?v=v7m0NiLzZTA>

Why do we have different skin colours <https://www.youtube.com/watch?v=gEQYdi3ZvQg>

How Maui slowed the sun (Te Reo with subtitles) <http://www.youtube.com/watch?v=jbM3PwcGi0g>

Chinese myth about the sun http://www.windows2universe.org/mythology/ten_chinese_suns.html

Science Concepts

How to be safe in the sun http://kidshealth.org/kid/watch/out/summer_safety.html

What is UV radiation <http://www.sciencelearn.org.nz/Contexts/You-Me-and-UV/NZ-Research/You-Me-and-UV>

Why NZ has higher UV levels <http://www.sciencelearn.org.nz/Contexts/You-Me-and-UV/Sci-Media/Video/Why-are-UV-levels-high-in-New-Zealand-summer>

NIWA UV index forecasts for NZ <https://niwa.co.nz/our-services/online-services/uv-and-ozone/forecasts>

Cancer Council West Australia has eight interesting and interactive learning activities that can be delivered as stand-alone activities or presented as a term's science work. The aim is to help students understand the science of light, with a focus on ultraviolet (UV) radiation <https://www.cancerwa.asn.au/resources/2013-04-10-uv-radiation-learning-activities-book.pdf>

New Zealand information

Sun safety information <http://www.cancernz.org.nz/reducing-your-cancer-risk/sunsmart/>

Slip, slop, slap, wrap video clip (50 seconds) <https://www.youtube.com/watch?v=ooCCM28ress>

SunSmart website - information relevant for New Zealand <https://www.sunsmart.org.nz/>

Waikato Bay of Plenty Cancer Society - **Undercover Cody** has a range of online tips, games and songs that promote sun safety <http://www.undercovercody.co.nz/>

Sunscreen - including short video on key tips for use <https://waikato-bop.cancernz.org.nz/reducing-cancer-risk/what-you-can-do/sunsmart/sunscreen/>

Sunscreen Q&A's <https://waikato-bop.cancernz.org.nz/assets/Sunsmart/Sunscreen-plain-English-Q-and-A-web-ID-25450.pdf>

SunSmart videos from NZ school children <http://sunsmartschools.co.nz/teachers/video/results.html>

Songs and Waiata

New Zealand's Kindy Rock TV's slip, slop, slap, wrap song <https://www.youtube.com/watch?v=GKPP8qqA7cY>

Undercover Cody's SunSmart rap - Waikato Bay of Plenty Cancer Society
<http://www.undercovercody.co.nz/mp3/>

“Hei Konei e te Ariki” and “He Rourou mā Koutou” (in Hei Waiata, Hei Whakakoakoa – Waiata to Support Teaching and Learning of Te Reo Māori in English-medium Schools: Years 1–8). “Kei Raro i te Moana” (in Kiwi Kidsongs 1, 1990)

Other Links

Why brimmed hats are better than caps <https://www.youtube.com/watch?v=Htfd63ccsRo>

Have fun in the sun <http://www.youtube.com/watch?v=wPCPxklEFAk>

Play safe in the sun http://www.youtube.com/watch?v=3_V8IT67K20

Importance of sun with sing-along song <http://www.youtube.com/watch?v=Zc2wE5dVx3Y>

Sun safety film (made by children) <http://www.youtube.com/watch?feature=endscreen&NR=1&v=QaTcqqAwzmU>

Sun days fun days - children & the ways they protect themselves during the week
http://www.youtube.com/watch?v=jc_kCw9_Nds

Online Learning Games

Undercover Cody - Waikato Bay of Plenty Cancer Society <http://undercovercody.co.nz/>

Animal Games <http://kinderwebgames.com/cat.html>

<http://www.learninggamesforkids.com/mammal-games-videos/elephant-games-videos.html>

<http://www.learninggamesforkids.com/mammal-games-videos/bear-games-videos.html>

<http://www.learninggamesforkids.com/animal-games-monkeys.html>

Part One, Lessons 1–8

Lessons 1–2: Introduction & Hauora Concept

OVERVIEW: Today we are learning about the concept of Hauora

Assessment Opportunities	Structure	Curriculum and Resource Links				
<p>We are successful when we can:</p> <ul style="list-style-type: none"> identify the things that keep us happy and healthy (physical (taha tinana), mental/emotions (taha hinengaro), social (taha Whānau) and spiritual (taha wairua)) understand that all four elements above need to be in balance for us to feel happy, healthy and safe identify and share the things that make us feel safe, grow and learn use some plural pronouns understand and use short forms of address identify our family members in Te Reo. <p>Evidence: Teach and Assess social and interpersonal skills (pp. 21–32 in resource booklet). Ideas for Teachers re: ongoing assessment.</p>	<p>Prepare: https://www.youtube.com/watch?v=2bwqTDuyv7Y Song Sue goes to the beach for a nice relaxing day and ends up having to teach her friends about Sun-safety. Who’s laughing now? Teacher draws up grid on the board. Has copies of large happy and sad faces with Blu Tack on the back (Resource 1a).</p> <table border="1"> <tr><td>1. taha tinana</td></tr> <tr><td>2. taha hinengaro</td></tr> <tr><td>3. taha whānau</td></tr> <tr><td>4. taha wairau</td></tr> </table> <p>Level Two Teacher could place students in groups with each group having a copy of the table and the faces so that they can place them.</p> <p>Connect:</p> <ul style="list-style-type: none"> Introduce the concept of Hauora using the diagram in the Resource 1b, Teacher’s Notes. Provide context for video. It is important to look after all four elements – we need the four walls – (physical (taha tinana), mental/emotions (taha hinengaro), social (taha whānau) and spiritual (taha wairua)). In the video we see that Sue has taken care of her physical needs. What happens about her other needs – mental/emotions (taha hinengaro), social (taha whānau) and spiritual (taha wairua)? 	1. taha tinana	2. taha hinengaro	3. taha whānau	4. taha wairau	<p>Pedagogical links:</p> <ul style="list-style-type: none"> Creating a supportive learning environment Encouraging reflective thought and action Enhancing the relevance of new learning Facilitating shared learning Making connections to prior learning Providing sufficient opportunities to learn E-learning Engaging Māori and Pāsifika students and their communities <p>Key competencies:</p> <ul style="list-style-type: none"> Thinking Using language, symbols and texts Managing self Relating to others Participating and contributing <p>Literacy:</p> <ul style="list-style-type: none"> English and Te Reo vocabulary building
1. taha tinana						
2. taha hinengaro						
3. taha whānau						
4. taha wairau						

Lessons 1-2

Structure

Opportunity to discuss and learn Te Reo for family. See <http://hereoora.tki.org.nz/Unit-plans/Unit-1-Ko-au/Reomations/Taku-whanau-My-family> for animation and teaching resources, vocabulary and activities.

Activate:

- Students watch the video.

If students in groups, they can place their faces in the four quadrants to describe this part of Sue's hauora.

Demonstrate:

- Discuss what Sue uses to protect herself from the Sun. We can see that Sue is looking after her taha tinana – her physical needs – so we can put a happy face in that box.

1. taha tinana 	1. taha hinengaro 
1. taha whānau 	1. taha wairua 

- How do her friends treat her when they see her on the beach? How does this make her feel? Can we put a happy face next the mental/emotions (taha hinengaro)? No? So add a sad face to the board.
- Who does Sue have to play with? Is she included in her whānau's games in the water? No? So what should we add to the taha whānau section on the board? Sad face.
- How does Sue feel inside when they are all laughing at her and playing in the water without her? Happy/sad face in the taha wairua space?
- Who can tell me what happens to her friends who have been playing in the Sun?
- By the end of the song Sue's hauora has changed. What should we now have in the four boxes – happy/sad faces?
- How do the things we do (e.g. taking care of ourselves so we do not get sunburnt and sharing sunscreen with our friends) impact on what happens? How does what others do impact on what happens? Discuss personal responsibility for our own actions and the responsibility of others.
- All of these things help make us feel safe and secure, help us to grow and learn. They are like the four walls of a house (draw/copy Hauora ([Resource Sheet 1b](#)) diagram for students to see and define four walls) which are necessary to keep everything inside safe. Can we put the pictures/words above/beside the four walls of the house? Some things may go under more than one heading.

Teacher may do this on the board or students to do in pairs depending upon abilities.

Consolidation:

- Refocus on the grid and faces in each of the quadrants.

Students draw the three most important things to them that help them to feel safe, grow, and learn.

Lessons 1-2, Resource 1a

Resource 1a Happy and Healthy

Key Vocabulary:

happy, healthy, wellbeing, hauora, taha tinana, taha hinengaro,
taha whānua, taha wairua

1. taha tinana

2. taha hinengaro

3. taha whānau

4. taha wairua



Lessons 1-2, Resource 1b

Hauora Concept

Information taken from Health and Physical Education online: <http://health.tki.org.nz/Teaching-in-HPE/Curriculum-statement/Underlying-concepts/Well-being-hauora>

Wellbeing

The concept of wellbeing encompasses the physical, mental and emotional, social, and spiritual dimensions of health. This concept is recognised by the World Health Organisation.

Hauora

Hauora is a Māori philosophy of health unique to New Zealand. It comprises taha tinana, taha hinengaro, taha whānau, and taha wairua.

Taha Tinana – Physical Wellbeing

The physical body, its growth, development, and ability to move, and ways of caring for it.

Taha Hinengaro – Mental and Emotional Wellbeing

Coherent thinking processes, acknowledging and expressing thoughts and feelings and responding constructively.

Taha Whānau – Social Wellbeing

Family relationships, friendships, and other interpersonal relationships; feelings of belonging, compassion, and caring; and social support.

Taha Wairua – Spiritual Wellbeing

The values and beliefs that determine the way people live, the search for meaning and purpose in life, and personal identity and self-awareness. (For some individuals and communities, spiritual wellbeing is linked to a particular religion; for others, it is not.)

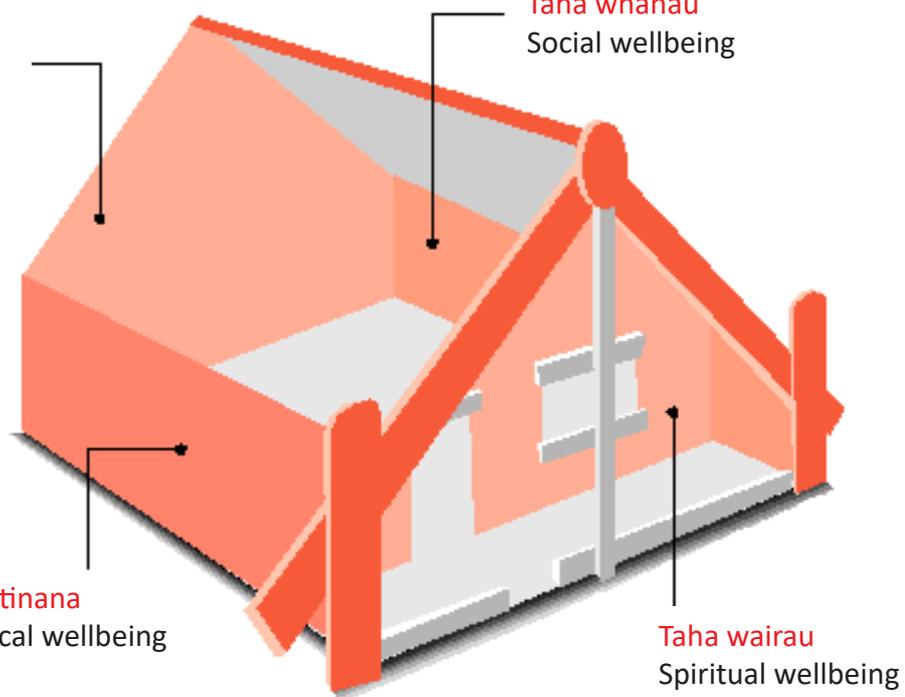
Each of these four dimensions of hauora influences and supports the others.

Taha hinengaro
Mental and
emotional wellbeing

Taha whānau
Social wellbeing

Taha tinana
Physical wellbeing

Taha wairua
Spiritual wellbeing



Dr Mason Durie's whare tapawha model compares hauora to the four walls of a whare, each wall representing a different dimension: taha wairua (the spiritual side); taha hinengaro (thoughts and feelings); taha tinana (the physical side); and taha whānau (family). All four dimensions are necessary for strength and symmetry. (Adapted from Mason Durie's *Whaiora: Māori Health Development*. Auckland: Oxford University Press, 1994, page 70).

Lessons 3-6

Part One – Living World – Finding out about SunSmart Animals

As animals, humans need the Sun. Unlike other living things, we live in many different places and this means that we have to be SunSmart. Living things that are in their own habitats have adaptations that help them to shield themselves from excessive Sun or make the most of the limited sunlight available; for example, camels and polar bears. Humans also have adaptations that help shield them from the Sun.

Overview: *Today we are learning about animals and whether they live in hot or cold countries and how they protect themselves from the Sun. We are also investigating how humans protect themselves from the Sun.*

Assessment Opportunities	Structure	Curriculum and Resource Links
<p>We are successful when we can:</p> <ul style="list-style-type: none"> • identify animals and places by sight • identify and match pictures of animals with the word that names them • identify other animals and plants that begin with the same sound • classify animals and plants using a range of criteria • say and write the name of the animal displayed in the pictures • identify and match where the animal lives • explain if the animal lives in a hot or a cold place • explain the different ways that animals in hot places protect themselves from the Sun • explain how humans protect themselves from the Sun. 	<p>Prepare: Read Teacher’s Notes Resource 2c, Go to Link https://www.foundation.sdsu.edu/sunwisestampede/meetanimals.html Access to a globe of Earth (optional)</p> <p>Connect: Teacher gives students Resource 2a. Teacher tells students that the words on the left-hand side are the names of animals that are pictured on the right-hand side.</p> <ul style="list-style-type: none"> • In pairs students are asked to match the picture of the animal (Resource 2a) with each of the words on the side. (This gives the teacher a good idea about students’ prior knowledge). • As a class they match the word and picture. Teacher asks students how the word sounds – and the different letters and their corresponding sound. (Resource 2b has the answers.) • Can you tell which of these animals live in a hot country and which live in a cold country? • What other animals can you think of that begin with the letter “c”, etc.? • Group all the animals that live in cold countries together and the ones that live in hot countries. 	<p>Pedagogical links:</p> <ul style="list-style-type: none"> • Creating a supportive learning environment • Encouraging reflective thought and action • Enhancing the relevance of new learning • Facilitating shared learning • Making connections prior to learning • Providing sufficient opportunities to learn • E-learning • Engaging Māori and Pasifika students and their communities <p>Key competencies:</p> <ul style="list-style-type: none"> • Thinking • Using language, symbols and texts • Managing self • Relating to others • Participating and contributing <p>Literacy:</p> <ul style="list-style-type: none"> • English and Te Reo vocabulary building • Can identify animals visually, orally and in writing and is able to connect these <p>Numeracy:</p> <ul style="list-style-type: none"> • Grouping animals according to a variety of criteria

Lessons 3-6

Structure

Activate:

See Teacher Resource link <https://www.foundation.sdsu.edu/sunwisestampede/meetanimals.html>

- Which animals live in trees, in water, on the ground, under the ground?
- Which ones have fur/scales/feathers/wool?
- How do animals in cold places keep themselves warm?
- Why do polar bears have special eye lids?
- Why do meerkats have black rings around their eyes?
- How do camels protect their eyes?
- How do rhinoceros, hippopotamuses, camels and elephants keep cool and protect themselves from the Sun? (See **Resource 2c** for teacher background info).
- How do koalas, chimpanzees, gorillas and rabbits protect themselves from the Sun?
Teacher gives each student/groups a copy of **Resource 2b** to use in the next task.
- On the picture of a koala, meerkat, rabbit and pig, (**Resource 2b**), draw the ways they keep cool and protect themselves from the Sun.

Demonstrate:

Resource 3

Students work in groups. Cut out each of the animal pictures, and place each of the animal pictures under the heading that describes how the animal protects itself from the Sun.

Resource 4

Students work in groups. Students draw a line from each of the statements to the types of Sun protection that is being used by the people in the photographs. Some may have more than one type of Sun protection.

Resource 5

Where do each of the animals live? Students match each of the animals in **Resource 5a** with the places that they live in **Resource 5b**.

Humans are animals too. (Young children may not have this understanding; the teacher needs to make explicit links here as to why we are animals. A useful resource might be <https://scienceonline.tki.org.nz/What-do-my-students-need-to-learn/Building-Science-Concepts/Titles-and-concept-overviews/Is-This-an-Animal-Introducing-the-Animal-Kingdom>)

Do we do the same things that koalas, meerkats, rabbits and pigs do to protect themselves from the Sun?

Teacher goes to www.sunsmart.org.nz/be-sunsmart/be-sunsmart and watches the short video clip. Then click on all the pop-ups on the "learn how to be SunSmart" image and discuss any similarities and differences between humans and other animals.



Lessons 3-6

Structure

Our skin colour can tell a story about our whakapapa and where our ancestors came from. Teacher goes to <https://www.youtube.com/watch?v=gEQYdi3ZvQg>

Discuss as a class: Light skin goes red fastest when it is exposed to the Sun. What does this tell us about the protection needed by people who have light skin when they are in the Sun? What does this tell us about people who have dark skin when they are exposed to the Sun? Do people with dark skin burn in the Sun? Consider our ancestors; where did people with dark skin usually live – in hot or cold countries? Where do people with light skin usually live – in hot or cold countries?

Teacher asks students to identify what type of skin colour they have. **Resource 6a, 6b** and **6c** can be used to help students decide what skin type they are. Alternatively students can also determine their skin type online <https://www.uvdaily.com.au/assessing-your-risk/skin-types/>

What does this tell us about the adaptation that humans are born with that help protect us from the Sun?

Reinforce that while darker coloured skins do give some protection from the sun, it is important that everyone protects their skin from too much sun. Skin cancer is most common in older people with fair skin, but can affect people of all ages and skin colours.

What things can humans do to protect themselves from the Sun? Teacher gives students **Resource 4**.

Why do the people skiing in the snow need to protect themselves from the Sun?

Consolidation:

Students talk about all the outdoor activities that humans do and what happens if they spend too much time outside in the Sun. What happens if we are unprotected and how can we protect ourselves? What can we learn from the animals? Look at how animals in natural habitats manage intensity of heat and sunlight.

Teacher explains that the Sun is one form of energy and provides us with heat and light energy which we can see and feel. The Sun is the main source of radiation. This makes life on Earth possible but it can be dangerous for us. Luckily for us, many of the dangerous rays are blocked by the atmosphere around the Earth.

There are other forms of energy that we can't see and feel. Ultraviolet radiation (UVR) is one that we can't see or feel but it makes our skin burn. Teacher refers to teacher notes in **Resource 2c**.

Discuss with the class how UVR from the sun with the shortest course (line) is the strongest. Teacher shows on the globe how countries like Indonesia, etc. and countries in Africa get strong amounts. What about if you are standing on a mountain in Australia (show on globe)? Will this make you closer to the UVR rays than the people who are on flat land?

Lessons 3-6, Resource 2a
Mix and Match

camel

elephant

hippopotamus

koala

giraffe

chimpanzee

pig

polar bear

possum

rhinoceros

meerkat

gorilla

tuatara

tortoise



Mix and match the English words from the left to the pictures on the right.

Lessons 3-6, Resource 2b
Mix and Match Answers



Camel



Elephant



Hippopotamus



Koala



Pig



Gorilla



Tortoise



Chimpanzee



Polar bear



Rhinoceros



Meerkat



Giraffe



Tuatara



Possum

Lessons 3–6, Resource 2c, Teacher's Notes

How do animals...

