



SunSmart Myth Busters
SunSmart Scientists

Learning from and about the natural world

Curriculum Level 3 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 radiation. 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, Pasifika and Southeast Asian)
- use Te Reo Māori concepts and language that will be woven into the resource
- takes an inquiry-based learning approach
- utilise the SunSmart Schools Website – www.SunSmartschools.co.nz, and www.niwa.co.nz



Level 3 Unit Overview

Overview Planning Tool

The overview diagram explains how the lessons for Level 3 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 & knowledge through inquiry

Health



Science



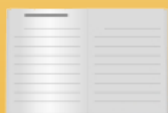
Science Experience



Technology



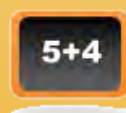
Literacy



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

Living World Plant Earth and Beyond Physical World Material World

Lessons 6–8

Science: Sun narratives- Learning how science knowledge and understanding about the sun can be communicated.

Lessons 1-2

Hauora.

Lessons 3-5

Our skin tells a story

Lesson 1–5

Myth busters and Sun protection

Lessons 3-5

Humans live, work and play in many different places and need to protect themselves from UVR.

Lesson 6

UVR – what is it? Using the Sun Protection Alert and UV Index as a guide for sun protective behaviours

Lessons 3–6

What have we learnt about UVR? What have we learnt about our skin? How does UVR affect our skin? Eyes? How can we protect ourselves?

Lessons 10–12

We are investigating the effect of sunlight on living and non-living things.

Lesson 13-14

We are investigating how UV beads and tonic water make light visible.

Lesson 15

We are investigating how gnomons can help us identify optimum shade times.

Lessons 16–20

INQUIRY USING:

What we have learnt about UVR and our skin?

The Pro's and Con's - Bio poems

What have we learnt from our science experiences about UVR light?

ESSENTIAL QUESTION:

How does our community protect themselves from UVR?

Design Survey

Analyse Results

Plan Action testing different materials using UV beads or a torch

Evaluate Outcome

Share Information/Conclusions

Links to the New Zealand Curriculum (NZC)

Purpose: To engage students and their families in exploring and developing an understanding about healthy skin.

Curriculum Level 3

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	Personal Health and Physical Development <i>Personal growth and development</i> Identify factors that affect personal, physical, social and emotional growth and develop skills to manage changes.	<ul style="list-style-type: none"> demonstrate an understanding of good skin health identify the factors that affect skin health, e.g. sunlight and exposure to UVR
		Safety Management <i>Personal growth and development</i> Identify risks and their causes and describe safe practices to manage these.	<ul style="list-style-type: none"> identify that Ultraviolet Radiation (UVR) in sunlight causes our skin to burn and develop skin cancers describe the ways we can best protect ourselves from the harmful effects of UVR
		Healthy Communities and Environment <i>Societal attitudes and values</i> Identify 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 exposure to UVR
		Community Resources Participate in communal events and describe how such events enhance the wellbeing of the community.	<ul style="list-style-type: none"> present ideas to the community about the most effective SunSmart actions
English		Listening, Reading and Viewing <i>Processes and strategies</i> Students will: <ul style="list-style-type: none"> integrate sources of information, processes, and strategies with developing confidence to identify, form, and express ideas. INDICATORS: <ul style="list-style-type: none"> selects and reads texts for enjoyment and personal fulfilment recognises and understands the connections between oral, written, and visual language integrates sources of information and prior knowledge with developing confidence to make sense of increasingly varied and complex texts selects and uses a range of processing and comprehension strategies with growing understanding and confidence thinks critically about texts with developing confidence monitors, self-evaluates and describes progress with growing confidence 	<ul style="list-style-type: none"> demonstrate an ability to gather, read, understand and effectively use SunSmart information for a specific purpose.

Curriculum Areas Incorporated	Achievement Objectives Relevant to the activity, including possible links	Specific Learning Outcomes Students will be able to:
English	<p>Speaking, writing and presenting <i>Processes and strategies</i> Integrate sources of information, processes and strategies with developing confidence to identify, form and express ideas</p> <ul style="list-style-type: none"> • uses a developing understanding of the connections between oral, written and visual language when creating texts • creates a range of texts by integrating sources of information and processing strategies with developing confidence • is reflective about the production of own texts: monitors and self-evaluates progress, articulating learning with growing confidence. 	<ul style="list-style-type: none"> • construct texts integrating all the SunSmart knowledge gained through secondary sources and investigations • use oral, written and visual language features to create a SunSmart message that is engaging for the school community.
Mathematics and Statistics	<p>Statistics</p> <p>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:</p> <p>Statistical investigation <i>Conduct investigations using the statistical enquiry cycle</i></p> <ul style="list-style-type: none"> • gathering, sorting, and displaying multivariate category and whole-number data and simple time-series data to answer questions • identifying patterns and trends in context, within and between data sets. <p>Statistical literacy</p> <ul style="list-style-type: none"> • Evaluate the effectiveness of different displays in representing the findings of a statistical investigation or probability activity undertaken by others. 	<ul style="list-style-type: none"> • gather, display and identify data patterns in the survey • interpret results of the survey data.

Curriculum Areas Incorporated		Achievement Objectives Relevant to the activity, including possible links	Specific Learning Outcomes Students will be able to:
Te Aho Arataki Marau mo te Ako Te Reo Māori	Tuamata	<p>Students should be able to:</p> <ul style="list-style-type: none"> • 3.1 communicate, including comparing and contrasting, about habits, routines, and customs • 3.2 communicate about survey and results • 3.3 give and follow directions to survey participants • 3.4 communicate, including comparing and contrasting the survey data • 3.5 communicate about immediate past survey activities. 	<ul style="list-style-type: none"> • ask and answer questions about their sunscreen survey results • request, accept or decline to participate in sunscreen survey • discuss, plan and record a checklist of what group members will do to prepare a sunscreen survey • summarise in terms of the most popular ways to protect their skin from the Sun • seek agreement from participants to take part in their survey.

Scientists investigate and use observation to ask questions about:

	Understanding in Science	Investigating in Science	Communicating in Science	Participating and Contributing
Nature of Science Achievement Objectives Level 3	<ul style="list-style-type: none"> • Appreciate that science is a way of explaining the world and that science knowledge changes over time. • Identify ways in which scientists work together and provide evidence to support their ideas. 	<ul style="list-style-type: none"> • Build on prior experiences, working together to share and examine their own and others' knowledge. • Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. 	<ul style="list-style-type: none"> • Begin to use a range of scientific symbols, conventions and vocabulary. • Engage with a range of science texts and begin to question the purposes for which these texts are constructed. 	<ul style="list-style-type: none"> • Use their growing science knowledge when considering issues of concern to them. • Explore various aspects of an issue and make decisions about possible actions.
Living World Achievement Objectives Level 3	Life Processes Recognise that there are life processes common to all living things and that these occur in different ways.			
Material World Achievement Objectives Level 3	Properties and Changes of Matter Compare chemical and physical changes. Chemistry and Society Relate the observed, characteristic chemical and physical properties of a range of different materials to technological uses and natural processes.			

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
<p>What we want for our young people:</p> <ul style="list-style-type: none"> • confident • connected • actively involved • lifelong learners 	<p>Beliefs about what is important</p> <ul style="list-style-type: none"> • high expectations • Treaty of Waitangi • cultural diversity • inclusion • learning to learn • community engagement • coherence • future focus 	<p>Expressed in thought and actions</p> <ul style="list-style-type: none"> • excellence • innovation, inquiry and curiosity • diversity • equity • community and participation • ecological sustainability • integrity 	<p>Which of the key competencies (NZC pp. 12-13)?</p> <ul style="list-style-type: none"> • thinking • using language, symbols and texts • managing self • relating to others • participating and contributing 	<p>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.</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



Links and Resources

TKI

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

Te Reo Maori In the curriculum guidelines, *Te Aho Arataki* there are suggestions for possible learning and assessment activities for **Curriculum Levels 3–4**. 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**, including cloze tasks, dycomm tasks and information transfer tasks.

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

Science Concepts - Ultraviolet Radiation

UV radiation in our environment - poster http://sunsmartschools.co.nz/CSNZ_-uvposter.jpg

NIWA <https://niwa.co.nz/our-services/online-services/uv-ozone>

Information and NZ app to find out UV levels <https://www.sunsmart.org.nz/learn-more/uv-radiation>

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>

What is UV and how does it affect us <https://www.youtube.com/watch?v=FHHysvZ2K2Q>

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

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

The WHO INTER Sun programme <https://www.who.int/uv/intersunprogramme/activities/en/>

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/>

SunSmart website <https://www.sunsmart.org.nz/>

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

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 with tips on how to apply

<https://waikato-bop.cancernz.org.nz/reducing-cancer-risk/what-you-can-do/sunsmart/sunscreen/>

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

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

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>

The science of skin colour https://www.youtube.com/watch?v=_r4c2NT4naQ

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

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

Your skin explained <http://kidshealth.org/kid/htbw/skin.html>

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

Animals and sun protection <http://www.foundation.sdsu.edu/sunwisestampede/meetanimals.html>
<http://wellness.stelter.com/static/health.html#skin1>

What is sunburn? <https://www.youtube.com/watch?v=yCZ941N3z2M>

UVNZ app for phones UVNZ app that tells you the UV level for your location and gives guidance based on your skin colour. Download from android and apple app stores

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

Part One, Lessons 1–4

Our Skin Tells A Story – Love the Skin You Are In

Introduction & Hauora Concept

OVERVIEW: We are using pictorial images to generate discussions around health and wellbeing and introduce the concept of hauora in skin health.

Assessment Opportunities	Structure	Curriculum and Resource Links
<p>We are successful when we:</p> <ul style="list-style-type: none"> can identify the factors that influence our everyday lives can explain how the environment and people around us influence us understand and can use some familiar health vocabulary in Māori can identify and explain our personal responsibility for our own actions and the responsibilities of others can identify and explain how health and wellbeing impact on the quality of our everyday lives can identify the things that keep our skin 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. <p>Te Reo – Learning intentions and success criteria rubrics for Te Reo – Ko au (I, me, myself) https://hereoora.tki.org.nz/Unit-plans/Unit-1-Ko-au/Assessment-opportunities</p> <p>Te wā Kai using success criteria and assessment rubrics at http://hereoora.tki.org.nz/Unit-plans/Unit-3-Kai/Learning-intentions-and-success-criteria.</p> <p>Evidence: to assess Tuamata Level 3.</p> <p>Evidence: Teach and assess social and interpersonal skills (pp. 5–14 in resource booklet). Student, peer and teacher assessment ongoing.</p>	<p>Prepare:</p> <p>Video clip 1: https://www.youtube.com/watch?v=v7m0NiLzZTA</p> <p>Video clip 2: https://www.youtube.com/watch?v=QIYLTAo54ss</p> <p>Resources:</p> <ol style="list-style-type: none"> 1 Pictures 2 Hauora 3a 3b Fitzpatrick skin types 3c My skin story 4 Three-level guide <p>Connect</p> <ul style="list-style-type: none"> Assign students into groups of three or four. Allocate and define tasks of collector, recorder, reporter, timekeeper (use of these roles is encouraged throughout the unit). Explain task, requirements and time frame. <p>Activate:</p> <ul style="list-style-type: none"> All watch video clip 1. What does the cartoon tell us about our skin? What jobs does our skin do for our body? (Protects organs, manages body temperature by sweating, etc.) Why is it important to look after our skin? What happens if we don't look after our skin? How should we look after our skin? Our skin can also tell a story about us. All watch clip 2. Discuss how skin colour is linked to our whakapapa. Students discuss how skin colour determines how quickly they burn. 	<p>Refer to:</p> <p>https://www.health.govt.nz/our-work/populations/maori-health/maori-health-models or Health and Physical Education Curriculum 1999.</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 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> <p>Integrate different sources of information, processes and strategies to inform, shape and express ideas about health and wellbeing.</p> <p>Te Reo:</p> <p>Ongoing opportunities to assess Te Reo – Ko au (I, me, myself) http://hereoora.tki.org.nz/Unit-plans/Unit-1-Ko-au/Assessment-opportunities</p> <p>Te wā Kai:</p> <p>http://hereoora.tki.org.nz/Unit-plans/Unit-3-Kai/Assessment-opportunities</p>

Lessons 1-4

OVERVIEW: We are using pictorial images to generate discussions around health and wellbeing and introduce the concept of Hauora in skin health.

Structure

- In groups students look at the photos in **Resource 1**.
- Why do babies like to be next to their mother's skin?
- What is ta moko?¹ What story does a moko tell?² Are there other cultures that have tattoos that tell a story? Samoan, etc.? What is the word for tattoo in Samoan/Tongan/Hindi, etc? What do the symbols mean? What stories do they tell?

Demonstrate:

- Introduce the concept of hauora through diagram (see **Resource 2**) on the board and headings beside each wall.
- Teacher provides background to headings (physical (taha tinana), mental/emotions (taha hinengaro), social (taha whanau), and spiritual (taha wairua)). See **Resource 2** for teacher.
- Discuss the importance of having four walls in a house and how they support each other. Relate to students and how each of the headings/four walls support our health and wellbeing. Refer back to the picture for examples.
- Ask students which heading goes with which picture. Using more than one heading is encouraged.
- Students to decide where each of the pictures in **Resource 1** belong.

Consolidation

- Our skin is very important to us. Our skin tells a story. It shows how old we are, where our family came from, the amount of ultraviolet radiation we have been exposed to and how much Sun protection we will need.
- What does the colour of our skin tell us about our whakapapa / the country we or our ancestors came from? (Refer to **Resources 3a** and **3b**. Alternatively students can also determine their skin type online <https://www.uvdaily.com.au/assessing-your-risk/skin-types/>).
- What skin type are you?
- How does our skin describe how old we are?
- How does our skin describe the kind of job and lifestyle we have? E.g. working in an office, working outdoors, frequently enjoying outdoor activities like cycling and running?
- How does knowing our whakapapa/ancestry help support our hauora?
- In **Resource 3c** write down what you found out about your skin type.
- What nationalities are missing from the Fitzpatrick Scale? (prompt Māori, Pasifika) Why? If you were Māori where could you fit on the scale? (prompt, pretty much everywhere)
- What does the colour of our skin tell us about the sort of Sun protection we need? (See **Resources 3a, 3b** and **3c**).
- Students go the three-level guide (**Resource 4**) and complete individually. Teacher collects up their answers as they will be returned to the students later in the unit (in Lesson 16) when students will be asked to re-visit their answers. Once they will have more understanding and knowledge, students will be able to answer or change their responses. This will allow students to see their shift in understanding. This first opportunity to complete the three-level guide also gives the teacher an understanding of the students' prior knowledge.

When students have completed **resource 4** they can go to <https://www.sunsmart.org.nz/be-sunsmart/mythbusters> to see if they are able to identify the difference between Sun-Smart myths and facts.

1. Ta moko is the ancient Māori practice of tattooing.

2. Patterns of the moko tell a story about the person, their family, where they come from and previously their rank. The area around the chin describes the hapu of the person and for men, the remainder of the face tells the history.

Lessons 1-4, Resource 1

Decide which photo/s are examples of:

- A. Physical (taha tinana)
- B. Mental/emotions (taha hinengaro)
- C. Social (taha whānau)
- D. Spiritual (taha wairua)

Put the number of the photo in the box below:

A. Physical (taha tinana)

B. Mental/emotions (taha hinengaro)

C. Social (taha whānau)

D. Spiritual (taha wairua)



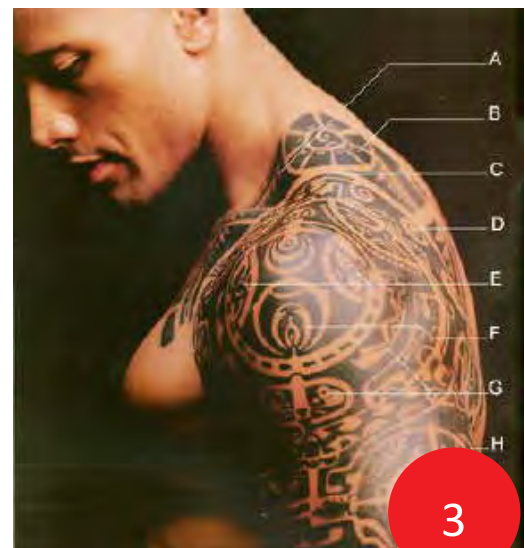
1



2

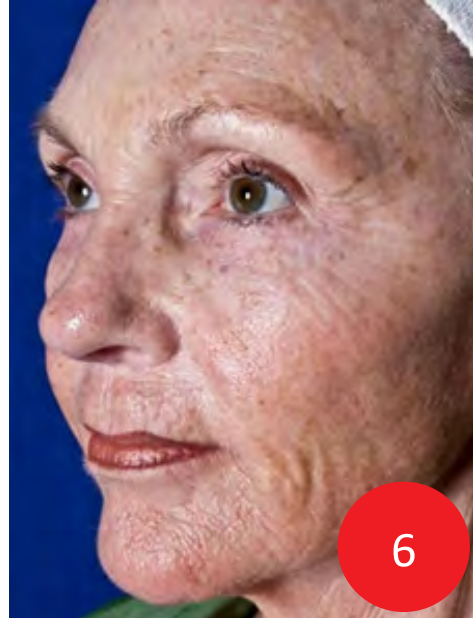


4



3

Resource 1



Newborn baby against mother's skin

How did you decide where each photo belonged? Were there any photos that were hard to place? Why?

Lessons 1–4, Resource 2

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

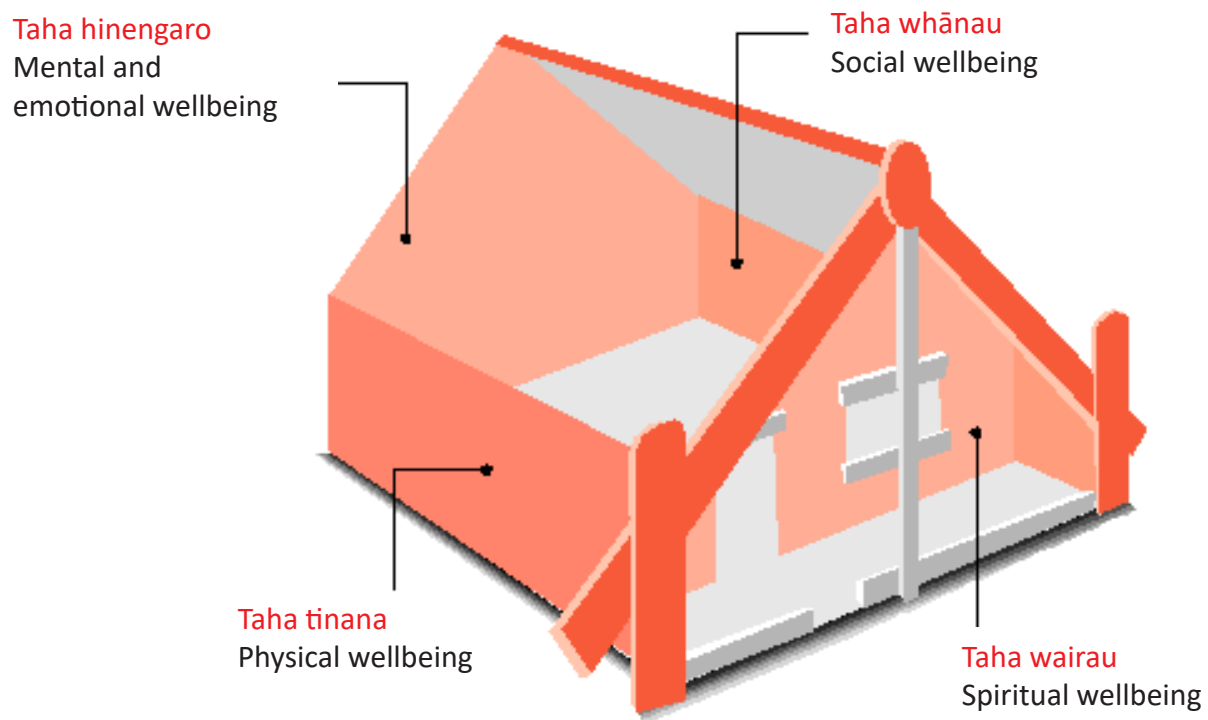
Taha Wairua – Spiritual Wellbeing

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.