Key vocabulary: coat, white, black, shade, water, protect, skin, sunscreen

How do animals in cold climates keep warm?

Polar bear

Polar bears live in one of the planet's coldest environments and depend on a thick coat of insulated fur, which covers a warming layer of fat. Fur even grows on the bottom of their paws, which protects against cold surfaces and provides a good grip on ice. The bear's stark white coat provides camouflage in surrounding snow and ice. But under their fur, polar bears have black skin – making it easier to soak in the sun's warming rays.

How do animals protect themselves from the sun?

Rhinoceros

White rhinos live on Africa's grassy plains where they sometimes gather in groups of as many as a dozen individuals. Females reproduce only every 2.5–5 years. Their single calf does not live on its own until it is about 3 years old.

Under the hot African sun, white rhinos take cover by lying in the shade. Rhinos are also wallowers. They find a suitable water hole and roll in the mud, coating their skin with a natural bug repellent and sunscreen.

Hippopotamus

Hippopotamuses love water, which is why the Greeks named them the "river horse". Hippos spend up to 16 hours a day submerged in rivers and lakes to keep their massive bodies cool under the hot African sun. Hippos are graceful in water, good swimmers and can hold their breath underwater for up to 5 minutes. However, they are often large enough to simply walk or stand on the lake floor or lie in the shallows. Their eyes and nostrils are located high on their heads, which allows them to see and breathe while mostly submerged.

Hippos also bask on the shoreline and secrete an oily red substance, which gave rise to the myth that they sweat blood. The liquid is actually a skin moisturiser and sunscreen that may also provide protection against germs.

Camel

The hump stores up to 36 kilograms of fat, which a camel can break down into water and energy when sustenance is not available. These humps give camels their legendary ability to travel up to 160 kilometres without water. Camels rarely sweat, even in desert temperatures that reach 49°C, so when they do take in fluids, they can conserve them for long periods of time. In winter, even desert plants may hold enough moisture to allow a camel to live without water for several weeks.

When camels do refill, however, they soak up water like a sponge. A very thirsty animal can drink 135 litres of water in only 13 minutes.

Other adaptations help camels thrive in desert conditions. Their nostrils close to keep sand at bay, and they have bushy eyebrows and two rows of long eyelashes to protect their eyes. Large, tough lips enable them to pick at dry and thorny desert vegetation. Big, thick footpads help them navigate the rough rocky terrain and shifting desert sands.

Lessons 3–6, Resource 2c, Teacher's Notes

How do animals...

Elephant

African elephants are the largest land animals on earth. They are slightly larger than their Asian cousins and can be identified by their larger ears, which look somewhat like the continent of Africa. (Asian elephants have smaller, rounded ears.)

Elephants' ears radiate heat to help keep these large animals cool, but sometimes, the African heat is too much. Elephants are fond of water and enjoy showering by sucking water into their trunks and spraying it all over themselves. Afterwards, they often spray their skin with a protective coating of dust.

Baby elephants often stand close to their mothers on the shaded side. Their mother's large body provides shade, and this helps their skin from UV radiation and helps to keep them cool.

<http://animals.nationalgeographic.com/animals/facts/>

For students needing additional language and word recognition skills they can connect to one of the online games.

Animal identification games:

<http://kinderwebgames.com/cat.html>

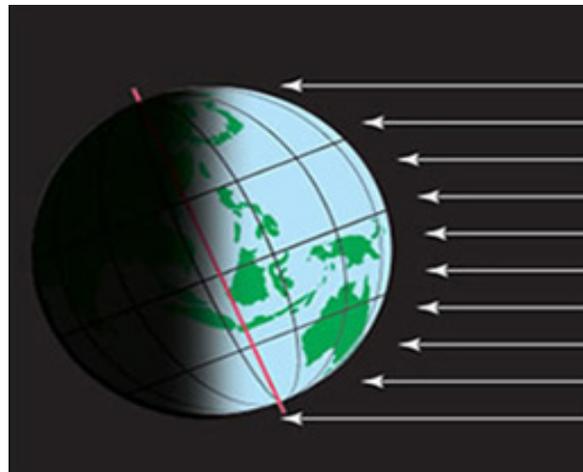
<http://www.learninggamesforkids.com/mammal-games-videos/elephant-games-videos.html>

<http://www.learninggamesforkids.com/mammal-games-videos/bear-games-videos.html>

<http://www.learninggamesforkids.com/animal-games-monkeys.html>

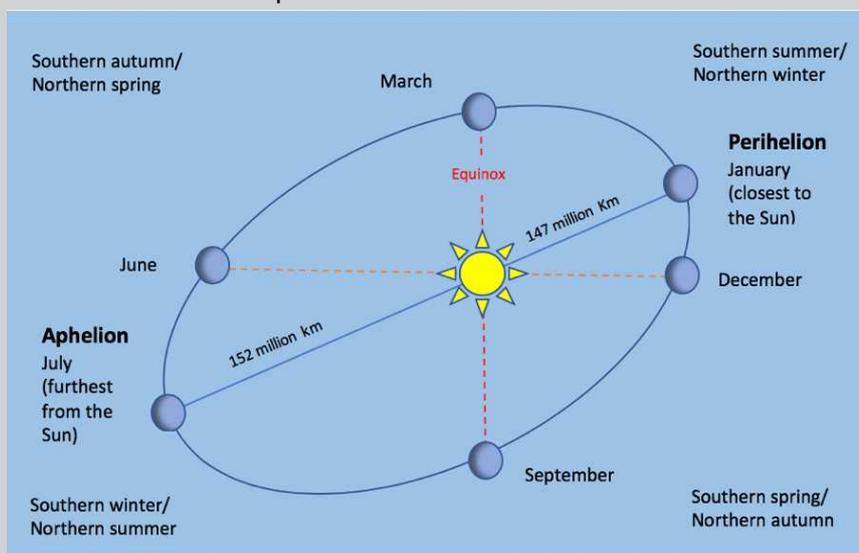
Ultraviolet Radiation

Energy from the sun includes heat, light and UV radiation (UVR). UVR cannot be seen or felt as heat. The amount of UVR reaching the surface is affected by the time of day and the season of the year. The higher the Sun is in the sky, the shorter the course of UV radiation – this means there is more UV radiation at lunchtime than at night. There is more UVR in summer than in winter. The geographic location also has an effect on the level of UVR. The closer you are to the Equator, the more UVR you will experience as you are closer to the Sun. As you go up a mountain the amount of UVR increases as the atmosphere becomes thinner. UVR is also reflected by different surfaces (eg snow, water, concrete).



Perihelion effect:

Due to the earth's axis, New Zealand (southern hemisphere) is closer to the sun in summer than the northern hemisphere is in their summer. This increases the amount of UV radiation received in a southern hemisphere summer compared to a northern hemisphere summer at similar latitude.



Dr Richard McKenzie, Emeritus Researcher on Atmospheric Radiation from NIWA, suggests, "Fair-skinned New Zealanders receive much higher UV radiation levels than our ancestral home in the northern hemisphere (e.g. United Kingdom (UK)) due to New Zealand being much closer to the equator than the UK. Our peak summer UVR levels are also 40% greater than at corresponding latitudes in the northern hemisphere (e.g. Southern Europe, mid USA). Further, because of our mild temperatures, it's comfortable to stay in the sun for too long."

<https://www.sciencelearn.org.nz/videos/87-why-are-uv-levels-high-in-new-zealand-summer>

<https://www.sciencelearn.org.nz/videos/88-uv-index-time-lapse-map-for-new-zealand>

Lessons 3-6, Resource 3

Ways Animals Protect Themselves from the Sun

Work in groups. Cut out each of the animal pictures. Place each of the animal pictures under the heading that describes how the animal protects itself from the Sun.



1. Keeps out of the hot midday Sun and slips in the shade

2. Slaps on dust or mud

3. Slaps on oil to keep their skin moist and act as a sunscreen

4. Wrap on protection for their eyes

5. Wrap on protective shell that protects their body

Lessons 3-6, Resource 4

Slip, Slop, Slap, Wrap

Work in groups. Draw a line from each of the statements below to the type of Sun protection that is being used by the people in the photographs. Some may have more than one type of Sun protection.



Slip into the shade



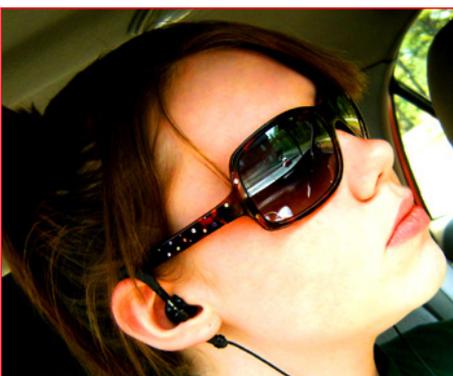
Slip into some sun protective clothing



Slap on a hat with a brim



Slop on plenty of sunscreen



Wrap on sunglasses

Lessons 3-6, Resource 5a

Mix and Match



1



2



3



4



5



6



7



8



9



10



11



12



13



14

Match these animals to their habitats on the next page.

Lessons 3-6, Resource 5b

Mix and Match



Resource 6a



Resource 6b

Skin Types	Characteristics	Genetic Origin
	Never tans, always burns easily, skin particularly light, freckles, reddish hair (all babies and children)	Scandinavian/Celtic
	Skin somehow darker than Type 1, freckles rare, tans slightly, high inclination to sunburn	Caucasians
	Skin light/light brown, no freckles, good tanning ability, very low inclination to sunburn	Central European
	Skin light-brown to olive, no freckles, very good tanning ability, very low inclination to sunburn	South Mediterranean South America
	Skin olive in colour, Sun-insensitive skin, very low inclination to sunburn	Middle Eastern, Asia, some Hispanics and African Americans
	Skin deeply pigmented, Sun-insensitive skin, never burns	African, African American

Resource 6c

Determining your susceptibility to skin cancer – skin type

SKIN TYPE (Fitzpatrick)	RESPONSE TO SUN EXPOSURE	EXAMPLES	SUSCEPTIBILITY
1.	Always sunburn Don't tan	Fair-skinned and freckled Blue-eyed Celtic	Very High
2.	Always sunburn Tan minimally	Fair-skinned, blonde hair Blue-eyed Scandinavians	High
3.	Sometimes sunburn Tan moderately	Fair-skinned, brown hair Brown-eyed Unexposed skin is white	Average
4.	Seldom sunburn Tan easily	Light brown skin, dark brown hair, brown-eyed Unexposed skin is tan Mediterranean, Hispanic	Low
5.	Rarely sunburn Tan profusely	Brown skinned darker Mediterranean, South East Asian, Eastern Indians	Very Low
6.	Never sunburn Deeply pigmented	African Americans	Minimal

Lessons 7–8

Myths and Legends

Assessment Opportunities	Overview Lessons 7–8
<p>Lessons 7–8</p> <p>We are successful when we can:</p> <ul style="list-style-type: none"> re-tell a Sun story using our own pictures and words organise the sequence of events in the story into the right order read and interpret information on the Sun use different sources of information to identify what is a fact (true) and what is fiction (false) about the Sun. 	<p>Prepare:</p> <p>Copy of <i>How Maui Slowed The Sun</i> by Peter Gossage (Penguin) and or a video clip of the story http://www.youtube.com/watch?v=jbM3PwcGi0g <i>Chinese Ten Suns</i> http://www.youtube.com/watch?v=DEzgAilV0zM <i>Daedalus and Icarus</i></p> <p>Teacher runs off enough copies of Resources 7, 8, 9 and 10 for students to work individually, in pairs, or groups of three, as the teacher sees fit.</p> <p>Resource 7 Sequencing <i>How Maui Slowed The Sun</i> Teacher cuts up each set of statements into individual strips and places them in an envelope. Each group gets one envelope containing a complete set of the statements cut into individual strips and one copy of the pictures.</p> <p>Resource 8 Flow diagram. Enough for pairs/groups. <i>Chinese Ten Suns</i> Resource 9 Fishbone analysis. Enough for individual/pairs/groups. <i>Daedalus and Icarus</i> Resource 10 Venn diagram. Enough for individual/pair/groups. <i>Summary.</i> Resource 11 Three-Level guide. Enough for each individual student. <i>Summary.</i></p> <p>Connect:</p> <p>Teacher connects students to the previous lessons. “We have learnt that the Sun is a very powerful source of energy for animals and humans. Without the Sun we would not be able to survive, but too much Sun is also harmful for us. There are many myths and legends about the Sun that have been passed down through the ages.”</p> <p>Teacher reads: <i>How Maui Slowed The Sun</i> by Peter Gossage (Penguin) to students and or shows them the video clip of the story, https://www.youtube.com/watch?v=jbM3PwcGi0g (which is told in Māori with English subtitles).</p> <p>Picture dictation: Teacher then reads/shows the video clip again. This time students draw a series of pictures that describe what happens in the story.</p>

Lesson 7-8

Structure

Activate:

How Maui Tamed The Sun - Sequencing

(See [Resource 7](#).) Students can work in pairs/groups. Each pair or group matches the statements with the picture. Teacher will need to read aloud each of the statements, then ask the students to put the statements against the correct pictures.

Ten Suns – Flow Diagram

Chinese Ten Suns. Students watch the video Ten Suns <http://www.youtube.com/watch?v=DEzgAiIV0zM> and then complete the flow diagram in [Resource 8](#).

Teachers may also like to read the story below to the students. (The story in the text below differs slightly from that in the video.)

‘The suns were the ten children of Di Jun, the god of the eastern sky. Each morning one of the suns would rise, climb into a chariot pulled by a dragon, and ride across the sky, bringing light to the different parts of the world. In this way the Earth got the right amount of sunshine, at the different seasons of the year.

But the ten suns grew bored. They wanted to work together and, one day, they woke early and rode across the sky together in their chariots.

The Earth hated it. It burnt. It cracked. The rivers ran dry. Animals and people grew weak with the heat. But the ten suns were enjoying themselves and would not listen to those who asked them to stop. They laughed and carried on riding around the sky.

Even their father, Di Jun, had no influence over them. To save the world he sent for the Divine Archer and gave him a magic bow ...

The Archer flew on the wind, down to the highest mountain he could see. He had nine arrows in his quiver and, one by one, he shot an arrow at each of the suns. As each arrow struck, the sun exploded and turned into stars.

By the end of the day, only one sun remained. Next day he rose again and his sad tears filled the rivers and made the plants grow again. And that is the sun we see today.’

Adapted from <http://myths.e2bn.org/mythsandlegends/userstory6758-the-stories-of-the-ten-suns.html>

Daedalus and Icarus – Fishbone Analysis

Students watch the story of Daedalus and Icarus and complete the fishbone analysis in [Resource 9](#).

Demonstrate:

Students complete the Venn diagram in [Resource 10](#) (with the teacher if they need support) that shows the similarities and differences between the three stories.

Consolidation:

Students complete [Resource 11](#) (a three-level guide) which is a summary of all the knowledge and understandings they now have about the Sun. Teacher will need to read aloud the instructions and each statement for the students.



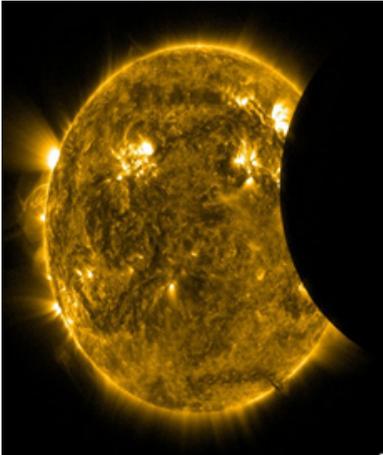
ANSWERS - resource 7

A2 B1 C3 D4 E7 F5 G6 H10 I9 J8

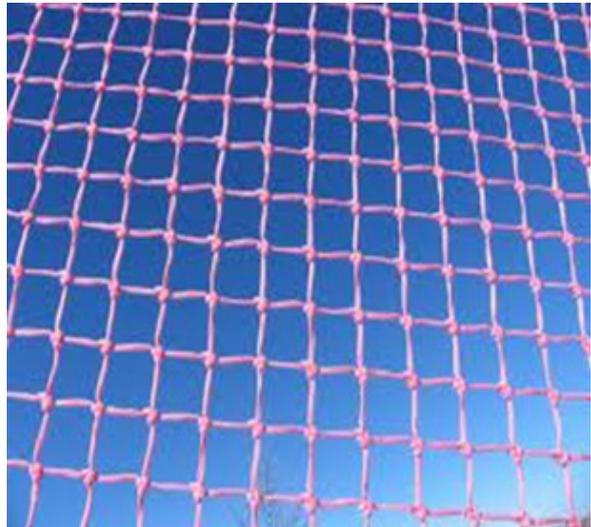
Lesson 7-8, Resource 7

Maui and the Sun – Sequencing

Your teacher will read out sentences that tell different parts of the story about how Maui tamed the Sun. When the teacher reads out the sentence, decide which picture it is describing and place the sentence beside the picture.

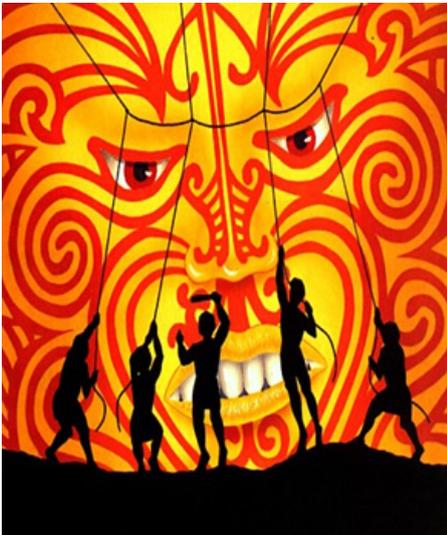
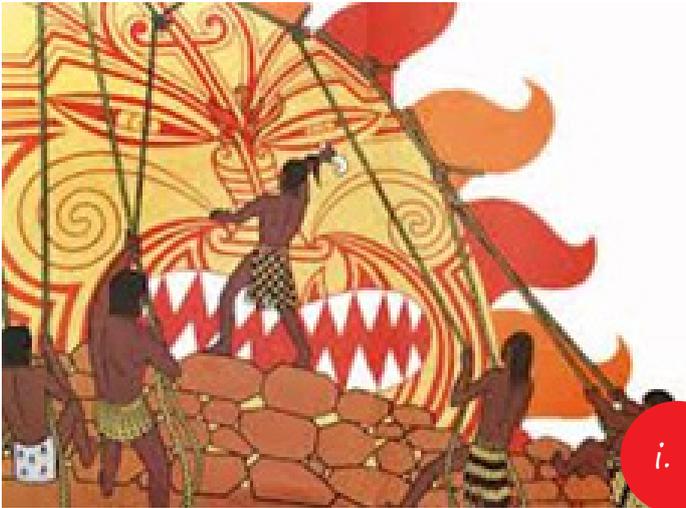
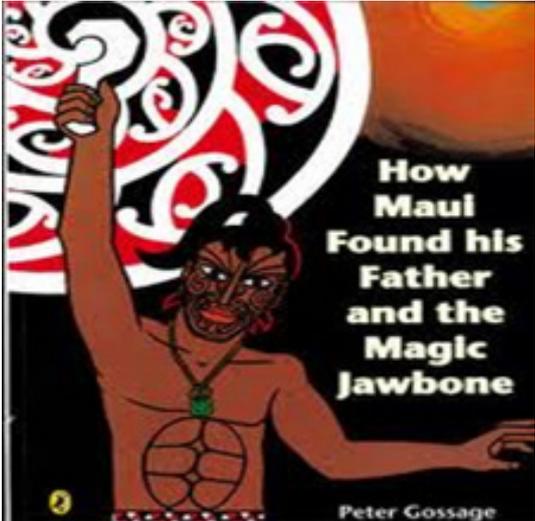
Picture	Sentence that describes what is happening
 <p>a.</p>	
 <p>b.</p>	
 <p>c.</p>	

Lesson 7-8, Resource 7

Picture	Sentence that describes what is happening
 <p data-bbox="766 896 877 1008">d.</p>	
 <p data-bbox="766 1456 877 1568">e.</p>	
 <p data-bbox="766 2016 877 2128">f.</p>	

Lesson 6 - 12: Part One - Front Loading

Lesson 7-8, Resource 7

Picture	Sentence that describes what is happening
 <p data-bbox="770 891 884 1003">h.</p>	
 <p data-bbox="770 1458 884 1570">i.</p>	
 <p data-bbox="770 2033 884 2145">j.</p>	

Lesson 7-8, Resource 7

Picture	Sentence that describes what is happening
 <p data-bbox="767 824 879 936">k.</p>	

Lesson 7–8, Resource 7

Sentences that the teacher will read aloud. Students place the sentences beside the correct picture on the preceding pages.