Lessons 1–4, Resource 2

Hauora Concept



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 1–4, Resource 3a

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 Celts	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, Southeast Asian, Eastern Indians	Very Low
6.	Never sunburn Deeply pigmented	African Americans	Minimal

The Fitzpatrick scale is illustrative, not comprehensive in determining skin colour.

Note: Any sign of skin colour change is a sign of sun damage. There is nothing healthy about a tan.

Lessons 1–4, Resource 3b

Skin Types

Characteristics

Genetic Origin



Never tans, always burns easily, skin particularly light, freckles, reddish hair (all babies and children)

Scandinavian/Celtic



Skin somewhat 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

Lessons 1–4, Resource 3c

My Skin Story

Fitzpatrick Skin Type and Resource
I have found that my skin profile is the following:

Fitzpatrick Skin Type 1, 2, 3, 4, 5 and 6	What I look like, e.g. skin and eye colour	Where my ancestors are likely to have come from	My skin's response to Sun exposure	How quickly my skin burns in the Sun 1= very quickly 2= quickly 3= slowly 4= very slowly

Lessons 1–4, Resource 4

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.

Lessons 1–4, Resource 4

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/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.

Lessons 1–4, Resource 4

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 ✓ beside the statement. If you think the statement is wrong, you need to put a X.

Statement	✓ or X
1. Animals have lots of different ways to protect themselves from the Sun.	
2. A suntan is healthy.	
3. Hauora is a Māori word which means health and wellbeing.	
4. There are four parts to our health and wellbeing and, like a whare, they need to be strong and equal so that there is a balance. These four parts are taha wairua (the spiritual side); taha hinengaro (thoughts and feelings); taha kia ora (the physical side); and taha whānau (social).	
5. According to Fitzgerald, humans have three main types of skin colour.	
6. Our skin colour can show us what part of the world some of our ancestors came from and where we live now.	
7. Humans with dark-coloured skin burn the fastest in the Sun.	
8. You cannot get sunburn on cold or cloudy days.	
9. Humans can protect themselves from the Sun by <i>Slipping</i> into the shade and into some sun protective clothing, <i>Slopping</i> on Sunscreen, <i>Slapping</i> on a hat, and <i>Wrapping</i> on sunglasses.	
10. Sunlight is made of all different sorts of energy and light.	
11. The Sun sends down ultraviolet radiation (UVR) to the earth.	
12. We can see UVR.	
13. The UVR is what causes our skin to burn even though we don't feel it as heat.	
14. There is more UVR at night because the Moon reflects the rays.	
15. There is more UVR in summer because the Earth is closer to the Sun in summertime.	
16. Skiing in the snow can expose you to high levels of UVR as the UVR bounces off your skin.	
17. UVR is reflected off snow and water so it is important to wear sunglasses when in the snow or near water.	
18. Countries in the world that are near the equator get more UVR than countries like the UK and Canada.	
19. The ozone layer is a filter (like a cloud) between the Sun's rays and the Earth's surface	

Answers:

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

Lessons 5-6

UVR and the Sun Protection Alert

Overview: We are finding out about our skin and how to best protect it from ultraviolet radiation

Assessment Opportunities	Structure
<p>Learning Outcomes</p> <p>We are successful in our learning when we can:</p> <ul style="list-style-type: none">• explain what UVR and UVI are• use information sources to identify facts about our skin and the sun• read and interpret information on the sun protection alert• use the information from the sun protection alert as a basis for decisions about sun protection.	<p>Prepare:</p> <ol style="list-style-type: none">1. Resource 5a and 5b, 'Love the skin you're in' and access to '50 incredible facts about skin' found at http://www.beautyflash.co.uk/skin-facts.html2. Resource 6, 'Twelve incredible facts about UVR'.3. Enough sets of crayons or coloured pencils for students to have a set if they are working in small groups. (Each group must have green, yellow, orange, red and purple colours.) <p>Connect:</p> <p>We have identified that our skin tells a story about our whakapapa and where our ancestors come from, the amount of Sun protection we need, our age and our lifestyle/activities. Now we are going to look more closely at 'skin' and how we can protect it from harmful ultraviolet radiation contained in sunlight.</p> <p>Activate:</p> <ol style="list-style-type: none">1. Students work in pairs and are given a copy of Resource 5a, 'Love the skin you're in' and access on a computer to '50 incredible facts about skin' http://www.beautyflash.co.uk/skin-facts.html. Students complete Resource 5a and 5b. Students move into groups of three or four with a copy of Resource 6, 'Twelve incredible facts about UVR'. They provide the graphics/pictures for the information (i.e. infographics). Students may need extra support around what infographics are and how they work. A good example of infographics can be found in the '50 Incredible Facts About Skin' http://www.beautyflash.co.uk/skin-facts.html or refer to https://auckland-northland.cancernz.org.nz/assets/Alcohol-and-cancer/C003118-Alcohol-Infographic-poster-A4-PRINT.pdf2. Students need to have access to the internet and can go to the websites below to help them find out more information.<ul style="list-style-type: none">• UV radiation in our environment http://sunsmartschools.co.nz/info/uv.html (in particular refer to the yellow poster)• SunSmart website https://www.sunsmart.org.nz/learn-more/uv-radiation• Science learning hub https://www.sciencelearn.org.nz/resources/2521-you-me-and-uv-question-bank <p>Gallery:</p> <p>Once students have completed the infographics for Resource 6, each group displays their work on the classroom wall. Students do a 'walk by' of the displayed infographic sheets as if they were in an art gallery. Teacher and students discuss which infographics worked well; which is, the visual images that successfully explain the facts.</p>

Please note: this lesson will be more successful if you avoid completing it during months of May-August; as these months will show very little variation in UVI levels

Lessons 5-6

UVR and the Sun Protection Alert

Structure

UVI and the Sun Protection Alert – Teacher Re-visits:

- the Cancer Society SunSmart messages of Slip, Slop, Slap, Wrap
- UVR in sunlight is what can damage your skin and eyes
- even though we cannot see or feel UVR as heat, we can measure it
- the ultraviolet index (UVI) is a measure of the strength of UVR in the environment. The higher the number the stronger the UVR
- UVR is affected by the following:
 - the season
 - time of day
 - geographical location
 - altitude
 - cloud cover
 - pollution
 - sun to earth distance

In Aotearoa/New Zealand, the National Institute of Water and Atmospheric Research (NIWA) measures UVI. They also forecast the amount of ultraviolet radiation (UVR) for the next day. This information is used to create the sun protection alert which gives guidance on the times of day you need to protect your skin and eyes from UVR.



The sun protection alert will state the times when the ultraviolet index (UVI) is forecast to be 3 or above, thereby requiring sun protection. Avoid doing this lesson between May - August, as an alert is not issued when the UVI is below 3.

Teacher takes students to the SunSmart website information about the sun protection alert <https://www.sunsmart.org.nz/sun-protection-alert/more-information-about-sun-protection-alert>

Discuss what the times mean in relation to UVR? Where would you find information about the sun protection alert?

Teacher returns to the map of Aotearoa for today's sun protection alert at <https://www.sunsmart.org.nz/sun-protection-alert>

Investigate the sun protection alert for different areas of the country.

Is there a difference between the top of the North Island and bottom of the South Island?

What does this tell us about when we will need sun protection in Aotearoa?



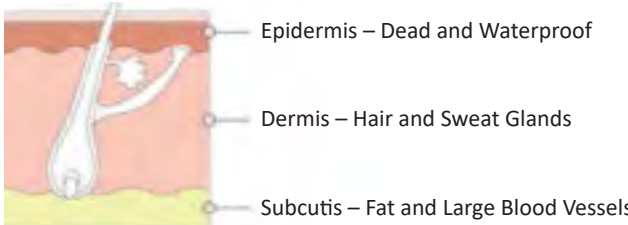
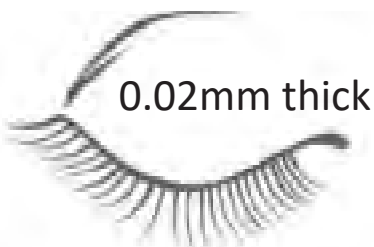
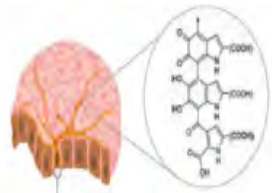
Consolidation:

In groups have students use **Resource 7** to determine which months of the year (in each of the regional locations) a sun protection alert is likely to be issued. What differences are there in the various parts of the country? What implications does this have for people living in those regions? Students could also investigate the average temperature each month at the different regional location. How does this compare with the UVI levels? Is temperature a reliable guide to whether sun protection is required?