1. Maui had an idea

2. Maui and his whānau did not have enough daylight to do their jobs

3. Maui said that he could solve the problem by taming the Sun

4. Maui asked the women in the village to make flax ropes
and a net to catch the Sun

5. When the Sun came out of the cave in the morning,
he was trapped in the net

6. Maui told his brothers to pull the ropes as hard as they could

7. Maui and his brothers found the Sun in a cave

8. The Sun was weak and agreed to move more slowly across the sky

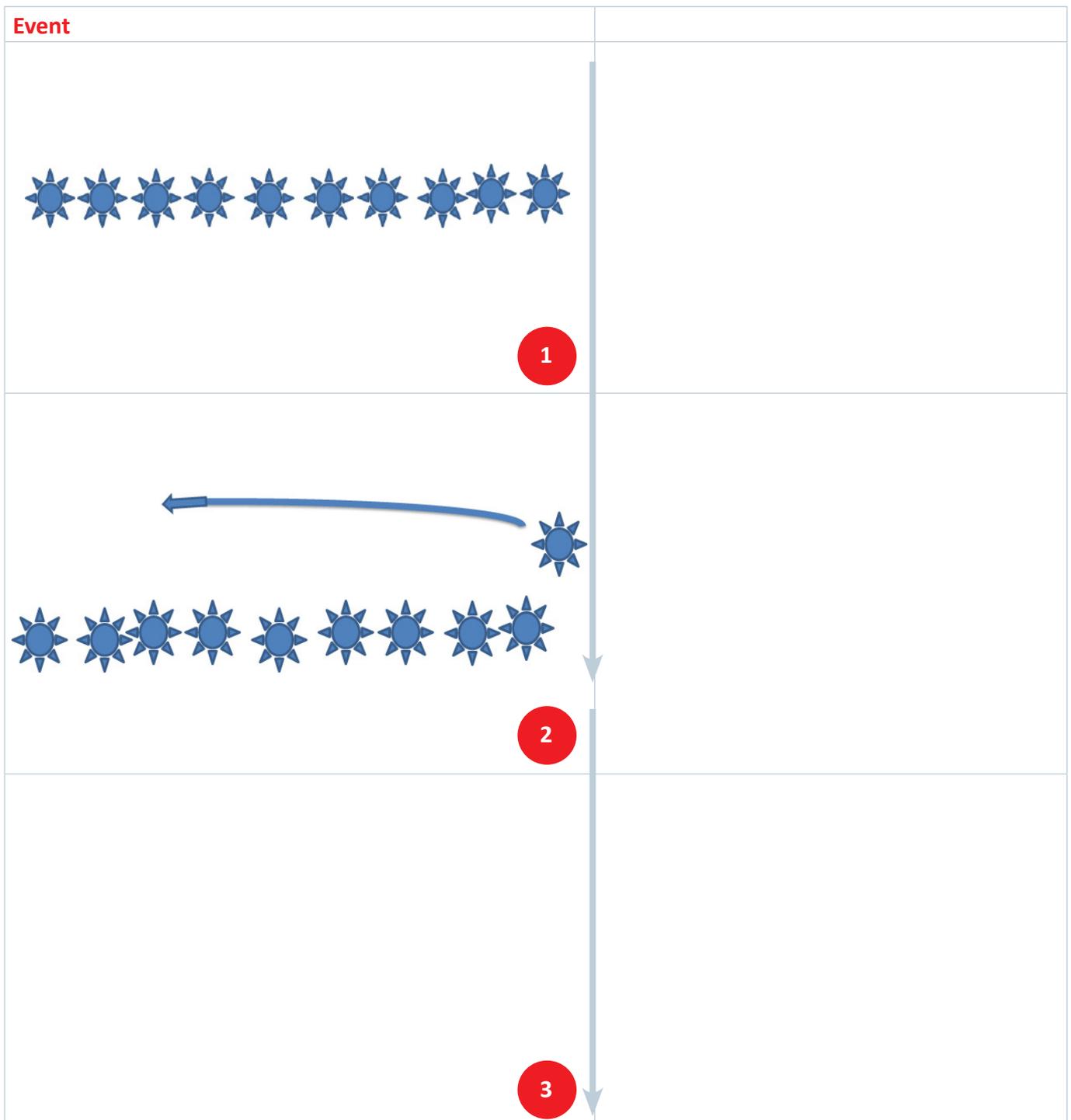
9. Maui hit the Sun with his magic jaw bone

10. The Sun struggled and roared

Lesson 7-8, Resource 8

Chinese Ten Suns

View the Ten Suns video on <https://www.youtube.com/watch?v=DEzgAilVOzM> (or listen to your teacher as they read the story) and then complete the flow diagram below that explains the story. Beside each of the stages in the flow diagram you may like to write what is happening. Draw in the parts of the story that are missing.



Lesson 6 - 12: Part One - Front Loading

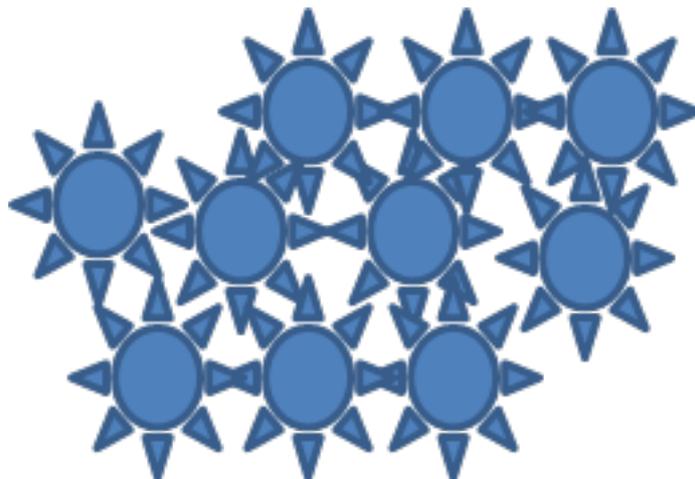
Lesson 7-8, Resource 8

Event	Your version of the story
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 <div data-bbox="798 1249 871 1323" style="text-align: right; border: 1px solid red; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-left: 10px;">5</div>	
 <div data-bbox="798 1727 871 1800" style="text-align: right; border: 1px solid red; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-left: 10px;">6</div>	
<div data-bbox="798 2047 871 2121" style="text-align: right; border: 1px solid red; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-left: 10px;">7</div>	

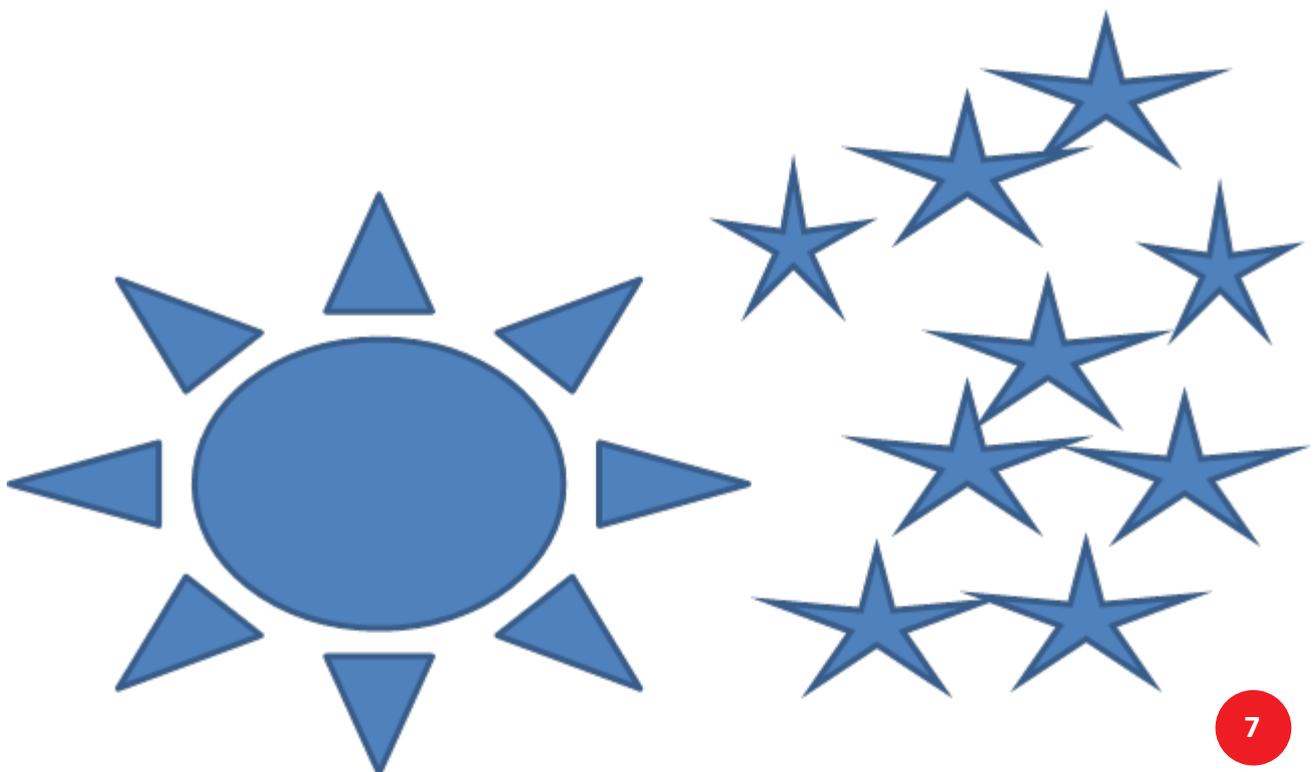
Lesson 6 - 12: Part One - Front Loading

Lesson 7–8, Resource 8

Suggested Images for Resource 8



3



7

Lesson 7-8, Resource 9

Daedalus and Icarus – Fishbone Analysis

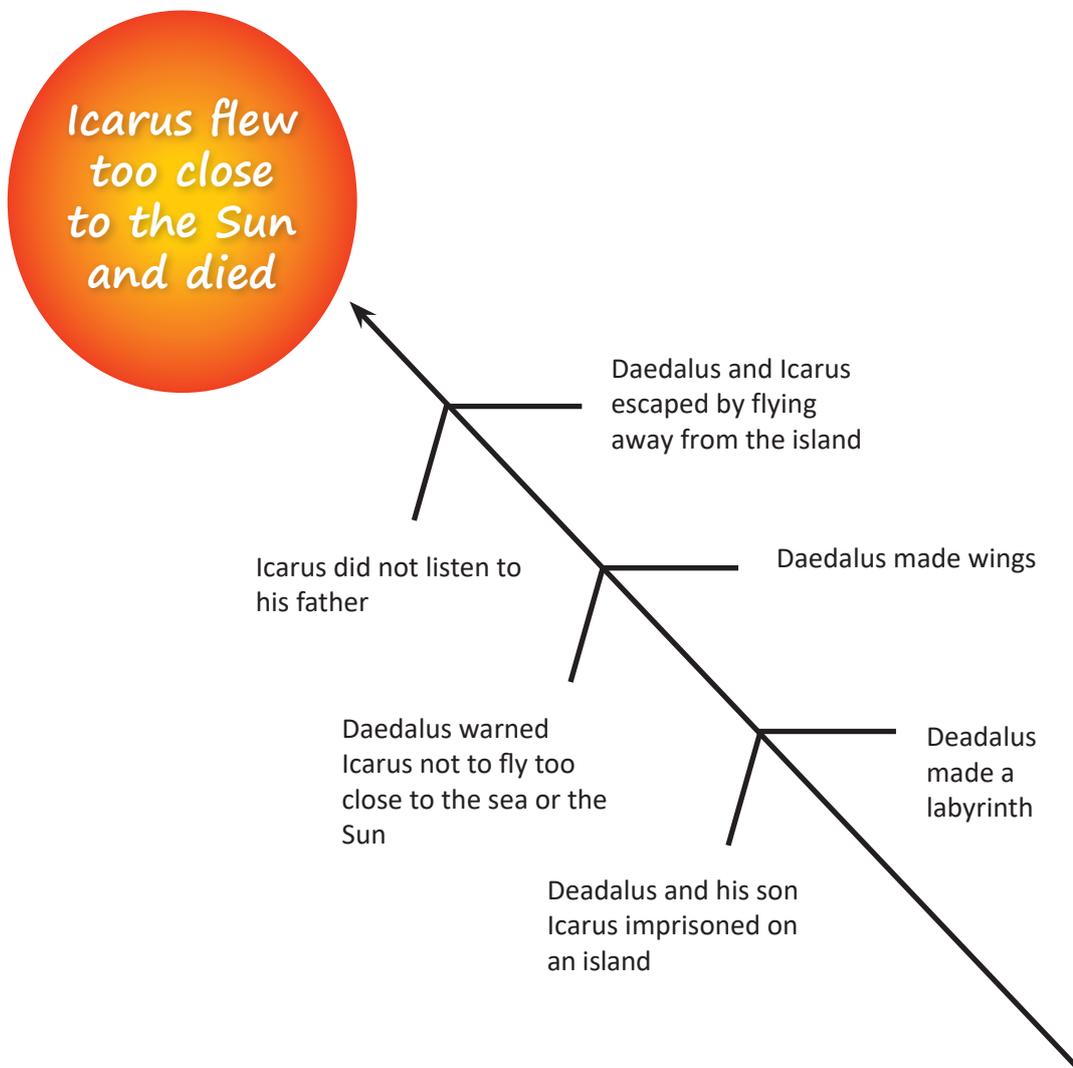
Structure

Lessons 7-8:

After watching the video https://www.youtube.com/watch?v=RVkwWo_LNZs that tells the story about Daedalus and Icarus, complete the fishbone analysis of the story with your teacher. This will help you to remember all the details about the story.



Step 1: Write in the events that led up to Icarus flying too close to the Sun on the fishbone below:

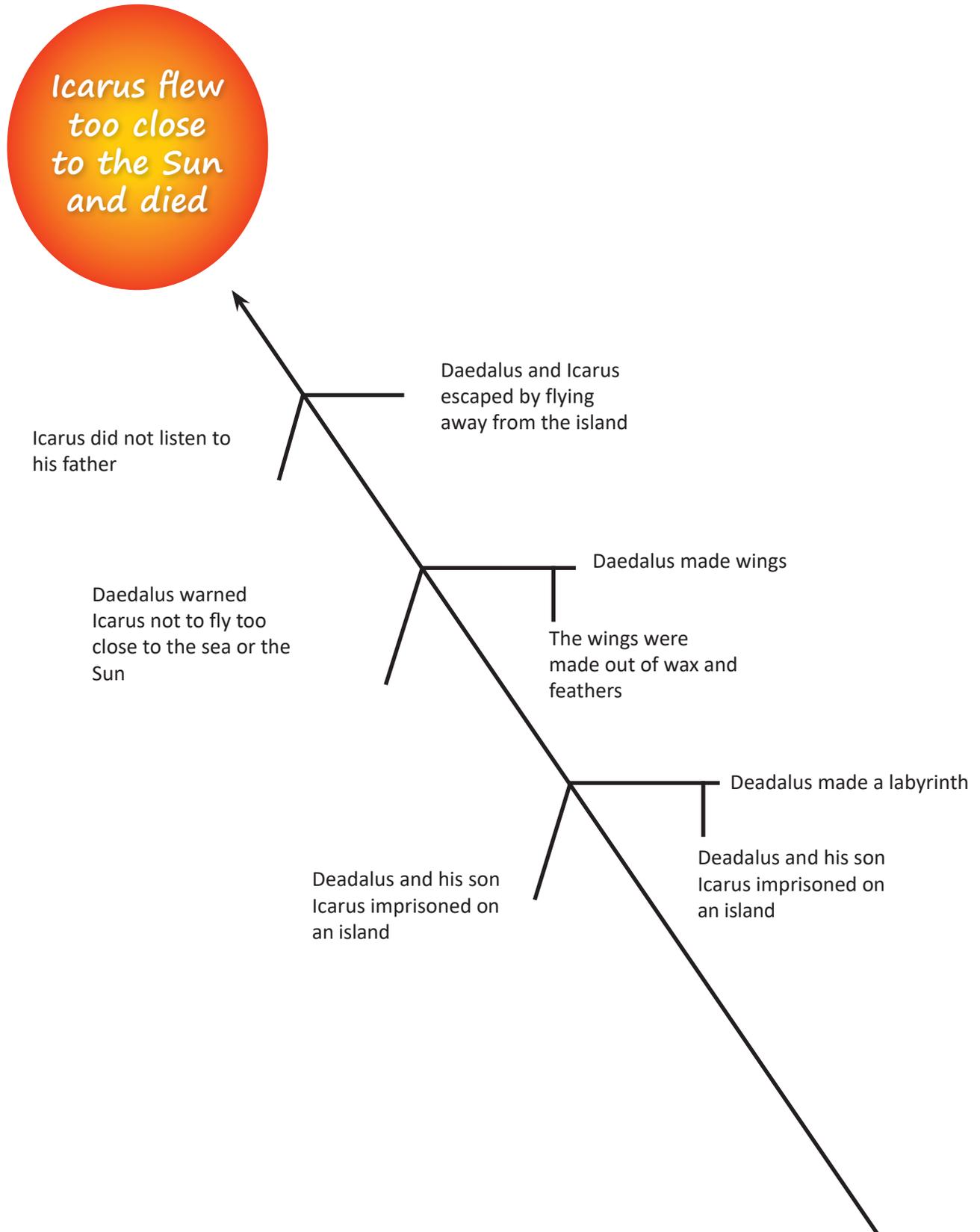


Step 2: Think about the things you know about each of these events. Brainstorm with your teacher any other factors that may affect the situation.

Step 3: With your teacher put in the additional details as the extra bones, as shown in the example on page 42.

Lesson 7-8, Resource 9

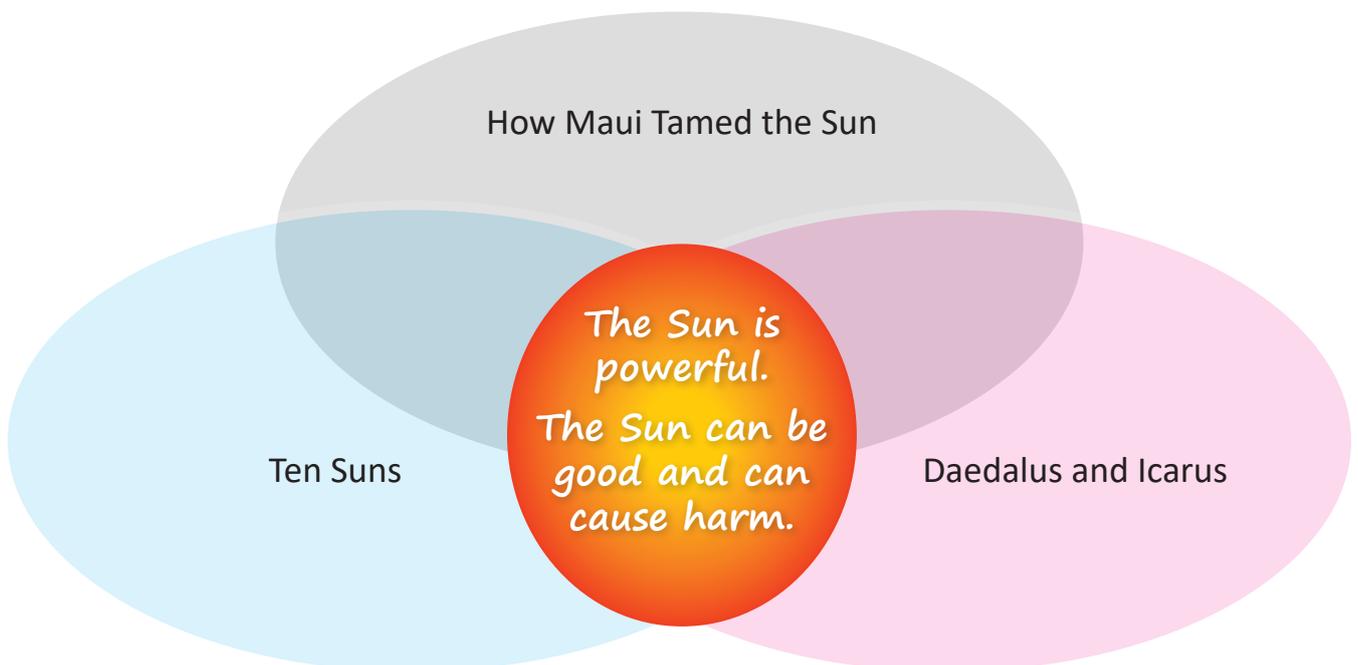
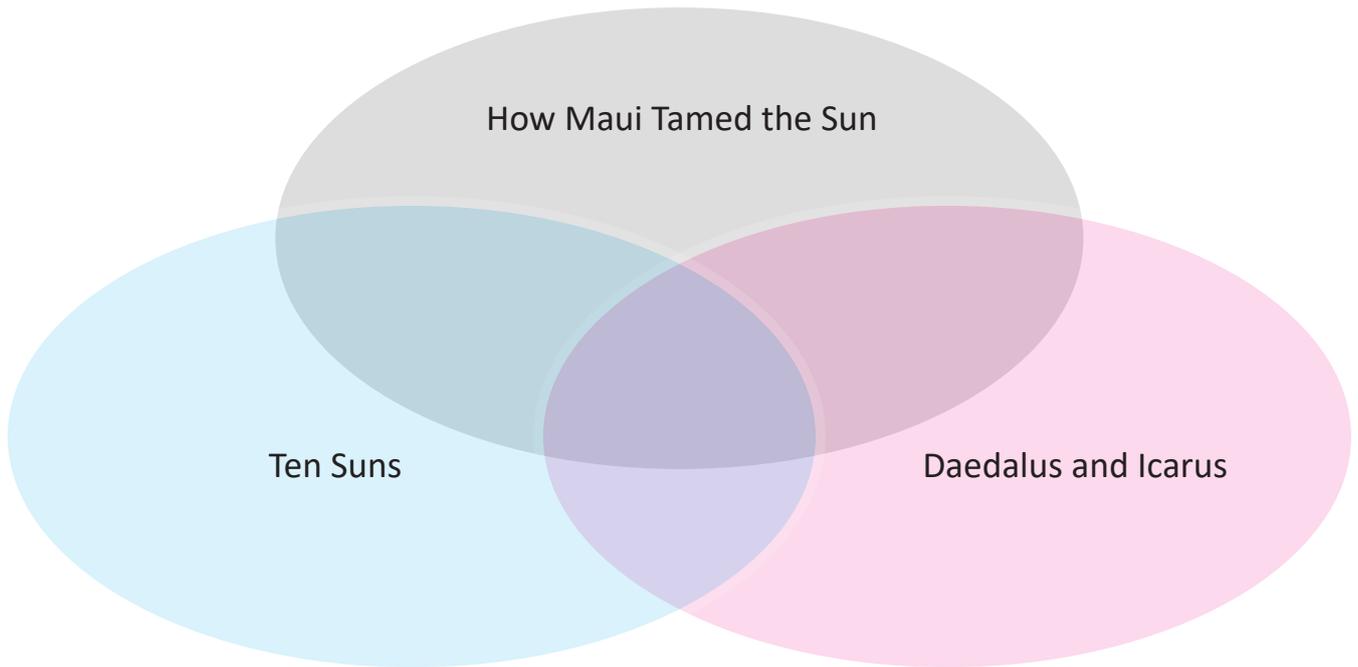
Daedalus and Icarus – Fishbone Analysis



Lesson 7-8, Resource 10

Venn Diagram

Think about the three stories that we have watched and listened to: *How Maui Tamed the Sun*, *The Ten Suns* and *Daedalus and Icarus*. With your teacher identify all the things these stories told us about the Sun. Write these things on the Venn diagram. The things that all the stories told us go in the middle.



Resource 11

Three-Level Guide

Three-Level Thinking Guide – Notes for the Teacher

- Three-level guides were developed by H. Herber around 1970. They are used to help students think through oral, written or visual texts after they have been given some background knowledge of a topic. They can be used across all curriculum areas.
- A three-level guide comprises a series of statements (not questions) that prompt readers to comprehend the text. The purpose of the guide must be clear and must be explained to students. The statements should be designed so that they promote a coherent understanding about some aspect/s of the topic or text (as opposed to a random set of statements about the text).

The Three Levels

Level One → Literal → What's "on the lines"? → Factual Level of understanding
AIM: to enable learners to accurately identify key and relevant information/ideas explicitly stated in the text

Level Two → Interpretative → What's "beyond the lines"?
→ Interpretative Level of understanding
AIM: to enable learners to reflect on and interpret the information,
to pick up the inferences in the text and to draw conclusions from the text

Level Three → Applied → What's "between the lines"?
→ Applied Level of understanding
AIM: to enable learners to apply the content of the text to broader situations
of generalisations beyond the text, but related to or generated from the text.

What are the benefits of Three-Level Guides?

Three-level guides

- show students which information they need to focus on
- encourage students to become close and critical readers and thinkers
- require students to clarify, support, justify and evaluate their thinking
- support less-successful learners by offering models of how to think through the content as they are reading
- provide opportunities for language development through focused small-group discussion.

How do I write a three-level guide?

1. Choose an important content area.
Three-level guides can take time to construct so it is important to base them on something that is significant and important for students to process in depth.
2. Work out what main ideas or understandings you want the students to get out of the text.
3. Write the Level Three (Applied) statements first.
This leads you to work out the main ideas and concepts you want learners to think about. Level three statements should promote discussion and not be able to be answered with a simple "yes" or "no" response. Students should be able to justify their conclusions or responses by referring to the text, but should be thinking beyond the text.
4. Write the Level One (Literal) statements.
Identify the key and relevant information that will lead learners towards the understandings at the applied level. Mix these statements with some information that is not explicitly stated/found in the text.

Resource 11

Three-Level Guide

5. Write the Level Two (Interpretative) statements last.
What can the learners infer from the text by thinking about what the text implies or suggests, but doesn't say directly? These statements need to be a mixture of what can and cannot be inferred from the text. Students need to justify their choices by referring to the text.

How do I use the three-level guide?

- Make sure students understand the purpose of the task, i.e. to reach an understanding of the text at three levels.
- Stress that this is not a simple 'true or false' activity and that Level three in particular will not have 'right or wrong' answers.
- Model the process with a practice guide or with a first question at each level.
- Allow plenty of time to complete all stages of the task.
- You may wish to follow this process for students in the classroom:
 - ➔ Stage One: students work individually
 - ➔ Stage Two: students work in groups – preferably multi-level/mixed ability
 - ➔ Stage Three: present or record and discuss similarities and differences between group responses, especially at applied level.

Resource 11

Three-Level Guide

Below is a list of statements that your teacher will read to you. If you think the statement is correct, you can put a tick ✓ beside the statement. If you think the statement is wrong, you need to put a X.

Statement	✓ or X
1. Animals live in hot and cold places on the Earth.	
2. Animals have lots of different ways to protect themselves from the Sun.	
3. Tigers have special eyelids to protect their eyes from the Sun.	
4. Humans are animals, too.	
5. Humans all have the same skin colour.	
6. Humans with dark-coloured skin burn the fastest in the Sun.	
7. Like animals, humans can protect themselves from the Sun by <i>Slipping</i> into the shade and into sun protective clothing, <i>Slopping</i> on sunscreen, <i>Slapping</i> on a hat and <i>Wrapping</i> on sunglasses.	
8. The Sun sends down ultraviolet radiation (UVR) to the Earth.	
9. We can feel ultraviolet radiation (UVR) as heat.	
10. It is the ultraviolet radiation (UVR) that causes our skin to burn - not the heat from the sun (infrared radiation).	
11. There are many different stories and myths from around the world about the Sun.	
12. The different stories and myths from around the world tell us that the Sun is weak and humans can control it.	
13. The different stories and myths from around the world tell us that the Sun is harmful and very dangerous to humans.	
14. The different stories and myths from around the world tell us that the Sun is very important to humans and animals.	
16. The Sun moves across the sky to create night and day.	
17. The Sun rises in the east and sets in the west in New Zealand.	
18. Unlike Icarus, we need to listen and protect ourselves from the Sun.	
19. We only need to be SunSmart when the temperature is hot.	

ANSWERS

1 ✓ 2 ✓ 3 x 4 ✓ 5 x 6 x 7 ✓ 8 ✓ 9 x 10 ✓ 11 ✓ 12 x 13 x 14 ✓ 15 ✓ 16 ✓ 17 ✓ 18 ✓ 19 x

Lessons 9–21

Part Two – The Nature of Science, Planet Earth and Beyond, Physical and Material World Thinking Like SunSmart Scientists

The Sun is our biggest source of energy. Energy makes things happen. Energy changes things.

OVERVIEW:



Scientists investigate and use observation to ask questions about, understand, think about and explain how the Sun's energy can make things happen.



Scientists share their understanding and knowledge with other people in order to check or improve their explanations of the Sun and its effects.



We can use our understanding to protect ourselves from the harmful effects of the Sun, while still enjoying the benefits.



Lesson 9, Part Two

Assessment Opportunities	Structure
<p>Lesson 9 – Science Experiences We are successful when we can:</p> <ul style="list-style-type: none"> share our understanding with and gain understanding from others (peers and experts) use a KWL chart to record what we know, what we want to know, what we have learnt identify the Sun and some other features of the solar system identify how the Sun is the centre of the solar system identify that the Sun is our biggest source of energy. <p>Lesson 10 We are successful when we can:</p> <ul style="list-style-type: none"> share and think about what we already know about the Sun use information from charts and videos to understand how powerful the Sun is explain that the Sun (energy) makes things happen/changes things; e.g. burns/fades/heats objects use what we know to make SunSmart choices. 	<p>Lesson 9 Just How Powerful is our Sun? How science can help us to find out about and understand the centre of our solar system. Connect and Activate: Science experience – By viewing, discussing, gathering information about the Sun.</p> <p style="color: red;">A Learning Intentions We are learning to:</p> <ul style="list-style-type: none"> find out about the Sun by sharing what I already know and by listening to experts use a KWL chart (Resource 12) to surface the students’ prior knowledge about the Sun. Record 4-5 responses. Record 4 things they would like to know. <p>Connect:</p> <ul style="list-style-type: none"> Display “Our solar system” http://www.seasky.org/solar-system/solar-system.html (Resource 13) Unpack how the chart shows how the Sun is the centre, how the rings show how the planets ROTATE around the Sun. Model this by acting it out. Students need explicit instruction to understand these representations. <p>Activate:</p> <ul style="list-style-type: none"> Talk about how energy changes things or makes things work. How does the picture of the Sun represent this energy (looks like it is glowing, etc.). Link to other things that flow when they are hot; e.g. stove elements, heaters, flames. <p>Demonstrate:</p> <ul style="list-style-type: none"> After viewing clip, ask students what new things they have found out about the Sun and any new questions they might have about the Sun. Record their responses on the KWL chart in different colour. View “I Love Charts”. Look at the Solar System Chart again and talk about how useful charts are to record and present information (language signs, symbols, text). <p style="color: red;">B Learning Intentions We are learning to:</p> <ul style="list-style-type: none"> understand that the Sun is powerful think about how we must be SunSmart because of the Sun’s energy. <p>Procedure:</p> <ul style="list-style-type: none"> Use video clip “Sun Safe Play Every Day” to confirm and add to students’ current knowledge. This clip uses a song about being SunSmart as well as building factual knowledge re: Sun and is tailored for use with young students. Point out how the title refers to every day. Alert students to whenever the Earth is facing the Sun, the Sun’s energy is acting on the Earth. <p>Throughout the unit, you may like to repeat the use of this clip. “Sun Safe Play Every Day” http://www.youtube.com/watch?v=Zc2wE5dVx3Y</p> <p>Demonstrate: After viewing, allow students time to share what they have found out.</p> <p>Consolidate: Help them to record the statements or questions that they have on the two Sun ray graphics (Resources 14a and 14b).</p>

Lesson 9, Resource 12

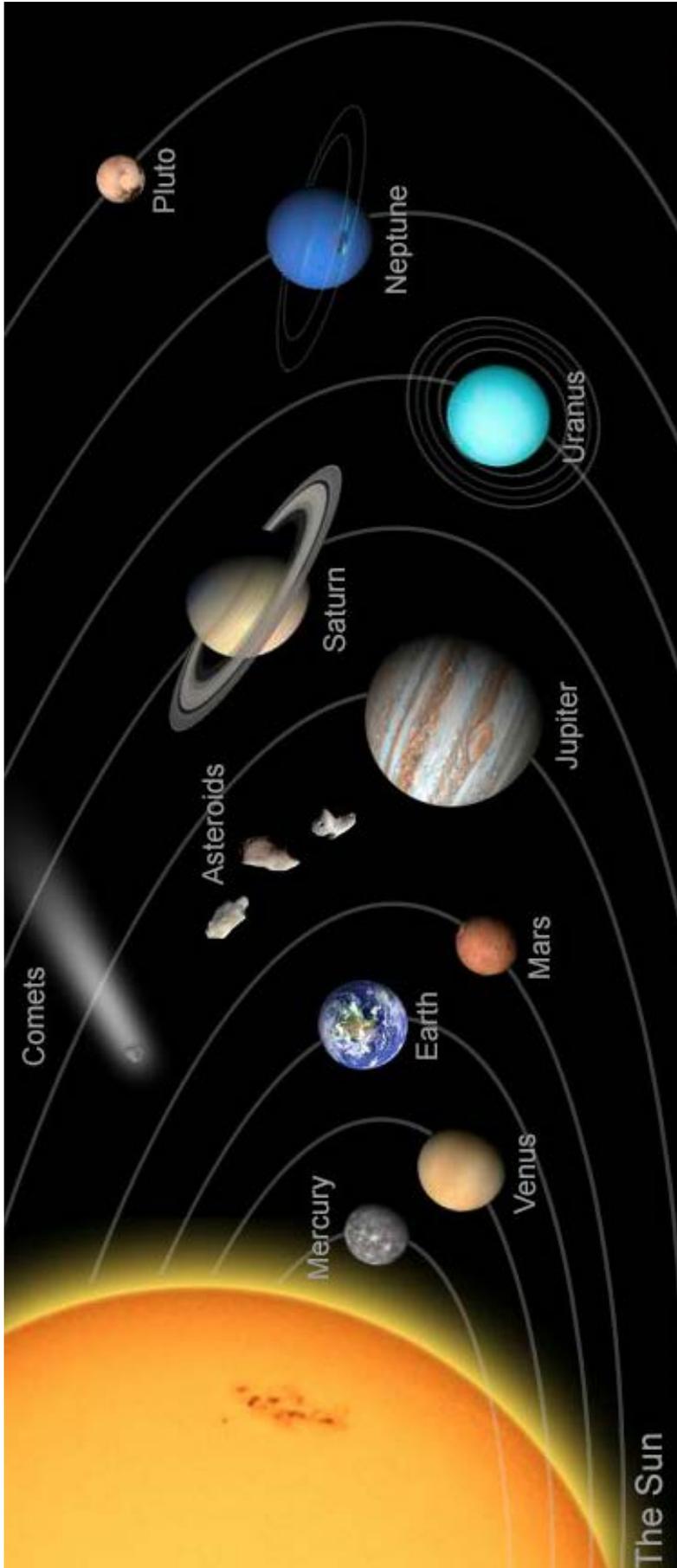
KWL Chart

What I know, what I want to know, what I have learnt.