Lessons 5-6, Resource 5a

Love The Skin You're In








Look at the image in Column A, which describes a fact about our skin. Go to '50 Incredible Facts About Skin' <http://www.beautyflash.co.uk/skin-facts.html>, find the 'fact' that goes with the image and write this in Column B. The first one has been done for you.

Column A	Column B
	<p>Skin is the human body's largest organ.</p>
	
	
	
<p>Large tentacle-like cells called melanocytes produce and distribute melanin.</p> 	

Lessons 5-6, Resource 5b

Love The Skin You're In

Look at the image in Column A, which describes a fact about our skin. Go to '50 Incredible Facts About Skin' <http://www.beautyflash.co.uk/skin-facts.html>, find the 'fact' that goes with the image and write this in Column B.

Column A	Column B
	
	
	
 Vitamin A  Vitamin D  Vitamin C  Vitamin E	

Lessons 5-6, Resource 6

Twelve Incredible Facts About UVR

Work in a group of three or four. Look at the facts below. Divide these between your group and draw a simple picture/graphic that describes the information. Each group will display their infographics to the class.

1. There are both positive and negative effects from UVR.
2. UVR levels are influenced by how close you are to the equator.
3. UVR levels are influenced by the time of day.
4. UVR levels are influenced by the time of year.
5. UVR from the sun cannot be seen or felt as heat.
6. The higher you climb a mountain, the stronger the UVR.
7. UVR can go through clouds.
8. UVR can be reflected off various surfaces - including snow, water, concrete and sea surf.
9. A person surrounded by snow receives UVR from the sky as well as UVR reflected off the snow.
10. The ultraviolet index is a measure of the strength of the level of UVR in the environment.
11. UVR is highest between September and April (especially between 10am and 4pm) in New Zealand/Aotearoa.
12. Be SunSmart by: slipping into some shade and slipping into some sun protective clothing; slapping on plenty of sunscreen; slapping on a hat with a brim and wrapping on some sunglasses.

Lessons 5-6, Resource 7

UVR and the Sun Protection Alert

The Sun Protection Alert is one way we can tell how much UVR there is. It tells us the time frames when the UVI is expected to be 3 or above at that location. Use the information in the tables below to determine what months of the year sun protection alerts are likely to be issued at any given location. (Select either table 1 or 2).



- What differences can be seen in the same location throughout the year?
- What months are sun protection required in that location?
- How much difference is there between Auckland and Invercargill (or other regions)?
- What does this mean for people living in those locations?

If necessary, refer back to the map of Aotearoa on the sunsmart.org.nz website to reinforce the geographical location of these regions.

Extension activity:

Select one location from the North Island and one from the South Island. Investigate the average temperature each month at that location. How does the average temperatures compare with the average UVI? Is temperature a reliable guide to telling if you need to take sun protection measures?

Table 1: Mean UVI Levels throughout the year

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Auckland	10	8	7	4	2	1	2	2	3	6	8	9
Wellington	9	8	6	3	1	1	1	2	2	5	7	8
Christchurch	8	7	5	2	1	1	1	1	2	4	7	8
Central Otago	8	7	5	2	1	1	1	1	2	4	6	8
Invercargill	7	6	4	2	1	0	0	1	2	3	5	6

Note: Mean UVI is taken in all weather conditions including when it was cloudy.

Table 2: Peak UVI Levels throughout the year

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Auckland	13	11	7	4	2	2	3	5	6	8	11	13
Wellington	13	9	6	3	2	1	2	4	5	8	11	12
Christchurch	12	8	5	3	1	1	2	3	4	8	10	11
Central Otago	10	8	5	2	1	1	1	3	4	7	10	11
Invercargill	8	7	4	2	1	1	1	2	3	5	9	10

Note: Peak UVI is when cloudless

Definitions:

UVR = Ultraviolet radiation - is a type of energy from the Sun.

UVI = Ultraviolet Index - is a measure of the strength of UVR in the environment. The higher the number the stronger the UVR

With humans, damage to our skin and eyes can occur from a UVI of 3 or above.

Lessons 7–9

Science Investigations

Part Two – Thinking Like SunSmart Scientists

The Sun is our biggest source of energy. Energy makes things happen. Energy changes things. Energy from the Sun includes heat, light and UV radiation. UV radiation cannot be seen or felt as heat.

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.



Lessons 7–9

Secondary Sources and Personal Experiences

Assessment Opportunities	Structure
<p>Lesson 7-9 Science Experiences We are successful when we can:</p> <ul style="list-style-type: none"> • explain how science can help us to find out about and understand the centre of our Solar System • share what we already know about the Sun and where/how we gained that knowledge • view and analyse secondary sources • carry out a plan of action to test our ideas • prepare equipment to use in investigations • understand that our senses help us collect data • use the data we collect to make explanations • use tools and measurements to describe change • explain the relationship between exposure to the Sun and changes in size, colour and temperature • use our data to think about what is happening and why 	<p>Lessons 7–9 Students will have amassed quite a body of information about the Sun. Some of this will be from media messages, previous school studies, personal interest and personal experience. The focus of this lesson is to help students to surface their present understandings and knowledge and to identify how they know what they know. Directing students in an explicit way will draw their attention to how, as humans, we draw upon multiple sources to make sense of the natural world. This series of lessons will add to their present understanding/knowledge of the Sun by asking students to engage with and analyse a number of texts and the information/ideas present. They will need direction to not just think about these texts not just as sources of facts/information but to consider what knowledge/understandings were required in order to construct them. Students should be encouraged to think about how successful the examples are. Asking the students to identify what they know as a result of personal experiences/noticings re: the Sun will help to reinforce that scientific understanding. Knowledge starts with observations.</p> <p>The Empirical Nature of Science This means that science is based on and derived from observations of the world around us from which interpretations are made. Scientists depend on empirical evidence to produce scientific knowledge. Any scientific explanation must be consistent with empirical evidence, and new evidence brings the revision of scientific knowledge. http://www.sciencelearn.org.nz/Nature-of-Science/Tenets-of-the-nature-of-science Building student knowledge about how scientists gain knowledge with regards to the Sun and by participating in guided and student-designed investigations will enable them to have confidence to make decisions about how they manage their exposure to the Sun’s energy.</p> <p>Just How Powerful is our Sun? What we already know about the Sun. How science can help us to find out about and understand the centre of our Solar System.</p> <p>Prepare: Preview the following sources: 1. Our solar system view https://solarsystem.nasa.gov/planets/overview/This interactive chart from NASA allows students to see how the Sun is central. Clicking on each planet, orbital pathways, etc. gives a brief synopsis of the information embedded in this chart. It may be useful to allow students time to navigate this chart at another time. “The Surface of the Sun as you have never seen it.” NASA clip of the Sun: https://www.youtube.com/watch?v=Izf51HlyEY8 This clip is able to build curiosity through awe and wonder using NASA footage. 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 students write their own ‘voice-over.’</p>

Lessons 7–9

Secondary Sources and Personal Experiences

Structure

The scope for science-specific words in combination with figurative language promotes the understanding that scientists are affected by and respond to phenomena in personal ways – awe and wonder is a driver of the need to know as much as the gathering of data. Scientists do not only describe phenomena in objective, clinical terms.

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.”

Connect and Activate:

Students view both video clips <https://www.youtube.com/watch?v=Izf51HIyEY8> and <https://solarsystem.nasa.gov/planets/overview/>

- Organise students in groups of four (see [Resource 8a](#), [8b](#) and [8c](#)). Supply each student with paper strips to record/draw what they know about the Sun. Stop after a few minutes and ask them to share what they have recorded. In the groups students organise what they know as a result of secondary sources into one set and what they know from personal experience/observation into the other set. They go to [Resource 8a](#), [8b](#) and [8c](#) and complete the exercise. Teacher explains that their personal observations are those gathered through the five senses and could be about their observations about reflection, light/shade, heat, effect on plant growth, effect on their skin, animals avoiding sunlight, evaporation, etc.

Demonstrate

Bus Stop

- Once each group has completed the activity,, they place [Resource 8b](#) on the wall at one end of the classroom (as pre-organised by the teacher) and [Resource 8c](#) on the other wall. Students move around and look at the statements from each group, detailing their response.
- Ask if there are any observations/experiences that they have in common with other groups. If so, what does that suggest? (The Sun’s effects may be consistent or there may be a pattern to our understanding.)
- Can they see any connection between what they know through secondary sources and their own observations or experiences? (E.g. the pattern of shadow lengths over the course of a day; insects avoiding the Sun.)
- Ask if anybody mentioned the Sun as the centre of our solar system. Note what is known and ask if anybody can add to that.
- Introduce the NASA “Our Solar System” interactive chart using data show/interactive white board <https://solarsystem.nasa.gov/planets/overview/>. What information is presented? How was this information collected? How reliable is it? Allow students time to discuss in their groups whether this interactive chart is useful in terms of adding new ideas and facts about the Sun. Each group can report back on and justify their decision. (See [Resource 9](#)).

Consolidate:

Talk about how energy changes things or makes things work. The Sun, as the major source of energy, means we need to think about how that energy changes things – both living and non-living. SunSmart people are aware that this energy defines our individual skin story. How that story reads is linked to our whakapapa (skin type) and what we do to shape the details (avoiding over-exposure that leads to Sun damage, both on the surface and deeper, leading to premature aging, skin lesions, carcinomas. Link back to previous lessons (e.g. Fitzpatrick Skin Types, [Resource 3](#))

Lessons 7–9, Resource 8a

Ten Things I Know About the Sun

Write down ten things you know about the Sun

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Instructions:

1. Write down ten things you know about the Sun.
2. Cut each of the above ten statements about the Sun into strips.
3. With your group, decide if the statement is either from a secondary source, or from personal experience or observation.
4. Once you have made the decision, glue each statement on the appropriate sheet (**Resource 8b** if it is from a secondary source or **Resource 8c** if it is from personal experience or observation).