The Sun		
K	W	L

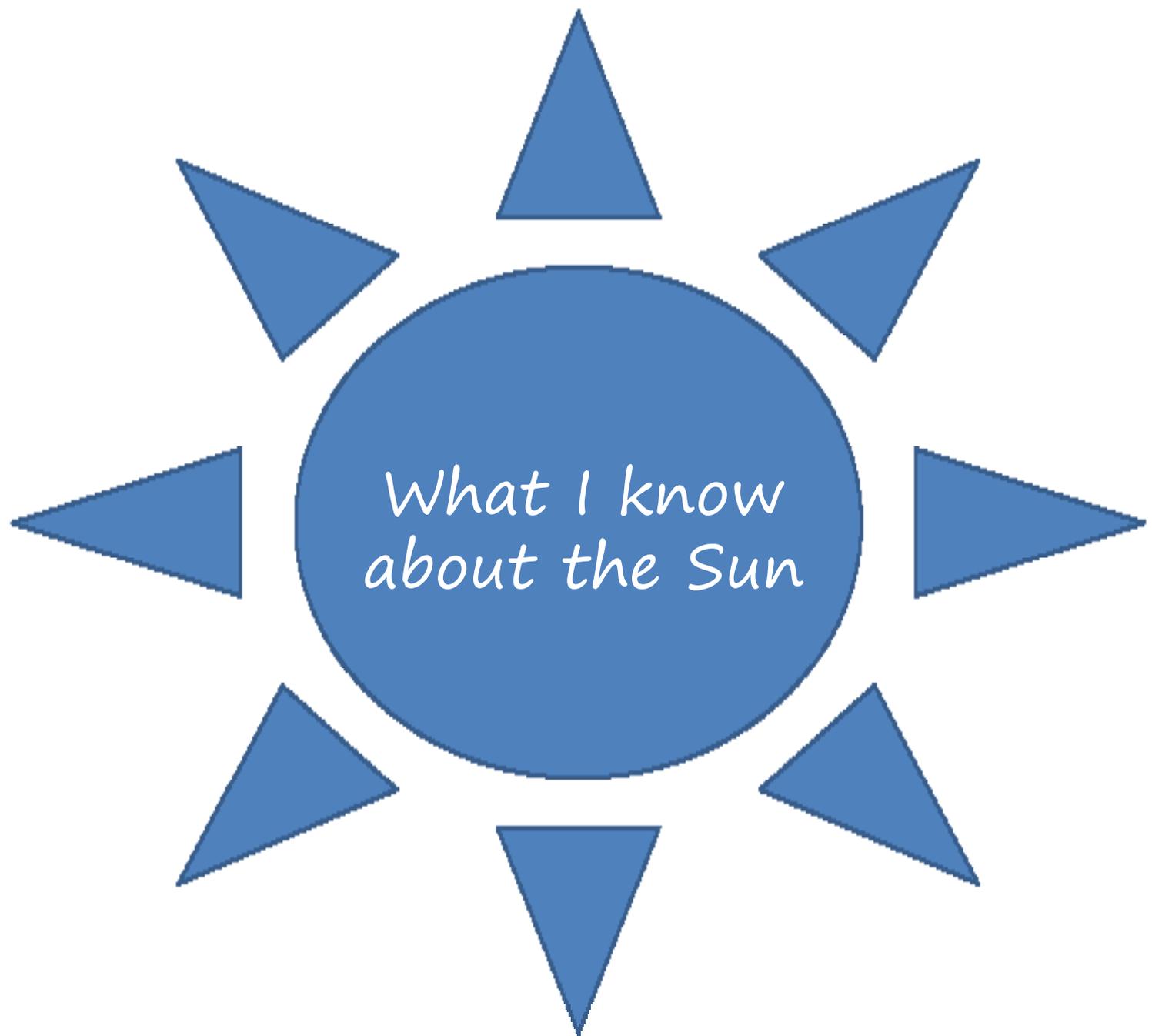
Lesson 9, Resource 13

Our Solar System



Lesson 9-20: Part Two-SunSmart Scientists

Lesson 9, Resource 14a
What I know about the Sun



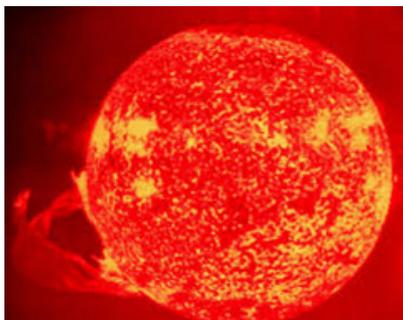
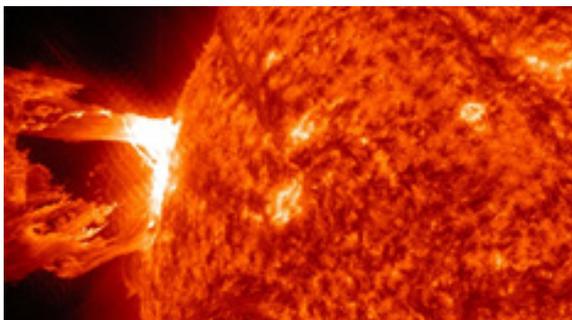
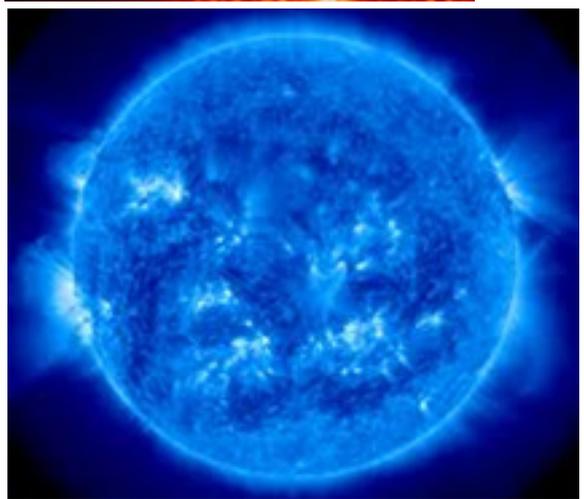
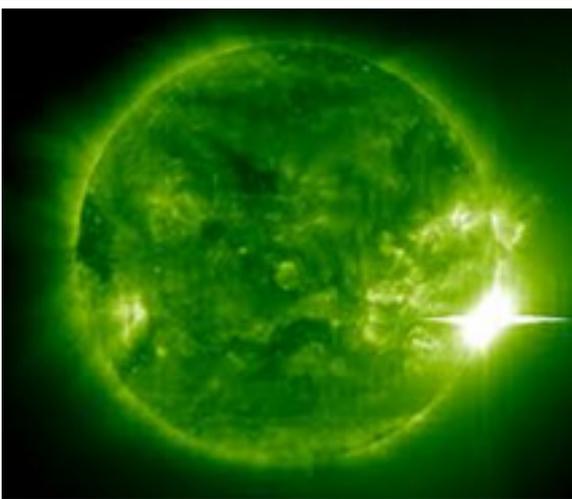
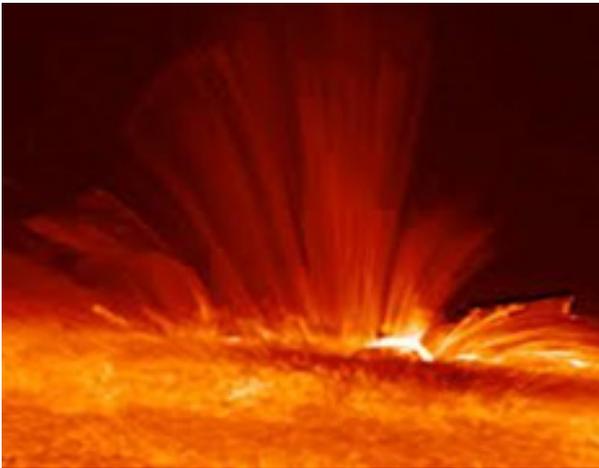
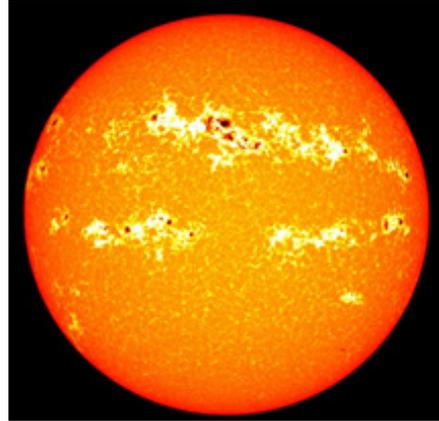
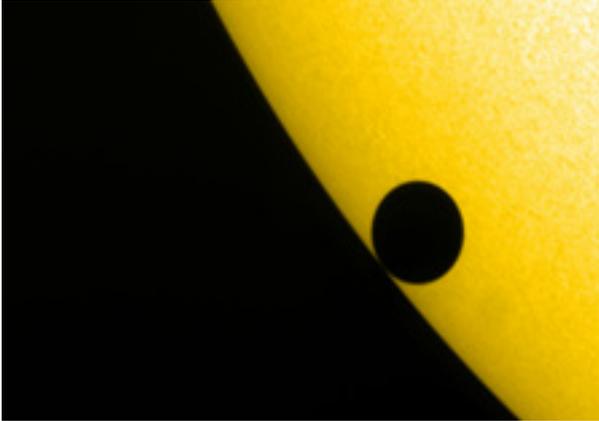
Lesson 9, Resource 14b
Our questions about the Sun



Lesson 10

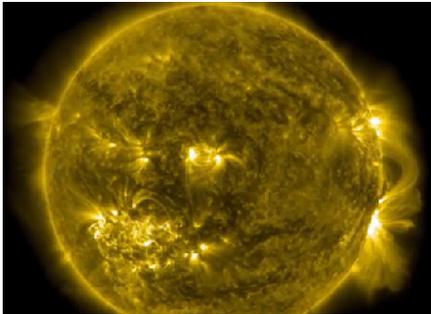
Assessment Opportunities	Structure
<p>Lesson 10 We are successful when we can:</p> <ul style="list-style-type: none"> • share and think about what we already know about the Sun • use information from charts and videos to understand how powerful the Sun is • present our new learning ICT Apps • present our new learning about the Sun by making our own pictures and sharing our ideas with our group. 	<p>Lesson 10 The Sun is very powerful and we must think about and respect this energy. Scientists study the sun and use technology to capture still and moving images of the Sun. We can learn by watching and thinking about what these images show us.</p> <p>Learning Intentions: We are learning to:</p> <ul style="list-style-type: none"> • share what we already know about the Sun • learn from our classmates and experts about the Sun • think about how information about the Sun helps us to make sensible SunSmart Choices. <p>Teacher Preparation: Preview this clip: NASA clip of the Sun https://www.youtube.com/watch?v=lzf51HlyEY8 This clip is important. The previous activities in Lesson 9 used graphic/cartoon representations of the Sun. There is a need to connect students with the ‘real’ in order to build curiosity through the awe and wonder that this clip generates. The clip provides reinforcement of what has been previously explored BUT adds depth through introducing powerful, dynamic images and vocabulary. The clip could be used to help write a class description/story. The scope for science-specific words in combination with figurative language promotes learning.</p> <p>Connect: Teacher reads narration/voice-over on clip: “The Sun has shed light on our home for more than 4 billion years. It will continue to do so for another 4. It is massive almost beyond comprehension. Constant yet ever changing. Born from a swirling cloud of dust and gas, it is a giant fusion engine that drives the solar system. It seethes and boils like a living thing. Loops of plasma rise up, so large they would dwarf Earth. Explosions flash on its surface. And yet the Sun also gives us warmth. And life. And beauty. ”</p> <p>Activate:</p> <ul style="list-style-type: none"> • View “Surface of the Sun As You’ve Never Seen It” https://www.youtube.com/watch?v=lzf51HlyEY8 • Ask students what they noticed, what words would they use to describe the Sun after watching the clip. What wonderings do they have? • Read the above script. How did the narrator describe the Sun? What was special to her? What did she notice/think? Do they agree? <p>Demonstrate:</p> <ul style="list-style-type: none"> • Talk about how the Sun is always there, every day, so we forget to even think about it. Ask how the scientists who study the Sun are able to make us think about the Sun.

Lesson 10, Resource 15
Selection of Sun Images - NASA



Lesson 9 - 20: Part Two - SunSmart Scientists

Lessons 10



The surface of the Sun as you've never seen it

Structure

- Alert students to how science can help us to know more about how the Sun's energy can work here on Earth, even though the Sun is far away from us.

Consolidate:

- Use "Voicethread" <https://voicethread.com/>
- or "Fotobabble" <http://www.fotobabble.com/> to capture student responses to selected NASA Sun images. NASA material is free to use .
- Ask students to draw and colour their own "Sun" images after viewing clips and NASA photos. The different colours shown in the images are as a result of the different filters used to get sharper images. In groups, students share their images and why they have made their particular representation (teacher to model this process – [Resource 15](#)).

Lesson 11, Part A

Assessment Opportunities	Overview Lessons 9–16
<p>Lessons 9–16 We are successful when we can:</p> <ul style="list-style-type: none"> • carry out a plan of action to test our ideas • record data using words, numbers, drawings and photos • use data to make explanations • explain the relationship between exposure to the Sun and how materials can fade • explain how a green plant reacts to the presence or absence of light from the Sun • explain that the Sun can change non-living and living things. 	<p>Lessons 9–16 Investigate: The following experiences/experiments have been organised to develop understanding of the Sun and how heat and light energy work in everyday situations. Some of the experiences may seem to be repeats of the same concepts; however, students need to meet concepts in different contexts to consolidate understanding. You will be providing students with experiences that build their understanding both of the Nature of Science and contextual knowledge of the Natural World.</p> <p>Lessons:</p> <ul style="list-style-type: none"> • We are investigating the effect that sunlight has on: <ul style="list-style-type: none"> • black paper • green plants. • We are investigating how quickly sunlight can heat water in different-coloured containers. • We are investigating whether different colours affect how quickly heat from the Sun melts ice. • We are investigating how the Sun makes shadows. • We are investigating how to make and use a sundial.

Lesson 11:

This lesson has two parts. Both parts to be set up on the same day or as close together as possible.

Part A

We are investigating the effect that sunlight has on living and non-living things: black paper and green plants

Learning Intentions

We are learning to:

- design a scientific way of testing how sunlight changes things
- predict what will happen to paper when we put it in different amounts of sunlight
- predict what will happen when green plants get different amounts of sunlight
- record data using photos.

Part B

- Investigates the effect different amounts of sunlight has on green plants.

Structure

Lesson 11: Part A

- Need black sugar paper. Cut three strips about 15 cm deep and as long as the length of the sheet (about 90 cm).
- Cut out three sets of coloured craft paper shapes. The size of the shapes need to be big enough to fit on the strips and be secured top and bottom with paper clips for easy removal.

Procedure:

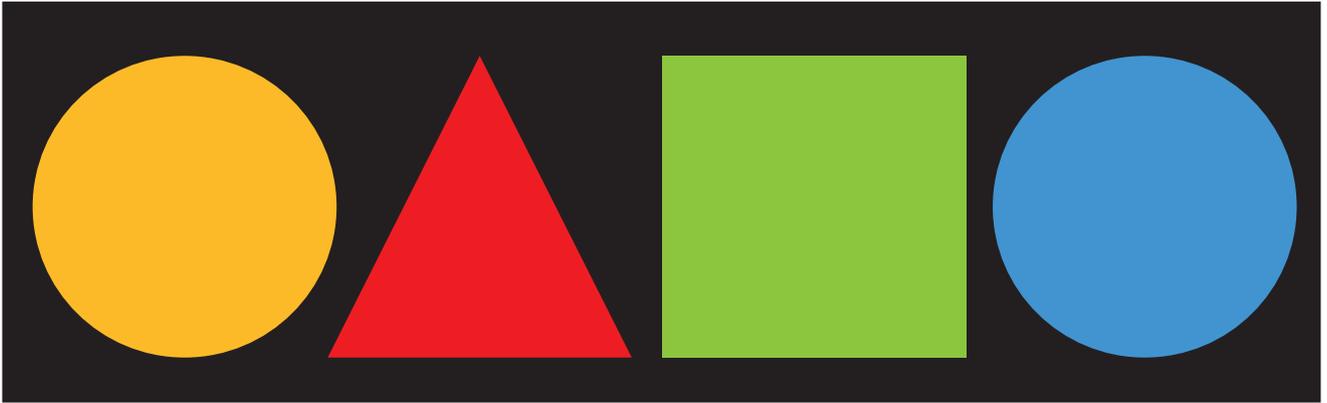
Connect and Activate:

Show students three strips.

- We want to test what happens when we put this strip in the window. What shapes have I attached? Why do you think I have put these shapes on?

Lesson 11, Part A

Structure



- Secure one strip onto classroom window, ensuring the side with shapes faces outside.
- If I wanted to do the opposite with this strip, where might I put it?
- So the opposite of 'in the Sun' would be 'no sunlight', so we will put this in the cupboard (place 2nd strip in cupboard).
- Where might we put this last strip to show something in between?
- We call this being in the shade. Choose a place and secure the strip. We will leave the strips for two weeks and check.
- We have three places now to try out. We are trying to find out what happens in different amounts of sunlight (need to repeat and be explicit with young students – introducing them to experiment, design and thinking).

Demonstrate:

- Ask students to predict what they think will happen. Record on chart ([Resource 16](#)).
- At the end of two weeks, ask students to revisit their predictions, what they think might have happened (think/pair/share). Record a response.
- Look at each strip in turn. Take photos of outcomes. Make a wall display with the strips and annotate with student observations/thinking.
- Can students offer explanations? Tell students that scientists use the evidence (observations) they collect to help them explain what has happened.

Consolidate:

- Write a group explanation to display.

Lesson 11, Resource 16
Sunlight Record Sheet

Investigating the Effect of Sunlight on Paper

Our Predictions

Changes

Lesson 11, Part B

Structure

Lesson 11, Part B

Investigating the effect of different amounts of sunlight on green plants. Start this the same day if possible.

Prepare: Three indoor plants of same type and size (e.g. lemon balm.)

Procedure:

Connect:

- Ask students: When we set up the three paper strips to test the effect of sunlight on paper what did we decide to do? What plan did we have? Could we use this same plan to find out about green plants?

Activate:

- Can you predict what might happen to each plant? Why?

Demonstrate:

- Divide students into three groups. Give each group time to look carefully at their specimen. Ask them to look at the leaves. What do they look like? Are they the same size? How are they joined to the stem? What colour are they? Use opportunity to identify plant parts. What is under the soil? Roots, etc. (Complete [Resource 17](#)).
- Take photos of each plant. Insert photo on chart. Measure the biggest leaf and the smallest leaf on each plant. Measure the height of the plant. Record.
- Tell students that scientists use numbers to describe things accurately (measurement is a description).
- Students to describe leaf colour. Record (as shown on next page).
- Place one plant in direct sunlight, one in indirect light and the other in a dark place where there is no Sun (e.g. in a cupboard or in a box).
- Take photos of each plant every two/three days for two weeks and make a wall display of the picture diary. Record student plant progressions under photos.
- At the end of two weeks, each group has time to observe their plant and to share their findings with the other groups. This reporting-back time can be organised by regrouping so new groups have members from each original group. The children may need a photo prompt for their plant to support their reporting back. Or each group could nominate one or two members or a whole-class reporting-back time.

Synthesising Part A and Part B

- Reiterate the aim of the two investigations. How were they the same? How were they different? How did students collect data? What explanations did they have for each investigation?
- What can they now say about the effect of the Sun on their living plant and non-living material (paper).

Restate: The Sun is powerful. The Sun's energy can change things. Remind students the Sun's UVR differs from its heat energy. UVR can change and damage our skin. We need to be SunSmart when we are in the Sun.

Lesson 11, Part B

Record Sheet

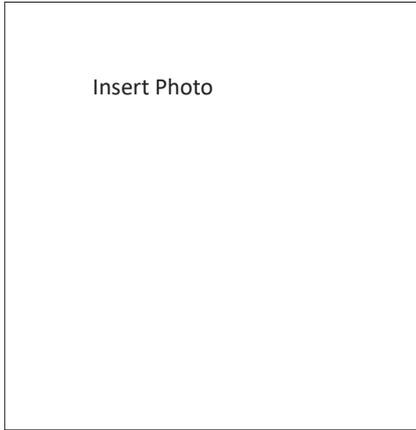
In the Sun/no sunlight/shade
DAY __ : DATE



Insert Photo

Measurement of biggest leaf:
Colour of biggest leaf:
Measurement of smallest leaf:.....
Colour of smallest leaf:.....
Height of plant.....

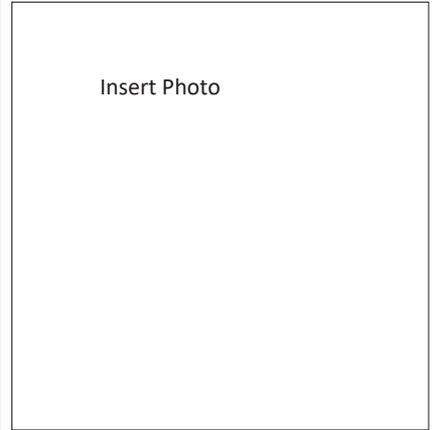
In the Sun/no sunlight/shade
DAY __ : DATE



Insert Photo

Measurement of biggest leaf:
Colour of biggest leaf:
Measurement of smallest leaf:.....
Colour of smallest leaf:.....
Height of plant.....