Lessons 7–9, Resource 8b

Things I Know About the Sun from Secondary Sources

Lessons 7–9, Resource 8c

Things I Know About the Sun from my experiences

Lessons 7-9

Secondary Sources and Personal Experiences

Structure

Prepare

Teacher to view clips and apps before use in class:

- 1: <https://www.youtube.com/watch?v=lzf51HlyEY8>
2. <https://voicethread.com/>
3. 'The Sun is a Mass of Incandescent Gas'
https://www.youtube.com/watch?v=me06I9GDM_k
4. 'Sun Safe Play Every Day'
<http://www.youtube.com/watch?v=Zc2wE5dVx3Y>
5. Sun Safety – Who's at risk of skin cancer?
http://www.youtube.com/watch?v=Mk_NM5V7Bas

Connect:

Introduce the clip "Surface of the Sun As You've Never Seen It" and provide students with transcript of the voice over **Resource 9**.

<https://www.youtube.com/watch?v=lzf51HlyEY8>

7. Tell students:

'This clip uses NASA footage. There is a common misunderstanding that scientists can only use facts to describe things that they notice, investigate and want to explain about the natural world. However, the work of science is carried out by human beings and all human beings respond to events and things that fill us all with awe and wonder.'

8. Ask them to think about how the three elements of visuals, voice and music work together to convey just how amazing and powerful our Sun is.

9. Read through the transcript before viewing. In groups students can identify poetic language and content-specific language. Do these two approaches work well together?

10. Remind students to think about how different techniques are used to add a level of engagement with the content. View "Surface of the Sun As You've Never Seen It" <https://www.youtube.com/watch?v=lzf51HlyEY8>

11. On **Resource 9** record words they would use and what wonderings they have about the Sun as a result of this clip.

12. Was the clip successful in creating interest and adding ideas and facts ?

13. 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.

Extension:

a. Suggest that students revisit the Solar System chart again, as part of their reading. Direct them to think about how different entities in the Solar System are affected by their proximity to the Sun. Pose the question: If the Sun determines these aspects/characteristics of Mercury, Asteroid Belt, etc., then this information should be factored into our decision-making around our exposure to the Sun's energy?

b. Using a compilation of Sun images from NASA (Google Images: the Sun), students can make presentations that reflect poetic and content-specific language. Use "Voicethread" or 'Fotobabble' or a [storyboard app](#).

Activate:

This next part of the lesson builds on the use of other media clips to present different information. Each clip has a different audience. Students will analyse and critique whether these clips are successful.

Teacher note: In New Zealand, we need to be SunSmart from September to April especially between 10am and 4pm. Timings may differ on international links.

Lessons 7-9

Secondary Sources and Personal Experiences

Structure

View clips:

Clip 3. 'The Sun is a Mass of Incandescent Gas'

https://www.youtube.com/watch?v=me06I9GDM_k

Clip 4. 'Sun Safe Play Every Day'

<http://www.youtube.com/watch?v=Zc2wE5dVx3Y>

Clip 5. 'Sun Safety – Who's at risk of skin cancer?' http://www.youtube.com/watch?v=Mk_NM5V7Bas

These clips will front load some information about the Sun and also allow students to think about the information and whether the techniques used are successful. If our aim is to build scientific literacy, then students need opportunities to practise this kind of approach and to share the thinking that is generated as a result. Scientific understandings/knowledge is cumulative and also tentative. Ideas are tested and sometimes revisited as new information comes to hand.

Students view clip 3: http://www.youtube.com/watch?v=me06I9GDM_k

- Use video clip 'The Sun is a Mass of Incandescent Gas'. Students work in groups of four. As the clip plays, students record as many facts as they can, in the form of words or pictures. Students read their list and tick the facts that they already know on **Resource 9**. Group members share what they have managed to record. Listen again following the same method. Are they able to add more? Why/why not? What helps/hinders the process? Ask what age group this clip is aimed at. Have the producers been successful? In what ways? What strategies have they used? What extra information about the Sun do all the clips share with us?
- Ask students in terms of adding to student understanding/knowledge is this clip successful?
- Students revisit the facts gathered by the group. Point out this is a very old track and that some of the "facts" may no longer be valid. Refer back to NASA chart and how this is a more recent compilation of understandings re: the Sun. What could the students do to check out the information in the song?
- Remind students that over time, and as technology advances, some of our ideas about the Sun and the solar system end up being revised. This is the TENTATIVE (not set in stone) nature of science. Most of the information is still considered to be current. Does this clip build a sense of how powerful the Sun is?

Students view clip 4: <http://www.youtube.com/watch?v=Zc2wE5dVx3Y>

and clip 5: http://www.youtube.com/watch?v=Mk_NM5V7Bas

Demonstrate:

Use similar analysis as above. Focus on what information is conveyed, who the message is aimed at and whether it is successful. Students will need access to the internet. After viewing, one person from each group reports back to class.

Consolidate:

We have been considering the knowledge we have about the Sun, either as a result of secondary sources or our own experiences. The clips allow us to think about some of the types of message about the Sun that are in circulation. These ideas emerged in much the same way that our own ideas about the Sun have been formed. Noticing the effects and then carrying out investigations to prove or disprove our thinking.

Learning from our Experiences:

Discuss with students how science investigations develop as a result of our noticing effects and wanting to determine causes. Investigation in science requires organised noticing.

The purpose of all the investigations is to help you to make SunSmart choices that are based on your science understandings and knowledge about how powerful our Sun is.

Lessons 7-9, Resource 9
Facts I know about the Sun



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.

MY WORDS	MY WONDERINGS

Lessons 10–12, Part A

Sunlight Investigation

Overview: We are investigating the effect of sunlight on living and non-living things.

Structure

Lessons 10–12, Part A

The first two investigations allow students to consider the Sun’s effect — its ability to change both living and non-living things. Students should be encouraged to think about how these experiences inform their ability to make SunSmart choices.

We are investigating the effect of heat and light from the Sun on living and non-living things.

A: What is the effect of different amounts of energy from the Sun on green plants?

B: What is the effect of energy from the Sun on different-coloured containers?

Learning Intentions:

We are learning to:

- predict what will happen when green plants get different amounts of sunlight
- record data using photos and qualitative and quantitative descriptions.

Prepare:

Plant Investigation

Six indoor plants of the same type and size (e.g. lemon balm).

Connect:

Ask students why sunlight is important for plants. Divide class into six groups. In groups discuss “Do all plants need the same amount of sunlight?” and give reasons and an example. Group to record responses. Only responses that include a reason and an example are valid. We are going to test the effect of different amounts of sunlight on six plants – two in a shaded part of class (out of direct sunlight), two covered by a box (or in cupboard), and two in full sunlight.

Activate:

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

Demonstrate:

- 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 the opportunity to identify plant parts. What is under the soil? Roots, etc. (Complete **Resource 10a**).
- Take photos of each plant. Insert photo on chart in **Resource 10b**. Measure the biggest leaf and the smallest leaf on each plant. Measure the height of the plant. Record.
- Remind students that scientists use numbers to describe things accurately (measurement is a quantitative description).
- Students to describe leaf colour. Record on **Resource 10b**.
- Place two plants in each location. Ensure that each ‘specimen’ is labelled (1, 2, 3, 4, 5 and 6) so that the group can identify their plant. Students to organise who will take photos and record observations.
- Group to 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 think about the data collected.

Allow groups to share their findings with other groups. This reporting-back time can be organised by regrouping so new groups have members from each of the original groups. Students to use their data to support their reporting back. Students to design information and graphics to describe their results.

Lessons 10–12, Part B

Structure

Lesson 10, Part B

We are investigating the effect of energy from the Sun on different-coloured containers.

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 the can is able to be wrapped in paper and secured by a rubber band); thermometer; jug of water; towels for spills; recording sheet for each student ([Resource 10c](#)).

Activate:

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 the 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:

- Teacher demonstrates wrapping a can with black paper and securing the paper with rubber band.
- Instruct students to wrap their cans.
- Distribute student recording chart. Students to colour in their can.
- Distribute jugs of water to groups. Take starting temperature.
- Students record on thermometer graphic.
- Each can is to be filled to the top.
- Carry 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 the students in their groups to discuss which colour can they think will be most effective at heating up the water, and why.
- Record each group's suggestion
- At the end of 1½ hours, check the temperature of the water inside the different-coloured cans.
- What has happened? Allow students time to share their results in their group.
- Collate findings of all groups. What do these results show?
- Does colour make a difference? How is this information useful when we are thinking about protecting our skin from the Sun.

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.

Lessons 10-12, Resource 10a

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



Lessons 7-20: Part Two—Thinking Like SunSmart Scientists

Measurement of biggest leaf:

Colour of biggest leaf:

Measurement of smallest leaf:

Colour of smallest leaf:

Height of plant:

Lessons 10-12, Resource 10b 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:

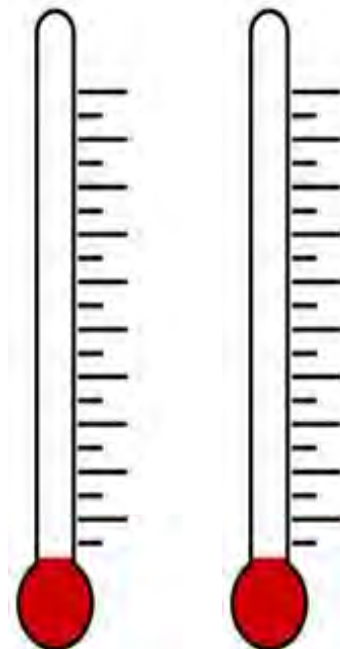
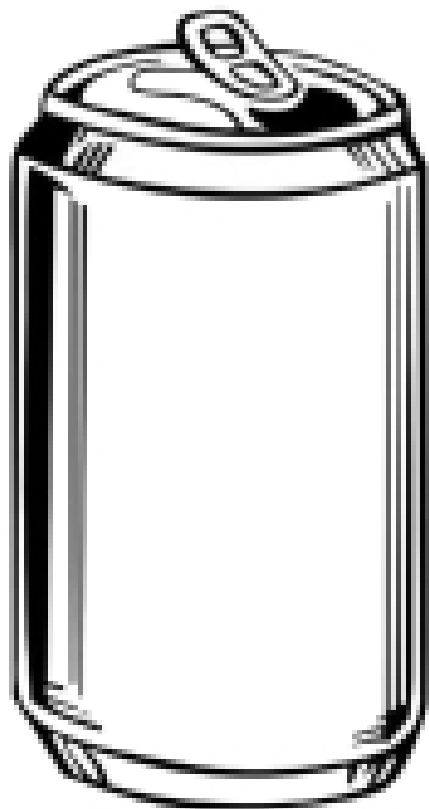
Colour of biggest leaf:

Measurement of smallest leaf:

Colour of smallest leaf:

Height of plant:

Lessons 10–12, Resource 10c
Observation Chart



Start Temperature

Finish Temperature.....

Lesson 13

UV Beads – Making UV Visible

Overview: We are investigating using UV beads to reveal the presence and intensity of UV light.

Structure

Lesson 13

Prepare:

- **Resource 11** recording sheet (one per student)
- colour pencils
- camera/video/iPad/tablet.

We are learning to:

- understand that the light spectrum has parts not visible to the naked eye
- familiarise ourselves with how UV beads can detect the presence of UV light.

Connect:

Sometimes we think that because something cannot be seen it is not able to have an effect. But think how, even though we cannot see air, we can see its effects; for example, how it moves trees and how it carries smoke from a chimney straight up on a calm day but off on an angle in the wind. Just like air, we cannot see UVR, but there are substances that can reveal its presence. We need to remind ourselves that it is present during all hours of sunlight and that over time it is harmful effects on our skin will be obvious.

Activate:

Work in groups of four.

1. Hold up a box. Inside this box there are some small Ziploc bags containing UV beads. Like tonic water, these beads contain a chemical that reacts to the presence of UV light by turning from white to another colour. This investigation will help us to detect the presence of UVR in three different locations – exposed to sunlight next to the window, exposed to full sunlight outdoors and exposed to sunlight level in a shady spot outdoors. You are to gather your data by showing what colour changes happen in each location over 10 minutes. You can record this on the data sheet – you will need colour pencils. You will also take photographs at intervals to track changes.
2. In your group discuss what result you expect in each location.
3. In your group discuss the order of locations.
4. At the end of the investigation, each group will account for three bags, each containing ten beads. These beads and bags will be required again for another investigation.
5. Take five minutes to discuss locations and roles. Share tasks.

Shade	Window Sill	Full Sun
0 Min 	0 Min 	0 Min
Intensity		
1 Min 	1 Min 	1 Min
Intensity		
5 Min 	5 Min 	5 Min
Intensity		
10 Min 	10 Min 	10 Min

Consolidate:

In your group discuss what you have found out. What are the implications of your results? What was interesting or surprising? How does this new information add to your SunSmarts?

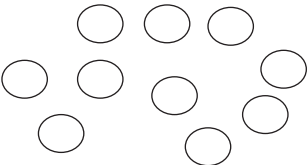
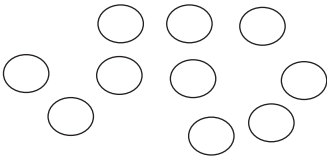
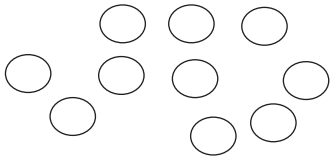
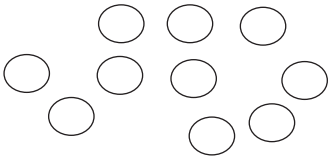
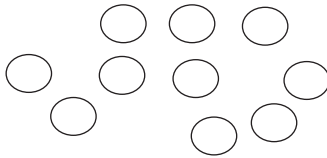
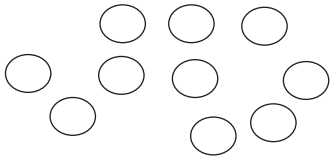
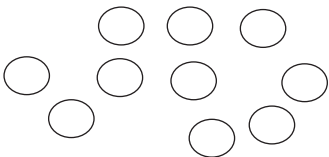
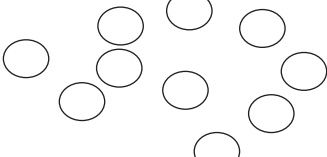
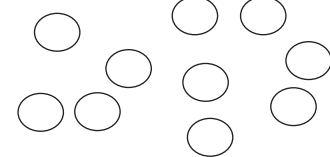
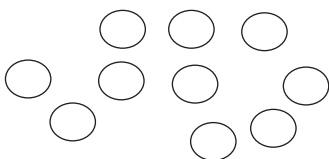
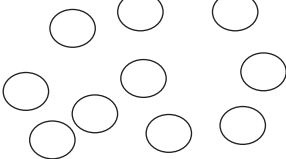
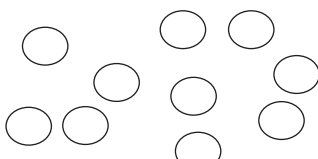
Remember:

This activity is outdoors, so take SunSmart precautions (sunhat and sunscreen)

Lesson 13, Resource 11

UV Bead Recording Sheet

UV Bead Detectives

SHADE	WINDOW SILL	FULL SUN
0 minutes 	0 minutes 	0 minutes 
Colour Intensity	Colour Intensity	Colour Intensity
1 minutes 	1 minutes 	1 minutes 
Colour Intensity	Colour Intensity	Colour Intensity
5 minutes 	5 minutes 	5 minutes 
Colour Intensity	Colour Intensity	Colour Intensity
10 minutes 	10 minutes 	10 minutes 
Colour Intensity	Colour Intensity	Colour Intensity

Lesson 14

Tonic Water Detective

Overview: We are investigating how we can make UV light visible.

Assessment Opportunities	Structure
<p>Lesson 14 We are successful when we can:</p> <ul style="list-style-type: none"> demonstrate how scientists can use chemicals to reveal the presence of something that is not visible to the naked eye use our science experiences to inform our SunSmart choices explain that light from the Sun is made up of a mixture of many different colours of light, even though to the eye the light looks almost white carry out an action and test our ideas use the results of the experience to explain the presence of UVR in sunlight. 	<p>Lesson 14 Teacher Note: The most dramatic results will occur around noon when the Sun is directly overhead and in summer.</p> <p>Prepare:</p> <ul style="list-style-type: none"> two clear, plastic cups per group use permanent marker to label one cup T and the other W. Provide a cup labelled T and a cup labelled W to each group one litre of tonic water one litre of tap water black paper, polythene, felt, or cloth (approximately 21 cm x 30 cm). <p>Connect :</p> <ul style="list-style-type: none"> We have learnt that we cannot see or feel UVR. Today we are going to use the quinine in tonic water to show that there is UVR in the sunlight. Tonic water is mostly made up of water, but it also contains a very small amount of a substance called quinine. The quinine is able to absorb UVR and then reflect this back so that we can see that part of the light spectrum that is usually invisible to our naked eye. <p>Activate and Demonstrate: Students follow the instructions in Resource 12a and 12b, Tonic Water Detective. Front load about the presence of quinine in tonic water. Although tonic water is mostly water, the small amount of quinine in it means we can use tonic water as a UV detective.</p> <p>Consolidate: The following is a guide for teacher questioning. Looking at the top five centimetres of the liquids, what do you see? (The upper centimetres of the tonic water cup should “glow” blue.)</p> <ol style="list-style-type: none"> Did both liquids appear the same? (No, the tap water should show no change.) What effect does the black paper, polythene, felt, or cloth have on your observation? (The black cloth increases the contrast, which makes the glow of blue easier to see.) What is contained in the sunlight that causes the observed results? (Ultraviolet radiation.) Give an explanation for the observed difference between the tonic water and the tap water. (There must be a difference between the tonic water and the tap water. Teacher can explain the presence of the quinine during post-lab discussion.) Have you observed similar occurrences in other materials? (Answers will vary. Some students might be aware of the fluorescence of minerals under UV light.) How might the position of the Sun affect your results? (The higher the Sun is in the sky, the shorter the path length through the atmosphere (ozone layer), allowing more ultraviolet to get through.) You may want to consider doing this activity at different times of the day so that students can compare the differences.

Lesson 14, Resource 12a

Tonic water detective reveals UVR

Your teacher will have given your group two clear plastic cups; one is labelled “T” and the other is labelled “W”.

- Fill the tonic water cup almost to the brim.
- Fill the tap water cup almost to the brim.
- Place the cups outdoors on a flat surface so that direct sunlight strikes the surface of the liquid in both cups.
- Hold a piece of paper or polythene behind the cups. Look across the surface of the tonic water and tap water through the sides of the cup.