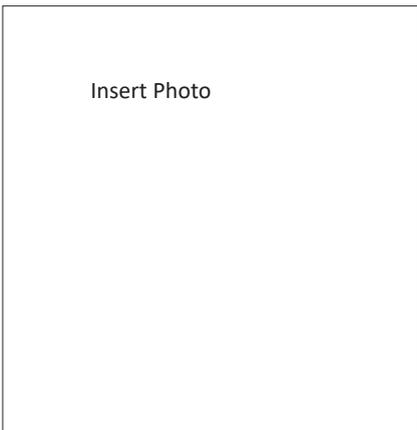
In the Sun/no sunlight/shade
DAY __ : DATE



Insert Photo

Measurement of biggest leaf:
Colour of biggest leaf:
Measurement of smallest leaf:.....
Colour of smallest leaf:.....
Height of plant.....

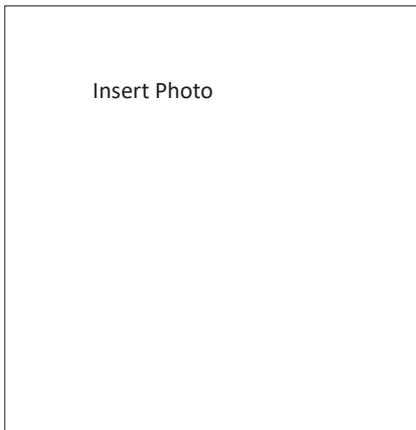
In the Sun/no sunlight/shade
DAY __ : DATE



Insert Photo

Measurement of biggest leaf:
Colour of biggest leaf:
Measurement of smallest leaf:.....
Colour of smallest leaf:.....
Height of plant.....

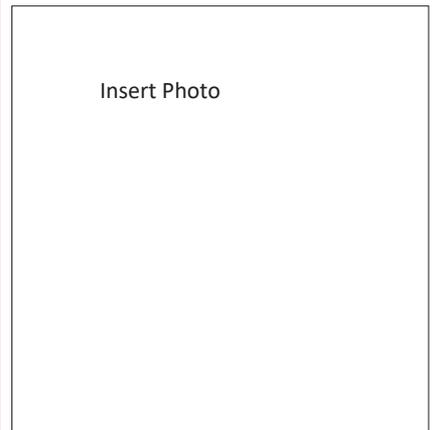
In the Sun/no sunlight/shade
DAY __ : DATE



Insert Photo

Measurement of biggest leaf:
Colour of biggest leaf:
Measurement of smallest leaf:.....
Colour of smallest leaf:.....
Height of plant.....

In the Sun/no sunlight/shade
DAY __ : DATE



Insert Photo

Measurement of biggest leaf:
Colour of biggest leaf:
Measurement of smallest leaf:.....
Colour of smallest leaf:.....
Height of plant.....

Lesson 11, Part B, Resource 17

Our Plant

STARTING DATE:

Scientists collect data at the beginning of their experiment. They can use words, pictures, drawings, numbers, videos and photos.

POSITION: In the Sun/no sunlight/shade.



Measurement of biggest leaf:

Colour of biggest leaf:

Measurement of smallest leaf:.....

Colour of smallest leaf:.....

Height of plant.....

Lesson 12

Assessment Opportunities	Overview Lesson 12
<p>Lesson 12 We are successful when we can:</p> <ul style="list-style-type: none"> • explain how we can use words and numbers to measure how hot or cold a place is • understand when a thermometer is hot or cold • read the numbers on a thermometer • compare temperature readings • explain why it is important to time how long the investigation lasts • explain the relationship between exposure to the Sun and temperature. 	<p>Lesson 12 We are investigating how quickly sunlight can heat water in different-coloured containers. Students will be using different ways to collect and record their observations. The first part of the lesson they will be building our investigation skills ready to use in the second part.</p> <p style="color: red;">Part A</p> <p>Learning Intentions We are learning to:</p> <ul style="list-style-type: none"> • use our sense of touch and sight to identify the difference between two cups of water • use a thermometer to measure temperature • use words and numbers to describe the change • record results.

Structure

Prepare:

For each group of four students:

Cup of very cold water, cup of warm water, thermometer, recording sheet, towels for spills.

- Organise groups of four

Connect:

- Refer to previous experience and outcome of Lesson 11. What did you notice about how the Sun affects plants? What caused the changes?

Activate:

- In the first part of the lesson, we are going to practise using our sense of touch to describe the temperature of hot and cold water.
- First we are going to use our fingers and words. Then we are going to use a thermometer and numbers.
- Distribute one cup of very cold water to each group. Ask students to take turns testing the temperature using their finger. Ask them to share their describing words with members of their group.
- Discuss how when we use a finger we can only use words (warm, hot, cold, etc.). List words on teacher chart.
- Have students circle correct words on their recording sheet (**Resource 18**).
- Distribute a thermometer to each group. Have group members, in turn, examine the thermometer. What can they see? (Line of alcohol, numbers).
- Explain that this line will let them know what the temperature is by looking at where the line starts and noticing the number where the line stops.
- Show the students the thermometer diagram on their recording sheet. Model record of starting temperature on teacher chart. Direct students to record the starting temperature on their recording sheet.

Demonstrate:

- Each group to place their thermometer in their cup of cold water. Allow time for temperature to register and get students to record on their sheet (model this on teacher chart).
- Distribute cup of hot water (not too hot) and repeat process.

Consolidate:

- Once the recordings have been made, encourage all the students to have turns using the thermometer.
- During this experience expect students to try holding thermometer in their hand etc. – it's all learning and exploration.

Lesson 12

Structure

- Ask students if they are now confident about using the thermometer.

Part B

We are investigating how quickly sunlight can heat water in different-coloured containers.

Learning Intentions

We are learning to:

- use words and numbers to describe change
- use a watch/timer
- record results
- decide if data shows that the sunlight changes the water.

Prepare:

Each group needs:

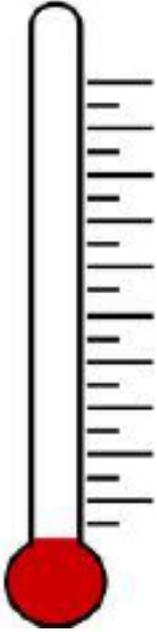
Four empty soft drink cans; four rubber bands; four sheets of paper (one white, one black plus two from a selection of colours, cut to size so that can is able to be wrapped in paper and secured by rubber band); thermometer; jug of water; towels for spills; recording sheet for each student ([Resource 19](#)).

Procedure:

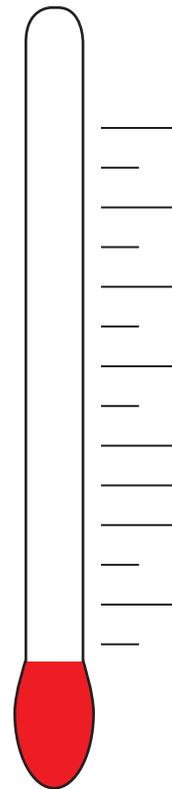
- Remind students: We are learning how energy from the Sun can change things.
- Today we are going to do an investigation to test how quickly water heats up in different-coloured containers.
- To keep this fair we are going to keep the size of container, the amount of water and the starting temperature of the water the same. We will put them outside in the same place. Only the colour of the can will be different.
- Demonstrate the following: Wrap can with black paper. Secure with rubber band.
- Instruct students to wrap their cans. They will need to help each other with this. Point out that scientists often need to help each other as well.
- Distribute student recording chart. Students to colour in their can.
- Distribute jugs of water to groups. Take starting temperature.
- Students record on their chart by drawing line on thermometer graphic.
- Point out how everybody will have the same starting temperature.
- Each child to fill their own can to the top. Be prepared for spills. Be patient. Don't do this part for them. Science is TACTILE!
- Let students carry their group's cans outside to place in sunlight.
- Set timer and leave outside for 1½ hours.
- Once the cans are set up and you have returned to class, ask students in their groups to discuss which colour can they think will be most effective, and why.
- Record each group's suggestion.
- At end of 1½ hours check the temperature in the cans.
- What has happened? Allow students time to share their results in their group.
- Collate findings of all groups. What do these results show?
- Explicitly connect outcomes to the investigation aim. Does colour make a difference?
- Link to Lesson 11.

Teacher Note: Remind students that the sun's heat energy differs from the ultraviolet radiation which can cause us damage. Therefore, temperature cannot be used to indicate your risk of getting sunburn.

Lesson 12, Part A, Resource 18

<p>Cold Water</p> 	<p>Describing Words</p> <p>Cold</p> <p>Warm</p> <p>Freezing</p> <p>Icy</p> <p>Hot</p> <p>Chilly</p>	<p>Thermometer</p> 
<p>Hot Water</p> 	<p>Describing Words</p> <p>Cold</p> <p>Warm</p> <p>Freezing</p> <p>Icy</p> <p>Hot</p> <p>Chilly</p>	<p>Thermometer</p> 

MY CAN:



Lesson 13

Assessment Opportunities	Structure
<p>Lesson 13 We are successful when we can:</p> <ul style="list-style-type: none"> prepare equipment to use in an investigation use our data to think about what is happening and why make a statement about the Sun, water and the colour of the paper. 	<p>Lesson 13 We are investigating whether different colours affect how quickly heat from the Sun melts ice?</p> <p>This investigation will reinforce that the Sun can change things as well as how different colours absorb more or less energy. There is a need to link these discoveries to how the more energy that is absorbed, the faster change can happen. In these explorations students can experience how darker colours can absorb more energy.</p> <p>As students will be outside during this exploration they need to wear their sunhats and sunscreen. Link this to what they have been learning.</p> <p>We have been noticing how the Sun has energy that changes things, so that is why we wear our hats and sunscreen: to protect us from too much of the Sun’s energy.</p> <p>Learning Intention We are learning to:</p> <ul style="list-style-type: none"> predict what will happen and give a reason. <p>Prepare: For each group:</p> <ul style="list-style-type: none"> 4 ice cubes 4 small Ziploc bags 4 coloured sheets of paper (1 black, 1 white, 2 other colours) <p>Procedure: (on a sunny day)</p> <ul style="list-style-type: none"> Discuss previous experiment findings. Get students to refer back to the data they gathered. What conclusion do they come to about the role of the Sun? Are they articulating that the Sun’s energy (heat and light) is able to change things? After review and discussion, each group sets out their coloured paper on a grassy surface. Avoid placement on concrete or asphalt as their stored heat will affect the outcome. Allow students to observe and sketch what happens. Take photos. Return to classroom. Discuss whether their findings confirm what they have observed in previous explorations.

Teacher Note: Remind students that the suns heat energy differs from the ultraviolet radiation which can cause us damage. Therefore, temperature cannot be used to indicate your risk of getting sunburn.

Lesson 14, Part A, B, C, D

Science Experiences

Assessment Opportunities	Overview Lesson 14, Part A, B, C and D
<p>Lesson 14</p> <p>We are successful when we can:</p> <ul style="list-style-type: none"> • share and use what our group knows about shadows • record data using drawing and photos • use the results from our shadow investigation to identify patterns made over time • make links to previous learning about the Sun and its energy. 	<p>Lesson 14</p> <p>We are investigating the link between the Sun and shadows. This investigation needs to be carried out over several days. (Parts A, B, C and D.)</p> <p>We are learning to:</p> <ul style="list-style-type: none"> • share our thinking about shadows using drawings and discussion • think about how investigating shadows can change or add to what we know about how the Sun works • use photos to gather and think about evidence • use our evidence to predict what will happen next • identify that changes need time to take place • identify that some changes form a pattern • think about how gathering data helps us to be better observers • check whether there is a link between shadows and temperature • use our observations to make links between how humans and other living things behave in the Sun. <p>Prepare: (on a sunny day)</p> <ul style="list-style-type: none"> • Sunhats / sunscreen • Chalk – several different colours • Camera <p>Part A.</p> <p>We are learning to:</p> <ul style="list-style-type: none"> • share our thinking about shadows using drawings and discussion • think about how investigating shadows can change or add to what we know about how the Sun works.

Structure

Overview:

- Start with students drawing a picture of themselves and their shadow.
- Bring students together to share their drawings.
- Ask students to think about what they know about shadows, when and where have they seen them, whether they know how shadows are made.
- Direct them to use their thinking and their drawings and to talk to their partner. Tell them to listen carefully to each other to check if their partner has the same or different ideas and experiences.
- Reinforce that in science sharing and collaborating is very important and that real collaboration starts with being able to listen to what somebody else has to say.
- Select a few students to share. Ask if anybody else can ADD to what has already been said.
- The role of the Sun will probably be identified.
- Ask the students to look at their drawings, and to draw where they think the Sun would be in the sky when the shadow was made.
- Collect drawings and display on wall as “What I Know Now”.
- Leave room next to the drawing for drawings completed at the end of the investigation. It is important with young students to be explicit about the link between current understanding and how INVESTIGATING in science adds to this.

Lesson 14, Part A and B

Science Experiences

Structure

Part A.

We are learning to:

- share our thinking about shadows using drawings and discussion
- think about how investigating shadows can change or add to what we know about how the Sun works.

Part B

(Beginning of the school day)

We are learning to:

- use photos to gather and think about evidence
- use our evidence to predict what will happen next
- identify that changes need time to take place
- identify that some changes form a pattern.

Prepare:

- Organise students into investigation teams of four. Nominate one student from each group as the 'shadow child'. Demonstrate in class what you want them to do when outside.
- Tell students that they will be wearing their sunscreen and sunhats. However, the hat will not protect their eyes from directly looking at the Sun. Tell students that looking directly at the Sun will hurt their eyes. Remind them about how over time the sun damaged the black paper.
- Take students to a sunny position on concrete/asphalt. Teacher locates position of the Sun (do not direct students to do this as they may stare at the Sun). Direct 'shadow child' to stand with their back to the Sun – to discourage looking at the Sun.
- The rest of the group trace the outline on the concrete using one chalk colour. Make sure that the position of the 'shadow child's' feet are drawn as this will be the position they stand in for each drawing.
- Repeat this procedure before interval and before lunch. There will now be three outlines.
- Ask the group to predict where they think the shadow will lie when they return before the end of school. They can draw this in a fourth colour.
- Do not mention the length of the shadows as this is something for them to notice. Take photos at each stage for each group for follow-up discussion the next day.



Lesson 14, Parts C and D

Science Experiences

Structure

Part C

(Next day)

We are learning to:

- think about how gathering data helps us to be better observers
- use our observations to make links between how humans and other living things behave in the Sun.

Procedure:

- Allow students time to share in their groups what they have noticed and what factors influence the making of shadows.
- Bring them together and ask for an explanation about how shadows are made. You may need to help this along.
- Reinforce that the work of science is to collaboratively form explanations. Students need to arrive at the understanding that shadows are caused when objects block the sunlight and as the Sun moves, the position and size of a shadow changes. Also that a shadow is two dimensional and that detail and colour is not discernible.
- Ask students if they noticed other shadows; for example, trees, buildings seats. What do we say when we are sitting in the shadow of a large object? – The shade.
- Make a link to how animals and some plants ‘block’ the effect of being always in direct sunlight by utilising shadows.
- As we move around, humans need to think about transportable shade or screening/blocking – sunhats, sunglasses, clothing and sunscreen. Be explicit with this age group.
- Revisit.

Part D

We are learning to:

- Check whether there is a link between shadows and temperature.

Prepare:

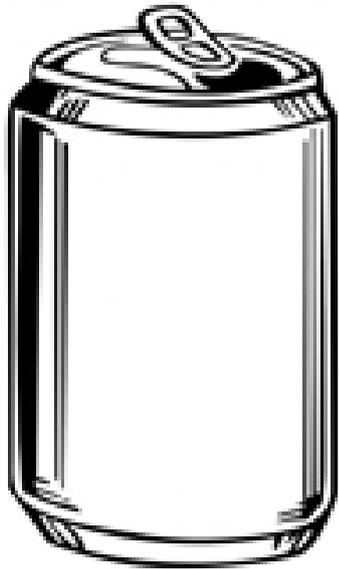
- timer
- For each group of four: thermometer, two empty soft-drink cans (same size) covered in black paper, water, chart/table of results.

Procedure:

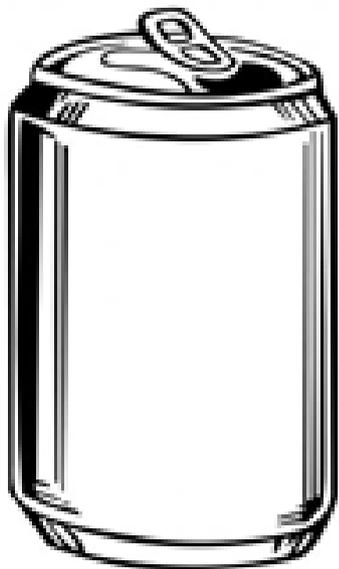
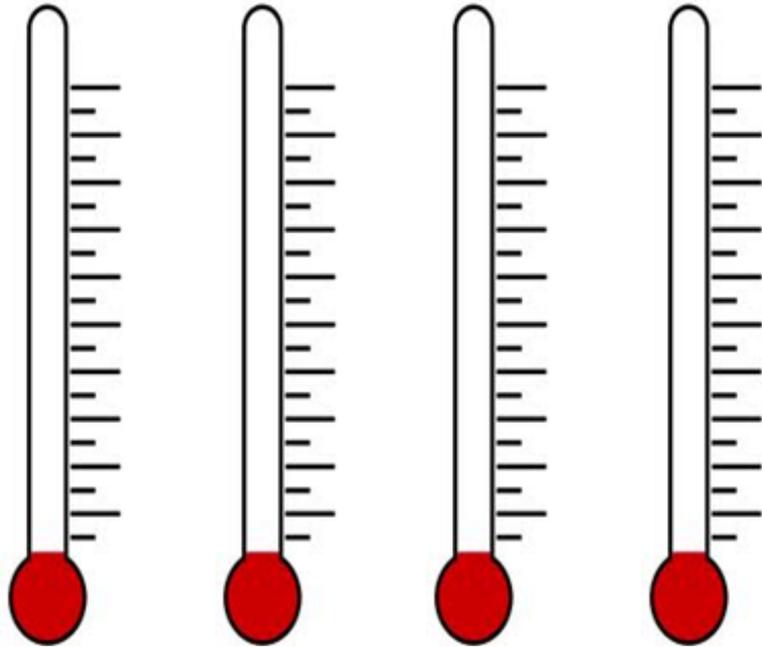
- To further reinforce the effect of screening/blocking the Sun, have each group place two soft-drink cans that are covered in black paper and filled with same temperature water outside for 1½ hours (one in the shade and one in full sunlight).
- At half-hourly intervals (use a timer) record the temperatures with a thermometer.
- Use a table ([Resource 20](#)) to record data.
- Let students share the outcomes in their working groups.
- Write a class explanation.

Note: The shorter the shadow, the higher the UV index levels and the more care you need to take in the sun.

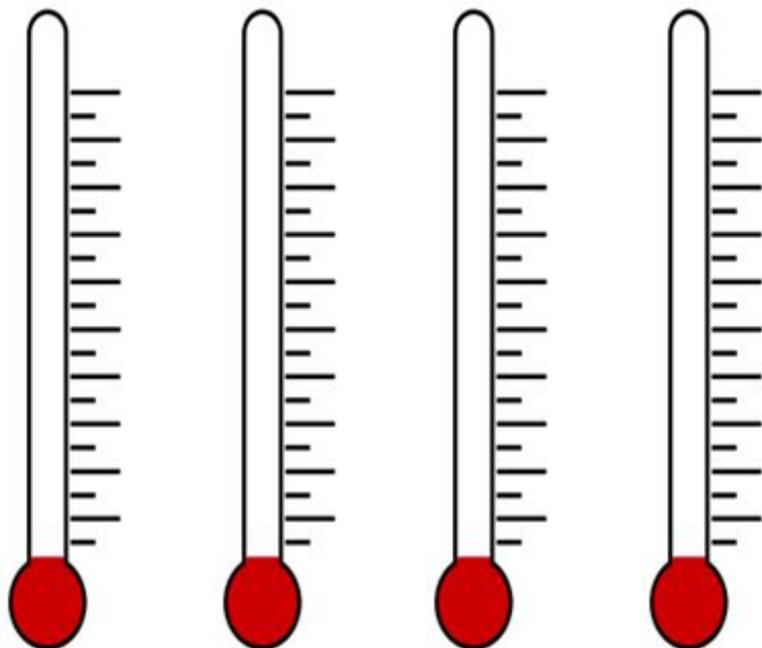
Lesson 14, Part D, Resource 20
Observation Chart



Shade



Sunlight



Lesson 15

Making a Sundial

We are investigating making and using a sundial.