Record your thoughts and observations on the Tonic Water Detective Reveals UVR [Resource 12b](#).

Questions:

1. Looking at the top 5 cm of the liquids, what do you see?
2. Did both liquids appear the same?
3. Try looking at the cups and without the black paper/polythene/felt/cloth. Does this affect your observation?

Consolidate:

Complete [Resource 12a](#) and [12b](#), showing the two cups used in the investigation. Label. Use symbols to indicate the passage of light into each cup.

4. Share your drawings and annotations with the group. Decide whose diagram best illustrates the equipment, the result and the passage of light.
5. Collaboratively, write a short description about your findings (results). There is no need to write the procedure carried out.

Guideline for reporting results:

Begin with ...

This investigation shows how the quinine in tonic water can let us see what the eye cannot usually see.

The description must include something about the following:

- What is contained in the sunlight that causes the observed results.
- The reason for placing cups in full sunlight.
- The reason for the observed difference between the tonic water and the tap water.
- The effect of the black paper/polythene/felt/cloth.

Finish with:

This investigation helps to remind us that rays of ultraviolet light are always present in sunlight and that, although the energy may be invisible, the effects of ultraviolet radiation from the Sun is always shaping the story that our skin tells.

Lesson 14, Resource 12b
Tonic water detective reveals UVR

TONIC	WATER
	
Observations and Thoughts	Observations and Thoughts

Lesson 15

Are You a Human Gnomon?

Investigating how gnomons can help us identify optimum shade times.

Structure

Lesson 15

We are investigating optimum shade time by using a human gnomon.

We are learning to:

- understand how the energy from the Sun can be blocked by solid objects that cast a shadow (shadows can lessen the effect of heat and light)
- use a human gnomon to observe the projected shadow over a day
- make a photographic record of the shadows
- record our observations on a table/chart
- share our data with our groups and identify how this data is useful.

Prepare:

Students organised in groups.

Materials needed for each group: • ruler • tape • chalk • worksheet to record observations

Equipment needed for teacher: timer or watch

Connect:

1. Ask students about any shadow exploration they have made. What did they notice about the shadows made at different times of the day? Show students the shadow images in [Resource 13](#). Discuss how people notice things/phenomena in the natural world and start to think about what is happening. We notice “effects”. Thinking about effects make us wonder about causes. We look for ways to explain things.
2. Tell students that they will use a group member as a human gnomon. A gnomon is the part of a sundial that projects a shadow. They will use experience to trace the passage of the Sun in a more organised way.

Activate:

Using the gnomon to collect data:

Day 1: Work in groups

The tracing of the human gnomon will need to be done at regular intervals – e.g. every two hours, on the hour, starting at 9 am.

1. Locate a sunny spot on the asphalt/concrete in the playground that is free from any other shadows.
2. Each group nominates a gnomon to stand in a designated spot with their back to the Sun (to discourage looking directly at the Sun).

Demonstrate:

3. Draw around the gnomon’s feet in order to mark the position that will be returned to. Take a photo of the shadow cast. Draw around the shadow. Recording the Sun’s position and length of shadow on the chart ([Resource 14](#)). Repeat this at set intervals throughout the day.
4. In groups, students predict and justify where they think their gnomon’s shadow will fall at the end of school.
5. Have students outline the predicted shadow with a different colour chalk. Take a photo and record the prediction on the charts.
6. At 2.00 pm make the last recording for the day.

Consolidate:

Day 2:

1. Students to check if their predictions were correct.
2. Do all the groups have similar findings?
3. How do these findings support SunSmart messages re: best times to stay indoors?

Definition of GNOMON

1: An object that by the position of length of its shadow services as an indicator especially of the hour of the day; as a: the pin of a sundial or b: a column or shaft erected perpendicular to the horizon.

Remember: The shorter your shadow, the higher the UV index.

Lesson 15, Resource 13
Shadow Images



Lessons 7–20: Part Two—Thinking Like SunSmart Scientists

Lesson 15, Resource 14

Gnomon Recording Sheet

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? _____

Lessons 16–20

Inquiring minds

OVERVIEW:

- What have we learnt about UVR?
- What have we learnt about our skin?
- What are the pro's and con's?
- How does UVR affect our skin?
- How can we protect ourselves from UVR?

Essential question:

How do others in our community protect their skin from ultraviolet radiation?

Assessment Opportunities	Structure
<p>Lessons 16–20 We are successful when we can:</p> <ul style="list-style-type: none"> • review previous learnings about UVR • describe key benefits and harms from UVR exposure • describe sun protective measures we can take • work co-operatively as part of a group • identify possible challenges with the interview process and provide solutions • identify and demonstrate effective interviewing techniques • give and receive constructive feedback • make improvements based on the feedback received • demonstrate the oral, reading and written communication skills required to conduct a survey (asking people to take part, reading questions clearly, recording answers). 	<p>Lessons 16–20 Prepare: Resources 15-23</p> <p>Connect:</p> <ul style="list-style-type: none"> • At what time of year and day is UVR strongest in New Zealand? • At what time of the year and day is UVR strongest where we live? (i.e. UVI 3 or more). • What do we about how UVR affects our skin? • Investigate the pro's and con's of Sun exposure. Visit https://www.healthline.com/health/depression/benefits-sunlight and https://cancernz.org.nz/reducing-cancer-risk/what-you-can-do/sunsmart/vitamin-d/ Complete the bio-poem Resources 15a and b and 10 ways that the Sun can damage your health Resource 15c • Link our scientific knowledge with ways that we can protect our skin and eyes from UV radiation. See Resource 16a b, Slip, Slop, Slap, Wrap and Scientific Investigations <p>Revisit Resource 4. Are there any changes you would like to make to your answers?</p> <p>Activate: Peparing For and Conducting a Survey (Resource 17), Survey and Survey Tally Sheet (Resource 18), Analysing Results (Resource 19), and Action Plan (Resource 20).</p> <p>Demonstrate: Students develop cartoon/short film about how to protect themselves from UVR (see Resource 21, Presentation Plan).</p> <p>Consolidation: Presentation to peers and whānau. (See Resource 22 23, Group Reflection).</p>

Lessons 16-20, Resource 15a

The Pro's and Con's

Sample of a Bio-poem written by a student

Our investigations have shown us that humans and all living things need the Sun. The Sun is not all bad. There are both pro's and con's of sun exposure.

Amalie "Emmy"

German mathematician and teacher;

Loving, innovative, inspiring, intelligent, pacifist;

Contemporary of Felix Klein, David Hilbert, and Albert Einstein;

Keenly interested in languages, teaching math, non-commutative algebra, axiomatic theory, and abstract algebra with special attention to rings, fields, and groups;

Who wrote Ideal Theorie in Ringberiechen and over 40 other papers;

Whose contributions include Noether's Theorem, Noether's rings, work on theory of invariant used by Einstein, finding relationships between algebra, geometry, and logic, inspiring students to make their own contributions;

Who is remembered as the Mother of Abstract Algebra and for the "Noether's Boys," her followers;

Who wanted to overcome gender issues, and political tensions and battles to become a woman professor under her own name;

Who lived in Germany from 1882 to 1933 and fled to the U. S. from 1933 until her death in 1935. During the Nazi rule because she was a Jewish, liberal woman.

Noether

The student above developed the poem by completing the following template

BIO POEM - TEMPLATE

- Line 1** Mathematician's first name
- Line 2** Description
- Line 3** Four characteristics of this person
- Line 4** Contemporary of _____ (minimum 2 other people)
- Line 5** Keenly interested in _____ (minimum 3 areas)
- Line 6** Who wrote _____ (titles of books or other writings)
- Line 7** Who is remembered as/for _____
- Line 8** Whose contributions include _____
- Line 9** Who wanted or wanted to change _____
- Line 10** Who lived in _____ (geographical and time reference)
- Line 11** During _____ (historical reference)
- Line 12** Last name

Lessons 16-20, Resource 15b

The Pro's and Con's

Writing a Bio-poem

Now write your own bio poem. You will need to read the information on the following sites in order to complete your bio poem.

<https://www.cancernz.org.nz/reducing-cancer-risk/what-you-can-do/sunsmart/vitamin-d/>

<https://www.health.govt.nz/your-health/healthy-living/food-activity-and-sleep/healthy-eating/vitamin-d>

- Line 1 Vitamin D is
- Line 2 Description
- Line 3 Three functions of vitamin D are
- Line 4 We get Vitamin D from _____ (minimum two sources)
- Line 5 Made when the Sun _____ (explain how it is produced)
- Line 6 Sensible Sun exposure is _____ (two reasons)
- Line 7 We need vitamin D for

Lessons 16-20, Resource 15c

The Pro's and Con's

Top 10 Ways that the Sun can damage your health

In groups of three, identify ten ways that too much Sun can damage your health. Use all the knowledge and observations you have made to complete the statements below by putting in the missing word.

1. The Sun's UVR can _____ your skin.
2. The Sun's UVR can _____ your eyesight.
3. The Sun's UVR can _____ skin cells.
4. The Sun's UVR can cause _____ which destroys the top layer of your skin.
5. The Sun's UVR ages our _____.
6. When exposed to the Sun's UVR, skin produces more of the brown melanin, which _____ the skin and gives us limited protection.
7. Over-exposure to the Sun's UVR causes 90% of all skin _____ cases in NZ.
8. The Sun heats _____ objects.
9. The Sun melts _____.
10. Too much Sun can _____ living and non-living things.

Answers

1 = burn; 2=damage; 3=kill; 4=sunburn; 5=skin; 6=darkens; 7=cancer; 8=up; 9=objects; 10=destroy

Lessons 16-20, Resource 16a

SunSmart Science

Link the SunSmart action in Column A with the scientific knowledge we now have in Column B.