Assessment Opportunities	Structure
<p>We are successful when we can:</p> <ul style="list-style-type: none"> • make and use a sundial to observe how the shadows produced can indicate the passage of time • use photos to capture the stages as we make our sundial • use photos to capture the different stages of how our sundial works • record our data and thinking on a table/chart • use our observations to predict and justify the next position and the length of a shadow on our sundial • share data with our group/class and discuss how sundials can be used as timekeepers • recognise the connection between the length of a shadow and the position of the Sun. 	<p>Lesson 15</p> <p>Prepare: Enough paper plates and straws (so that there is one for each student).</p> <p>Connect:</p> <ul style="list-style-type: none"> • Explain to students that they will make sundials and collect data based on their observations. • Teacher to model steps for making the sundial. • Distribute materials. • Students to locate centre of the paper plate and mark (provide templates for the group to use). • Students divide the circumference of the circle into quarters making a mark at each of the four points. • Make one mark longer than the others. These marks will help the students reposition their sundials when collecting data throughout the day. • Students make 4.20 mm cuts in one end of the straw. • Splay the cuts of the straw and tape to the centre of the plate. The straw should be perpendicular to the surface of the plate. • Cut the straw to 60 mm length. <p>Activate:</p> <p>Day One: work in groups</p> <p>The tracing of the straw shadow will need to be done at regular intervals – e.g. every 2 hours, starting as soon as possible to 9 am.</p> <p>Use Resource 21 to record your findings.</p> <ol style="list-style-type: none"> 1. Place sundials in a sunny spot on the asphalt/concrete in the playground. 2. Make strong chalk marks on the asphalt/concrete at the four quarter points of the sundial edge (demonstrate). 3. Ensure one of the chalk marks is longer so that sundials can be correctly repositioned. 4. Draw around the straw’s shadow with a pencil. Darken the shadow and record the time at the top of the shadow. 5. Record on data table/chart where the Sun is in the sky. Warn students NOT to look directly at the Sun. 6. Measure the shadow length and add to data sheet. 7. Repeat the process at times decided – e.g. every two hours on the hour. 8. In groups students to predict and justify where they think shadows will fall in the afternoon e.g. 2 pm (looking for and identifying patterns). 9. Using a different coloured pencil, have students outline the predicted shadow on their sundials. <p>Day Two:</p> <ol style="list-style-type: none"> 1. At 2 pm place the sundials in their original locations, aligning the marking points. 2. Students to check if their predictions are correct. 3. Students to trace the actual shadow. 4. Record Question Prompts (Resource 22). In their groups students discuss their group findings. Students use their worksheet during this discussion.

Lesson 15, Resource 21

Making a Sundial

Sundial Data _____

Group Members _____



TIME	SHADOW LENGTH (Remember to measure from zero!)	POSITION OF SUN (Remember- do not look directly at the Sun)
1.		
2.		
3.		
4.		
5.		

Time of longest shadow? _____ Time of shortest shadow? _____

Lesson 15, Resource 22

Making a Sundial



Sundial Investigation

What We Observed

Our Thinking

Group Members:

What did the shadows do?

When was the shadow the longest? Where was the Sun?

When was the shadow the shortest? Where was the Sun?

Why do you think the shadows change length? How can you explain what you are observing?

How could you use a shadow to tell the time of day?

How accurate were your predictions?

Our observations make us think:

Lesson 16

Sunhat Tally

Lesson 16

Inquiry – Data Gathering – Photographic evidence dated and displayed in classroom to map progress

What can we learn from myths and legends about the power of the Sun? What have we learnt from our science experiences about the energy of the Sun?

(Photographic evidence dated and displayed in classroom to map progress of action taken.)

Assessment Opportunities	Structure	Curriculum and Resource Links
<p>We are learning to:</p> <ul style="list-style-type: none"> ask questions and find answers from others gather, sort and count answers from others show the results in a table discuss the results use the results as a basis to decide a course of action. 	<p>Prepare: Resource 23</p> <p>Connect: We have found that animals protect themselves from the Sun by sitting in the shade, wearing dust or dirt as a sunscreen, protecting their face and protecting their eyes. Rabbits and possums go outside during the evening to feed in order to avoid the hot midday Sun. We have found out that the Sun can melt things. We have found out how to use the Sun to help us to tell the time. And, we have also found out that plants, like humans, also change colour when they have less or more sunlight. Let’s find out how you like to protect yourself from the Sun. (Teacher may like to show students Resource 23 to identify the ways they protect themselves.)</p> <p>Activate: (Survey class and count up responses and choose the most popular)</p> <p>SLIP into some shade</p> <p>SLIP into sun protective clothing</p> <p>SLOP on plenty of sunscreen</p> <p>SLAP on a hat with a brim.</p> <p>WRAP on some sunglasses</p> <p>Demonstrate: Teacher draws a tally chart on the board. Students look at Resource 23 to decide which one they do most often. Teacher records each student’s response by recording their response with a tick. Once all the class members have given their response, teacher ask pairs to add up the columns and find out which form of Sun protection is most used by the students. Teacher then tallies up. Which option has the most ticks from students in the class? Teacher takes a photograph of the final tally chart as a record. Teacher works with students to draw a simple graph of the results.</p> <p>Consolidation: Big Questions: What type of Sun protection would ensure we are best protected from the Sun? How much shade protection do we have at our school?</p>	<p>Pedagogical links:</p> <ul style="list-style-type: none"> creating a supportive learning environment encouraging reflective thought and action enhancing the relevance of new learning facilitating shared learning making connections to prior learning providing sufficient opportunities to learn e-learning engaging Māori and Pasifika students and their communities <p>Key competencies:</p> <ul style="list-style-type: none"> Thinking Using language, symbols and texts Managing self Relating to others Participating and contributing <p>Literacy:</p> <ul style="list-style-type: none"> English and Te Reo vocabulary building Oral and visual cues to inform thinking Sharing ideas and preferences <p>Numeracy:</p> <ul style="list-style-type: none"> Statistics

Teacher note: Reinforce that using a range of Sun protective measures provides the most protection

Lesson 16, Resource 23

Slip, Slop, Slap, Wrap

Ways we can protect ourselves from the Sun.



SLIP into some shade and into sun-protective clothing

Clothing that covers more skin is best e.g. a shirt with a collar and sleeves and longer shorts/dresses



SLOP on plenty of sunscreen

Use broad-spectrum of at least SPF 30. Apply 20 mins before going outside and reapply every two hours and especially after being in water or sweating.



SLAP on a hat with a brim

Broad-brimmed or bucket styles are best.



WRAP on sunglasses

Choose close fitting, wrap around styles. Make sure the label says they protect against UV radiation.

Lesson 17

Sunhat Designs

Structure

Prepare: Resources 24a, 24b, 25 and 26 and information at <http://www.sunsmartschools.co.nz/schools/hats.html>

Connect:

We have identified that hats in dark colours are a great way to protect our eyes and head from the Sun. We have also found that if a hat is to provide the best protection, it must cover our **face, neck and ears**.

Inquiry: What can we do at this school to protect our head and face? How can we encourage members of our school community to wear a hat that will protect their whole head, including face, neck, and ears?

Activate:

Resources 24a and 24b, 25 and 26

Dictagloss

1. Dictation. Students are given **Resource 24a**. The teacher reads the text (**Resource 24b**) at a speed a little bit slower than native speaker speed. Students are encouraged to listen and write down any word/a picture that describes what the information is about. The purpose is to get the main ideas.
2. The teacher then reads the text for a second time at native speaker speed. On this second reading students individually make very brief notes (words) or draw pictures about the main ideas. Remember that the purpose is to get the main ideas, not every word exactly as it appears in the text, so do not read too slowly.
3. Reconstruction. The students work in pairs and then fours to compare notes and pictures. They write or draw a shared version of the text, adding in words and or pictures to ensure they have included the main ideas.
4. The teacher reads the text for a final time. Students can add to their shared version. Students then Blu Tack their shared version to the wall. The students view the shared versions (in silence) as if they are in an art gallery.
5. Students then compare their reconstructions with other groups and with the original. The teacher leads discussion of the differences.

Demonstrate:

The Cancer Society recommends that staff and students wear hats that provide good shade to the face, back of the neck and ears.

The teacher then tries on a cap. Will this protect my face, back of the neck and ears? No?

The teacher tries on a broad-brimmed hat. Will this protect my face, back of the neck and ears? Yes?

This is called a broad-brimmed hat. If we have to wear a broad-brimmed hat what kind of designs are broad brimmed? Which ones do you like or would you wear? (See **Resource 25**.) How could you make the broad-brimmed hat look funky or cool for students to wear? How could make it look funky or cool for teachers to wear?

Students are given three large A4-sized copies of their chosen hat (see **Resource 26**). They have three copies so that they can experiment and do draft copies. They then make adaptations including colours and designs on the hat to make them more attractive for students and teachers to wear.

Think, Pair, Share

In pairs students share their designs. They make suggestions to each other about improvements.

- What is good about the design?
- What and how could the design be improved?
- Who do you think will wear it? (Students, teachers, males, females, etc.?)

Using the feedback from peers, students make the adaptations.

In groups of four students share their design and get feedback from the others.

Gallery

Students then place their designs in a Gallery (as they did for the dictagloss exercise). Students view each other's work. The teacher leads discussion about what they liked/didn't like.

Lesson 17, Resource 24a

Dictagloss

1. Dictation

Your teacher will read aloud a piece of information to you three times. The first time the teacher reads aloud the information, you need to listen carefully, and if you want to, you can write down any words or draw quick pictures about the main ideas in the box below.

The second time the teacher reads aloud the information, you can write down more words or draw more pictures about the main ideas. Remember that the purpose is to get the main ideas, not every word exactly as it appears in the text.

The last time the teacher reads aloud the text, you will be able to make final changes.

MAIN IDEAS IN THE TEXT:

2. Reconstruction

Working in pairs, and then fours, compare your notes and pictures. Write or draw a shared version of the text, adding in words and or pictures to ensure you have included the main ideas.

3. Analysis and Correction

Your teacher will read aloud the text one more time so that you can make any final adjustments. Your group will then put your shared version on the wall with Blu Tack.

4. Gallery

Imagine that you are in an art gallery. No-one is to talk. All you have to do is move around the room and look at the shared reconstructions of the text.

5. Compare your reconstructions with the others. Discuss the differences.

Lesson 17, Resource 24b

Dictation Text:

The Cancer Society of New Zealand recommends that all students and staff should wear broad-brimmed or bucket hats or legionnaire hats. Dark-coloured hats are preferable. Hats need to provide good shade to the face, back of the neck and ears when outdoors.

This is because the most common areas for skin damage and skin cancer are the neck, ears, lips, face and nose. These areas of our bodies are constantly exposed to the Sun. They receive more ultraviolet radiation than other parts of the body.

Wearing a hat is one of the SunSmart behaviours recommended by the Cancer Society to protect our body.

Slip into the shade and into sun protective clothing

Slop on sunscreen

Slap on a hat with a brim

Wrap on sunglasses

Ultraviolet radiation levels are the most dangerous between morning tea and home time in terms one and four of the school year. Staff and students need to take as many of the SunSmart actions as possible whenever they are outside at school during these times.

Lesson 17, Resource 25

Which type of hat do you like?



Legionnaire Hat



Bucket hat



Broad-brimmed hat



Broad brimmed hats should have a brim at least 7.5 cm wide. A broad brimmed hat that provides good shade can considerably reduce UVR exposure to the face.



Bucket or surfie style hats must have a deep crown and sit low on the head. The angled brim should be at least 6 cm to provide the face, neck and ears with plenty of protection from the Sun. Please note that brims need to be measured from the rim on the inside of the hat.

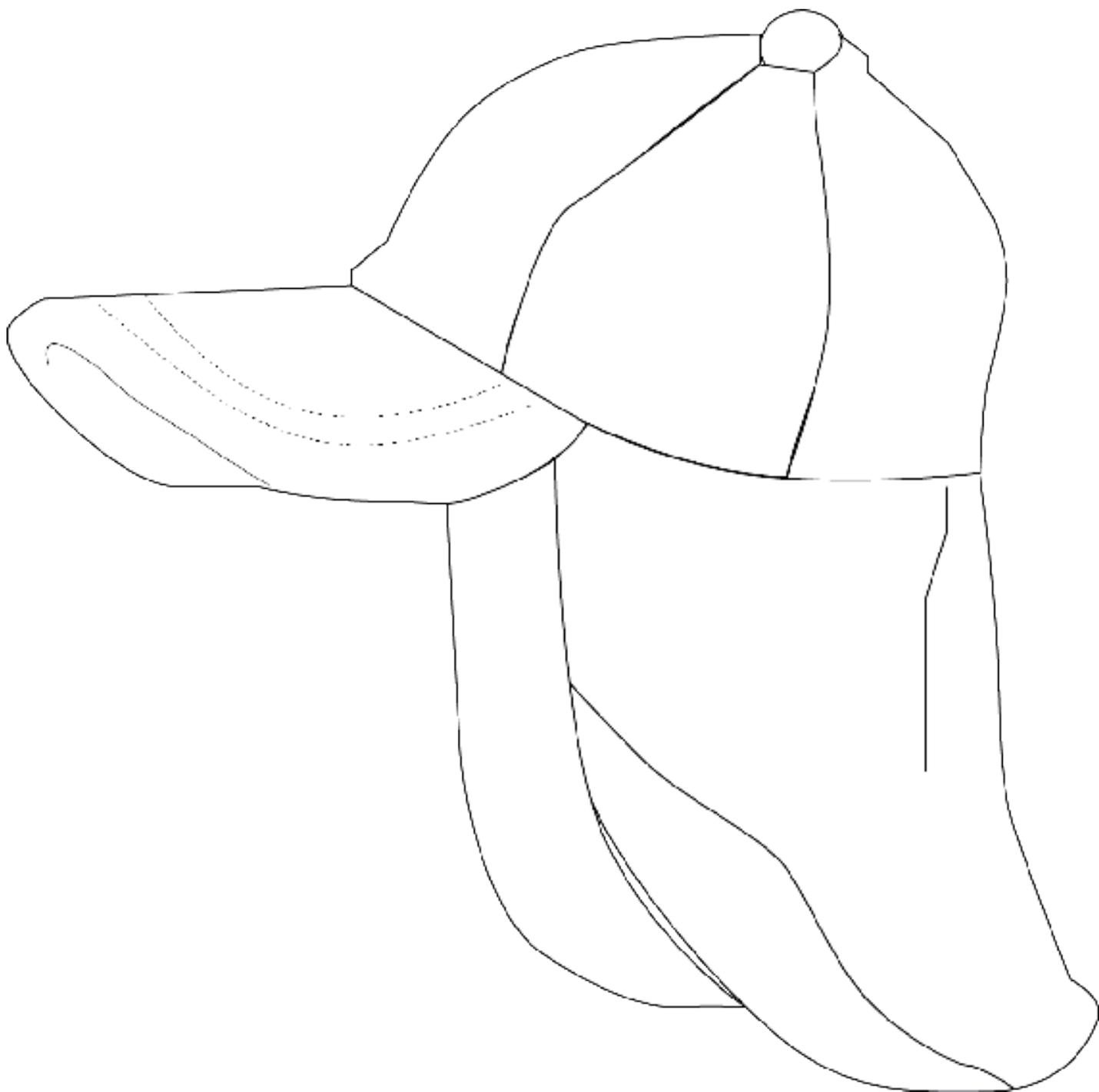


Legionnaire-style hats should have a flap that covers the neck and meets the sides of the front peak to provide protection to the side of the face.

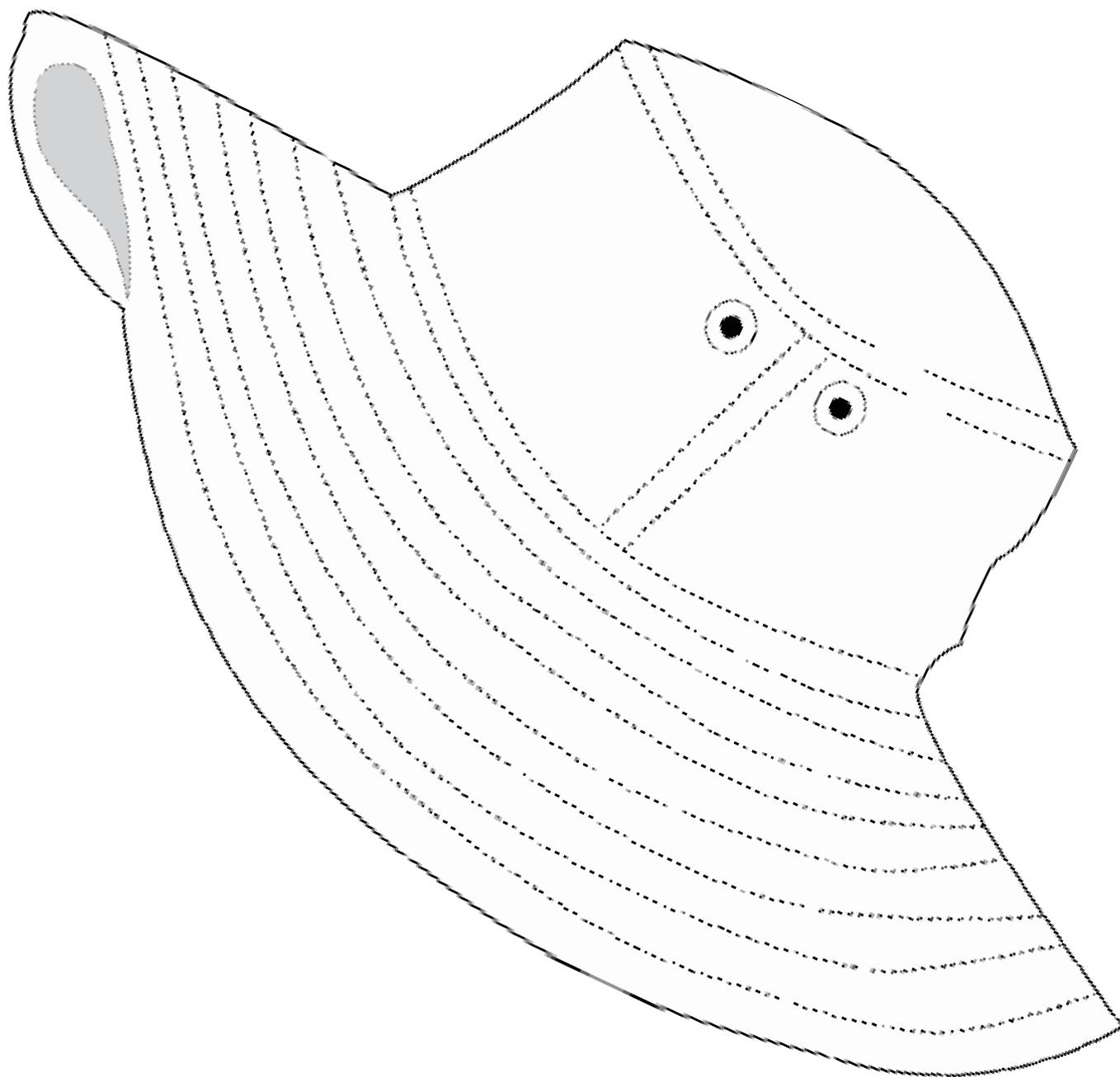
Baseball caps and sun visors are **NOT** recommended as they leave the ears and back of the neck exposed.

How could you make your hat look more funky/fun to wear?

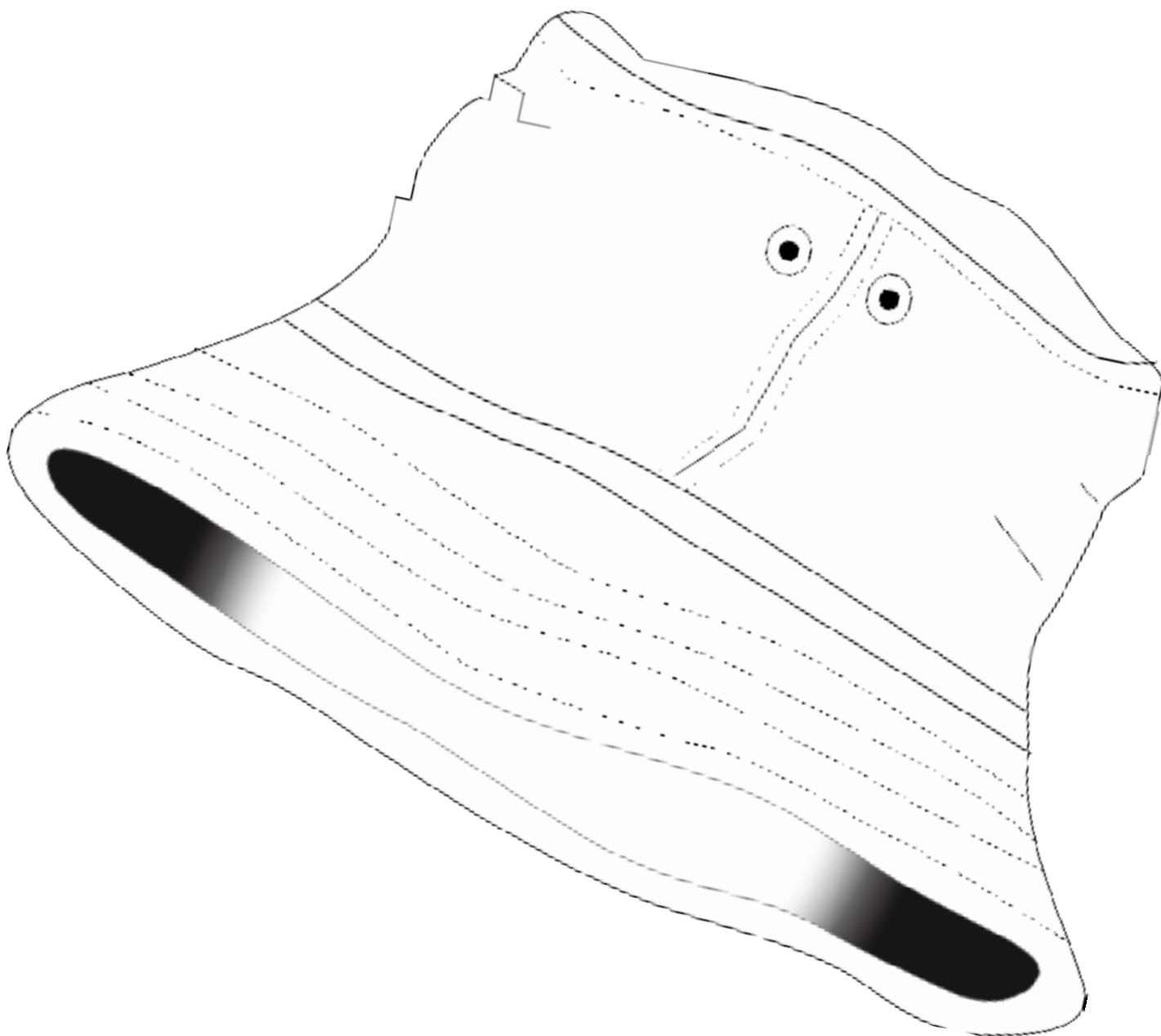
Lesson 17, Resource 26



Lesson 17, Resource 26



Lesson 17, Resource 26



Lesson 18

Evaluation

Consolidation Lesson 18

Preparing to report at end of project (over two or three lessons).

OVERVIEW: *Today we are evaluating our actions to improve our use of Sun protection for our heads and faces in our school.*

Assessment Opportunities	Structure	Curriculum and Resource Links
<p>We know we are successful when we can:</p> <ul style="list-style-type: none"> clearly explain our inquiry, what we did and the results identify and carry out actions that encourage people to make the school a healthy place identify key words and use them in our presentation about SunSmart approaches give and receive constructive feedback make changes to our presentation based on the feedback explain events in terms of a timeline reflect on our learning about SunSmart practices identify our next steps. 	<p>See lesson overview for resources.</p> <p>Connect:</p> <ul style="list-style-type: none"> Remind students about the inquiry “What type of Sun protection would ensure our head and face is protected?” <p>Activate:</p> <p>Look at the photographic display of students as they design their hats.</p> <p>Watch the PowerPoint of the photographs in the display.</p> <ul style="list-style-type: none"> Write down/draw the challenges and how we overcame them. Write down/draw the successes and how we overcame them. Write down/draw the thing that was hardest to achieve. What did we learn from this experience? What is our next step? Draw a timeline with the milestone actions listed and the challenges, successes and hard-to-achieve events above drawn in on the timeline (teacher may have to lead) and a big star for the thing that was hardest to achieve. How could we find out which hat design people in our school would like to wear? Brainstorm how we could share our designs with others. <p>Display student hat designs for the board of trustees, staff, senior management, whole school at assembly, during parent-teacher interviews/conferencing etc. and in the library or hall. School community is given the chance to vote by placing a sticker next to the hat design they like.</p>	<p>Pedagogical links:</p> <ul style="list-style-type: none"> Creating a supportive learning environment Encouraging reflective thought and action Enhancing the relevance of new learning Facilitating shared learning Making connections to prior learning Providing sufficient opportunities to learn E-learning Engaging Māori and Pasifika students and their communities <p>Key competencies:</p> <ul style="list-style-type: none"> Thinking Using language, symbols and texts Managing self Relating to others Participating and contributing <p>Literacy:</p> <ul style="list-style-type: none"> English and Te Reo vocabulary building Language development and developing an understanding about interpersonal communication skill development through focused small group discussion Oral communication and public speaking skills Seeks feedback and makes changes based on recommendations Gathering, reading and interpreting information to form conclusions about the survey

Lesson 19

Presentation

Structure	Curriculum and Resource Links
<p>Demonstrate:</p> <ul style="list-style-type: none"> • Teacher discusses with students and models what makes an effective speaker when delivering a report to a group, i.e. speak clearly, in a loud voice, stand up straight and still and look at our audience when we talk. • How to introduce themselves in Te Reo Māori. • In pairs prepare a presentation of report as detailed below. Those capable can write their ideas next to SEE prompt. <p>(Teacher draws following on whiteboard (SEE) as prompt for students and goes over it with them.)</p> <p>S State what your main question is. What type of Sun protection would ensure our head and face is protected from the Sun?</p> <p>What is the action the class chose?</p> <p>E Explain the steps, challenges, and how you overcame them (arrow to the timeline on the board to remind them).</p> <p>E Examples of what you have learnt as a result:</p> <ol style="list-style-type: none"> 1. 2. 3. <ul style="list-style-type: none"> • Example of the hat you have designed. • What others thought about your hat design. • What you will do next and how you could encourage them to wear your hat. (3–5 mins.) • Students practise their presentation in pairs, beginning with introducing themselves in Te Reo Māori. Receive feedback and make adjustments. Teacher may like to accompany with PowerPoint photos of the main steps. • Teacher should also listen and provide feedback. For some children teacher may need to provide prompts. • Teacher may suggest that some deliver their report in pairs, sharing the delivery. • Presentations could be videoed. <p>Consolidation:</p> <p>We want to tell our community that we have designed SunSmart hats. In the previous lesson we have decided on the best way to do this, and we will put it into action. This includes a presentation, school newsletter, PowerPoint of photos and commentary for board of trustees, parents, peers, assembly, local paper etc. or play/song/cartoon.</p>	<p>Numeracy:</p> <ul style="list-style-type: none"> • Concept of a timeline, statistical investigation

Lesson 20

Presentation

Final Lesson

Sharing our information/conclusions

OVERVIEW: Today we are sharing our findings with our community

Assessment Opportunities	Structure	Curriculum and Resource Links
<p>We know we are successful when we can:</p> <ul style="list-style-type: none"> • speak clearly, in a loud voice, stand straight and still and look at our audience when we talk • use key words in our presentation • reflect on our learning about SunSmart practices • evaluate the impact that our presentation has had on others. 	<p>Prepare:</p> <p>Connect:</p> <ul style="list-style-type: none"> • Before the presentation ensure the students have had adequate time to practice. Reassure them that the timeline and prompts will be on display and visible to help them if they forget. • Go over the PowerPoint, timeline and prompts with them. <p>Activate:</p> <ul style="list-style-type: none"> • Allow students the opportunity to practise in the venue where they will be delivering their presentation. <p>Demonstrate:</p> <p>Teacher introduces:</p> <ul style="list-style-type: none"> • students present (individually or in pairs) to: the board of trustees, staff, senior management, whole school at assembly, parents at parent-teacher interviews/ conferencing, etc. <p>Consolidation:</p> <ul style="list-style-type: none"> • Review the video (if taken) • Reflect on what went well for us, what we could improve, what we have learnt as a result. 	<p>Pedagogical Links:</p> <ul style="list-style-type: none"> • Creating a supportive learning environment • Encouraging reflective thought and action • Enhancing the relevance of new learning • Facilitating shared learning • Making connections to prior learning • Providing sufficient opportunities to learn • E-learning • Engaging Māori and Pasifika students and their communities <p>Key competencies:</p> <ul style="list-style-type: none"> • Thinking • Using language, symbols and texts • Managing self • Relating to others • Participating and contributing <p>Literacy:</p> <ul style="list-style-type: none"> • Language development and developing an understanding about interpersonal communication skill development through focused small-group discussion • Oral communication and public speaking skills • Seeks feedback and makes changes based on recommendations • Gathering, reading and interpreting information to form conclusions.

Resource 27

Group Work – What Works

- 1. For the Teacher – Group work checklist*
- 2. For the Students – Group rules and agreement*
- 3. For each Student – Feedback on group work (form)*
- 4. What group work strategies are effective in your school?*
- 5. Strategies for effective group work*
- 6. Essential group dynamics*
- 7. Group work: Lesson plan – An example*
- 8. Evaluation of group dynamics*
- 9. Social skills score card – Levels 1-4*

Resource 27

Group Work – What Works

Instructional Environment and Management Components

Teachers:

1. *A Positive Attitude*

Believe that students are capable of learning. Have high expectations and make students accountable for meeting these expectations.

2. *Ensure your instructions and criteria for success are clear*

3. *Teach and assess the social and interpersonal skills*

These include:

- **Level 1**

Building trust, listening, taking turns, looking at people when they talk, forming groups quickly and efficiently, taking responsibility for their own and the group's behaviour, accepting and valuing differences, resolving conflict constructively.

- **Level 2**

Active listening, asking questions, clarifying, constructive criticism, helping and accepting others, paraphrasing, summarising.

- **Level 3**

Interviewing, coaching, teaching, negotiating, brainstorming, building on each other's ideas.

- **Level 4**

Creative group problem solving, conflict resolution, planning and organising, decision-making, individually negotiating curriculum and research.

4. *Use a variety of team formations*

Teacher-selected groups can be the primary groupings, but you can vary this by using randomly selected and student-selected groups. Students who do not work in student-selected groups may lose this privilege and be placed in teacher-selected groups or work individually on projects.

5. *Ensure students understand their positive interdependence within the group (outcome and means interdependence)*

Students realise that they "sink or swim together".

6. *Encourage considerable promotive (face-to-face) interaction between students*

7. *Individual accountability and personal responsibility are paramount*

Each student is held responsible by group members for contributing his or her fair share to the group's success. The teacher is no longer the fountain of all knowledge, but is a resource guide.

8. *Ensure there is group processing at the end of every session.*

Groups reflect on how well they are functioning by:

- describing what actions were helpful and unhelpful
- making decisions about what actions to continue or change.

Group processing also promotes a sense of self-efficacy.

Resource 27

Group Work – What Works

9. *Stress the importance of attendance*

Each student needs to feel that there is ownership and a responsibility to turn up. They will be answerable to their group when their absence negatively impacts on the group's ability to complete a task.

10. *Consistency – arrange your room so that group work can take place frequently*

Use co-operative learning regularly as “you have to sweat in practice before you can perform in concert”. The skill needs to be practised until it becomes an automatic habit pattern.

11. *Reward often*

Use both extrinsic and intrinsic rewards.

12. *Provide frequent specific feedback on the task*

13. *Monitor the progress of the groups*

Keep a book that details the points and bonus points students have gained for effort and social skills as well as the task-specific skills.

14. *Everyone has a role to play*

Groups need a chairperson, recorder, timekeeper, clarifier and summariser.

15. *Be patient*

New skills take a while to master. Students need a lot of practice before it becomes automatic.

Resource 27

Group Work – What Works

Group Rules and Agreement

You will need to discuss and then write up a list of agreed rules that will govern your group. Each member of your group will need to sign the agreement below.

Points to consider:

1. A positive attitude
2. Be generous with praise for each other
3. Listen while others talk, take turns, look at people when they talk, form the group quickly, take responsibility for your own and the group's behaviour, resolve conflict constructively.
4. Remember you 'sink or swim' together
5. Each group member is responsible to the group for contributing their fair share
6. Each group member is responsible for the outcome – they need to show up to class
7. Be patient with those who find it difficult to understand the first time

Group members:

List of rules for our group:

My role in this group is: _____

Signed: _____

Date: _____

Resource 27

Group Work – What Works

Feedback on Group Work

Besides each of the statements write the number that best describes your judgement.

1 = always, 2 = often, 3 = usually, 4 = sometimes, 5 = never

Individual	Grade 1–5	Group	Grade 1–5
1. I had a positive attitude when working with the group		The group had a positive attitude	
2. I was generous with praise for others in my group		My group was generous with praise for each other	
3. I listened while others talked		My group listened while others talked	
4. I took my turn to contribute and talk		We took turns to contribute and talk	
5. I looked at people when I talked to them		We looked at people when we talked to them	
6. I joined my group quickly		We joined our group quickly	
7. I took responsibility for my own behaviour		We took responsibility for our own behaviour	
8. I took responsibility for the behaviour of my group members		We took responsibility for the behaviour of our group members	
9. I worked together with the others to ensure that we “swam” rather than “sunk”		We worked together to ensure that we “swam” rather than “sunk”	
10. I contributed my fair share to the group		We all contributed our fair share to the group	
11. I showed up regularly to class		We showed up regularly to class	
12. I was patient with those who found it difficult to understand the first time		We were patient with those who found it difficult to understand the first time	

Resource 27

Group Work – What Works

What Group Work Strategies are Effective In Your Group?

SUMMARY:

- Goals* Expectation clearly expressed (verbally and on OHT/board)
- Rules* Individual roles within team
- Objectives* Clear time allocation
- Understanding* Student behaviour – (the shy; the outcasts; the saboteur)
- Planning* Where in the unit will this fit?
- When?* Time of day/week /term?
- Organisation* Environment/resources – well before the lesson
- Resources* An obvious one
- Knowledge* Development of group-work skills
- Evaluate* Student feedback/strategies for group work reflection – i.e. score cards, discussion, self-evaluation (student and teacher)

Resource 27

Group Work – What Works

Strategies for Effective Group Work

1. **Group size**
Maximum 5, 3 or 4 is ideal.
2. **State objectives and set goals**
E.g. give each group (4) an egg, 4 straws, 6 sheets of paper and Sellotape. Design a contraption using these materials to stop an egg breaking when it is dropped from a height of 5 metres.
3. **Identify strategies for working together (Group dynamics)**
This may be done at the start of the year or lesson to set the scene for appropriate group work (see attached ESSENTIAL GROUP DYNAMICS).
4. **Resources**
Ensure you have enough resources for each group.
5. **Identify roles**
Design some role-play cards, which clearly describe the job of each member of the group; e.g. Initiator – must get the group started in discussion.

Assign roles to each member of the group.

Roles can include:
 - Initiator:** must get the group started in discussion
 - Reader:** reads problems to the group and comes up with the first idea
 - Reporter:** writes down group ideas
 - Evaluator:** writes down how well the group worked together
 - Improver:** writes down things the group could do to improve and works closely with the evaluator.
6. **Evaluation**
After participating in a group activity, evaluate how well the group worked together. Teacher can share their observations.

Resource 27

Group Work – What Works

Essential Group Dynamics

Below is a list of essential elements important to establishing a co-operative group. These will be important this year when working together in groups or as a class. Head up “Essential Group Dynamics” and copy the following.

1. *Good leaders and followers*
These people can make decisions, keep things moving, and work with others in the group to achieve goals. They should never totally dominate but look to include others’ opinions because these can be valuable. Good followers should offer opinions and support the leader’s approach to completing a task. It should not be up to the leader alone to complete tasks.
2. *Give everyone a chance*
Statements like “What do you think ...?” can help include others in group discussions. Always look for those who aren’t involved and help them feel accepted into your group, especially if they are people you do not generally talk to in class.
3. *Be involved yourself*
What you think is often what you never say because you feel others will “shame you out”. If we support other’s opinions and challenge opinions carefully people don’t get hurt.
4. *Good groups and individuals co-operate*
Identify your challenges and set goals either in debate or discussion and sort out a plan of attack. A group’s decision may not always be what you agree with. Good team members are people who can accept team decisions. (Think of some of the rules your parents set you – you may not agree with these). Distribute the tasks so time is maximised and everyone feels involved.

Some groups argue, some debate and others discuss. Arguing can slow things and harm others. Debating and discussion provides many opinions and solutions to challenges.

The most important component of all these is **CO-OPERATION**.

Resource 27

Group Work – What Works

Social Skills Score Card

Level 1

Student's Name:

Date:

	Listening	Taking turns	Eye contact	On task	Responsible behaviour	Resolving conflict	Accepting others' differences	Being trustworthy
Student								
Peer								
Teacher								

Social Skills Score Card

Level 2

Student's Name:

Date:

	Active Listening	Asking questions	Clarifying	Constructive criticism	Helping others	Paraphrasing	Accepting others	Summarising
Student								
Peer								
Teacher								

Resource 27

Group Work – What Works

Social Skills Score Card

Level 3

Student's Name:

Date:

	Interviewing	Coaching	Teaching	Negotiating	Brain storming	Resolving conflict	Building on others ideas	Being trustworthy
Student								
Peer								
Teacher								

Social Skills Score Card

Level 4

Student's Name:

Date:

	Creative group problem-solving	Planning and organising	Decision-making	Negotiating curriculum	Research	Resolving conflict	Accepting others differences	Being trustworthy
Student								
Peer								
Teacher								



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