Draw lines between Column A and B. some may match more than one fact on column B.

Column A

1. Stay in the shade around lunchtime
2. Wear a hat with a brim
3. Choose clothing that covers up as much skin as possible
4. Use broad-spectrum sunscreen, SPF30 or higher
5. Wear lip balm with a sunscreen in it or zinc on my lips and nose
6. Wear wraparound sunglasses
7. Wear a rash suit when near or in water

Column B

1. Snow, concrete and water all reflect UVR
2. UVR can affect our eyes
3. UVR is strongest between September to April (especially between 10am - 4pm)
4. Time of day, season, geographic location, altitude and pollution levels all have an impact on UVR levels
5. Humans with fair skin burn faster in the Sun and need to cover up most of their skin whenever the UVI is 3 or above
6. Water reflects UVR
7. The skin on our face and eyes is very delicate and thinner than it is on other parts of our body.



Lessons 16-20, Resource 16b

Slip, Slop, Slap, Wrap

We need a combination of things to better protect ourselves from the Sun



SLIP into the shade



SLIP into Sun protective clothing



SLOP on sunscreen
broad-spectrum SPF 30 +



SLAP on a hat with a brim



WRAP on sunglasses

Lessons 16–20, Resource 17

Preparing for and conducting a survey

Let's find out what sunscreen the people in our community use by carrying out a survey. Before we use our survey, let's practise our interviewing techniques.

(Teacher models good and not-so-good interviewing techniques through role play and asks students to identify features such as not looking at person, muffled voices, speaking too quickly. Create a checklist of interview technique reminders. Add to interview sheet.)

- In groups, students interview each other and record their findings on the survey sheet on the next page. One student to conduct interview, one to record, and the other to observe. Rotate roles.
- After the four interviews, ask each group to consider: "What did we do well? What did we not do well? What could we improve on next time and how?"
- Students work in their group to identify five different people they could ask in their survey, so that they get different ages, genders and ethnicities.

Survey to Cover	Who in our group is responsible	Completed
Females		
Males		
5–10 years old		
11–30 year olds		
31–50 year olds		
51 years and older		
Different ethnicities		

Students have six copies of the survey. Each of the five people they interview are given a copy of the survey. The extra sheet is used by the students to tally their results.

Lessons 16-20, Resource 18

Survey and Survey Tally Sheet

Survey Tally

Name: _____

Gender: _____

Male	Female

Age Group

5-10	11-30	31-50	51+

Ethnicity:

Pakeha	Other European	NZ Māori	Samoan	Cook Is. Māori	Tongan	Other Ethnicity	Niuean	Tokelaun	Fijian	SE Asian	Chinese	Indian

SunSmart Action	Never	Sometimes	Always
Stay in the shade between 10am and 4pm			
Wear sun protective clothing; e.g. long shirts, collars, items that cover more of the legs			
Wear a hat with a brim			
Wear broad-spectrum SPF 30+ sunscreen			
Wear lip balm with a sunscreen in it or zinc on my lips and nose			
Wear wraparound sunglasses			
Wear a rash suit when near or in the water			

SunSmart Action	I forget to do it	I do not have access to it	I do not like doing it	Other
Stay in the shade between 10am and 4pm				
Wear Sun protective clothing; e.g. long shirts with collars				
Wear a hat with a brim				
Wear broad-spectrum SPF 30+ sunscreen				
Wear lip balm with a sunscreen in it or zinc on my lips and nose				
Wear wraparound sunglasses				
Wear a rash suit when near or in the water				

Lessons 16–20, Resource 19

Analysing Results

Students collate their results (for the five people they surveyed) by tallying up the totals on their spare survey sheet. Teacher asks each group;

- Have you noticed if there are any similarities or differences between what the males and females have reported?
- Have you noticed if there are any similarities or differences between the age groups and what they have reported?
- Have you noticed if there are any similarities or differences between the ethnicities and what they have reported?

Teacher then uses the survey sheet to collate the totals from each group so that they have total figures for the class.

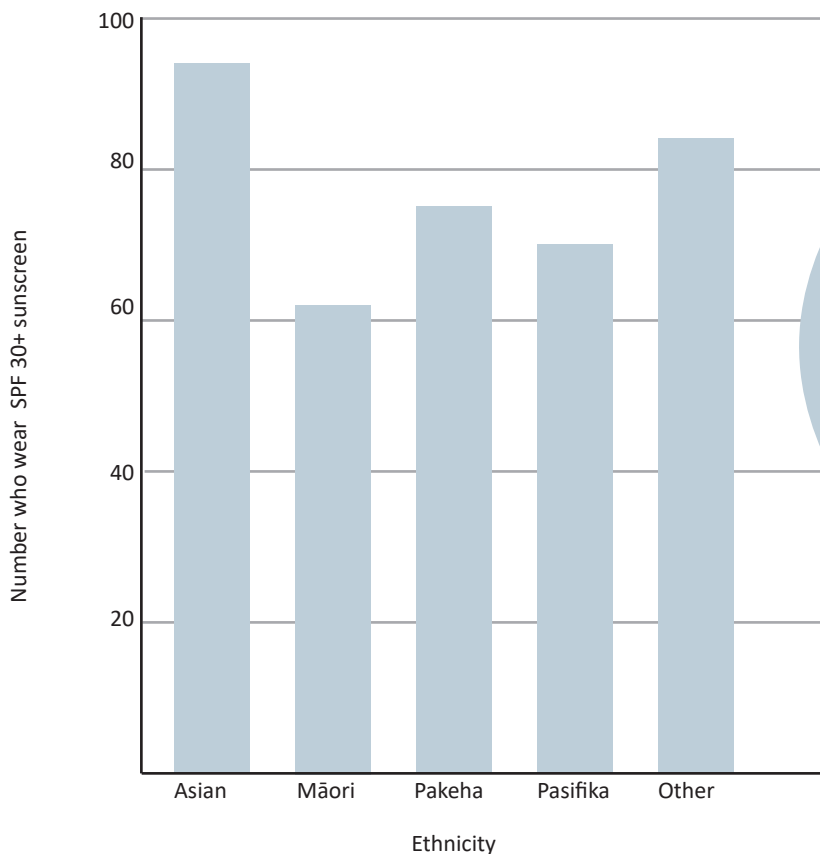
- Have you noticed if there are any similarities or differences between what the males and females have reported? I wonder why that is?
- Have you noticed if there are any similarities or differences between the age groups and what they have reported? I wonder why that is?
- Have you noticed if there are any similarities or differences between the ethnicities and what they have reported? I wonder why that is?

Teacher then discusses with students the best ways to present the data that is of most interest. See examples of a pie chart or bar graph below. Students write what the data results tell them.

Teachers could go to the links below for tasks at Levels 3–4 that focus on interpreting given data and graphing it.

<http://new.censusatschool.org.nz/resource/nosey-parker-1/>

<http://new.censusatschool.org.nz/resource/nosey-parker-2/>



Lessons 16-20, Resource 20

Action Plan

Action plan for presentation to peers and whānau

We have found out a lot of things about ultraviolet radiation and how we can protect our skin. The key messages we have that will help us to protect ourselves from UV Radiation is:

- *Slip into the shade and into sun protective clothing*
 - *Slap on sunscreen, broad-spectrum SPF 30+*
 - *Slap on a hat with a brim*
 - *Wrap on sunglasses*
- We have found out what SunSmart actions the people in our community use most often, and those they use the least. We need to share the findings from our survey with the community. We also need to encourage the community to take ALL the SunSmart actions.

Encourage students to add to the list and also provide SunSmart actions used in their culture.

Students then work with their group to decide how they will present:

- a) the findings from the survey
- b) their message to encourage the school community to use all SunSmart actions.

They could present their message as a short film or cartoon; see <http://www.youtube.com/watch?v=bHhwro4r7ks>

See the following pages for a presentation plan and group reflection sheet.



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Lessons 16-20, Resource 21

Presentation Plan

Group Name: _____

We will present our findings to: _____

We will present them by: _____

Questions	PREPARE/PLAN
What information needs to go on our presentation?	
What resources do we need for our presentation? Where will we get these from?	
How do we want it to look? (Attach a draft if needed.)	
TAKE ACTION	
Who do we need to ask about where our presentation is allowed to go? How will we ask them?	
What are the steps we will take in making our presentation? E.g. Step 1. collect materials Step 2. allocate jobs	
EVALUATION	
How will we ask people to evaluate our project? E.g. email, post it to box.	
What questions will we ask them?	

Lessons 16-20, Resource 22

Group Reflection

Consider the way you worked as a group throughout the unit. For each of the areas below, put a circle around the number that best indicates how you think your group worked.

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

1. Taking turns

_____ / 1 / 2 / 3 / 4 / 5

2. Listening to each other

_____ / 1 / 2 / 3 / 4 / 5

3. Sharing the responsibilities

_____ / 1 / 2 / 3 / 4 / 5

4. Solving problems

_____ / 1 / 2 / 3 / 4 / 5

5. Producing work we are proud of

_____ / 1 / 2 / 3 / 4 / 5

Resource 23

Group Work – What Works

1. For the Teacher – a checklist of instructional environment and management components
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 group?
5. Strategies for effective group work
6. Essential group dynamics
7. Social skills score cards – Levels 1–4

Resource 23

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.

Resource 23

Group Work – What Works

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.
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 23

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 his/her 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 23

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 23

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 23

Group Work – What Works

Strategies for Effective Group Work

1. **Group size**
Maximum 5, 3 or 4 ideal.
2. **State objectives and set goals**
E.g. give each group of four students, four straws, six 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 that 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 23

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 can 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 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 23

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 23

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								

