

SUNSMART  
SCHOOLS



Cancer  
Society  
Te Kihui Matepukupuku  
o Aotearoa

*SunSmart Beautilicious  
SunSmart Scientists*

*Learning from and about the natural world*

**Curriculum Level 4 Unit Plan**

# Introduction

## SunSmart Schools Aotearoa

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

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

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



## The SunSmart Schools Programme

The Cancer Society SunSmart programme in schools supports the findings of the [Community Preventive Services Task Force](#).<sup>1</sup> 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 <http://www.thecommunityguide.org/cancer/skin/education-policy/primaryandmiddleschools.html>

## 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:

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



# Level 4 Unit Overview

## Overview Planning Tool

The overview diagram explains how the lessons for Level 4 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



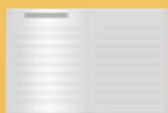
Science Experience



Technology



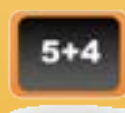
Literacy



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 7-9

Science: Sun narratives – Learning how science knowledge and understanding can be communicated.

Lessons 10-12

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

Lessons 1-2

Hauora

Lessons 3-5

Facts about the Sun and skin

Lesson 5

Sun protection in different environments, e.g. snow, water, mountains, desert

Lessons 13-14

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

Lessons 1-5

Myth busters and Sun protection

Lesson 15

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

Lessons 3-5

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

Lesson 5

UVR – what is it?  
MetService predictions  
Sports and recreation

Lesson 5

Sunlight – the good and the bad  
How do people in the Sun protect themselves?

Lesson 6

Beauty – Fact or fiction

Lesson 16

We are investigating the effectiveness of commercially prepared and student-made sunscreens.

Lessons 5-6

What have we learnt about UVR and sunbathing?  
What have we learnt about our skin? How does UVR affect our skin? Eyes? How can we protect ourselves? Why do we need to expose our body to sunlight?

Lesson 17

We are conducting our own investigation into SunSmart materials.

Lessons 18-22

INQUIRY USING:

What we have learnt about UVR and our skin?

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

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 4

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	<b>Personal Health and Development</b> <i>Safety Management</i> Access and use information to make and action safe choices in a range of contexts.	<ul style="list-style-type: none"> <li>demonstrate an understanding about good skin health</li> <li>identify own skin type and the level of Sun protection that is required</li> <li>identify how exposure to UVR affects our skin health, causing it to burn or develop skin cancers</li> <li>describe the ways we can best protect ourselves from the harmful effects of UVR.</li> </ul>
		<b>Safety Management</b> <i>Personal identity</i> Describe how social messages and stereotypes, including those in the media, can affect feelings of self-worth.	<ul style="list-style-type: none"> <li>critically analyse the stereotypes and media messages around beauty and tanned skin</li> </ul>
		<b>Healthy Communities and Environment</b> <i>Societal attitudes and values</i> Investigate and describe lifestyle factors and media influences that contribute to the wellbeing of people in New Zealand.	<ul style="list-style-type: none"> <li>examine issues and challenges associated with making SunSmart choices</li> <li>analyse SunSmart messages and identify the strategies that are effective</li> <li>investigate and compare the opinions of identified groups' regarding SunSmart actions</li> <li>take collective action to increase identified groups understanding of how misleading advertising can be.</li> </ul>
English		<b>Listening, Reading and Viewing</b> <i>Processes and strategies</i> Integrate sources of information, processes, and strategies with developing confidence to identify, form, and express ideas: <ul style="list-style-type: none"> <li>recognises and understands the connections between oral, written, and visual language</li> <li>integrates sources of information and prior knowledge confidently to make sense of increasingly varied and complex texts</li> <li>selects and uses a range of processing and comprehension strategies with growing understanding and confidence</li> <li>thinks critically about texts with increasing understanding and confidence.</li> </ul>	<ul style="list-style-type: none"> <li>identify, analyse and discuss aspects of media used to persuade consumers to use SunSmart products</li> <li>read and critically review a range of texts</li> <li>read, interpret and apply SunSmart information.</li> </ul>

Curriculum Areas Incorporated	Achievement Objectives Relevant to the activity, including possible links	Specific Learning Outcomes Students will be able to:
English	<p><b>Speaking, writing and presenting</b> <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"> <li>• uses an increasing understanding of the connections between oral, written and visual language when creating texts</li> <li>• creates a range of texts by integrating sources of information and processing strategies with developing confidence</li> <li>• seeks feedback and makes changes to texts to improve clarity, meaning and effect</li> <li>• is reflective about the production of own texts: monitors and self-evaluates progress, articulating learning with growing confidence.</li> </ul>	<ul style="list-style-type: none"> <li>• construct texts with an awareness of audience and purpose, using key strategies and language to persuade other readers</li> <li>• conduct a survey which integrates varying sources of information and conduct with an identified group</li> <li>• create and present an advertisement showcasing SunSmart messages for the school community.</li> </ul>
Mathematics and Statistics	<p><b>Statistics</b></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><b>Statistical investigation</b> <i>Plan and conduct investigations using the statistical enquiry cycle</i></p> <ul style="list-style-type: none"> <li>• determining appropriate variables and data collection methods</li> <li>• gathering, sorting and displaying multivariate category, measurement and time-series data to detect patterns, variations, relationships and trends</li> <li>• comparing distribution visually</li> <li>• communicating findings, using appropriate displays.</li> </ul>	<ul style="list-style-type: none"> <li>• plan and conduct a survey investigating the opinions of a variety of identified groups</li> <li>• determine appropriate variables and data collection method</li> <li>• accurately gather, sort and display data in different ways</li> <li>• analyse data and detect patterns and variations.</li> </ul>

<b>Curriculum Areas Incorporated</b>		<b>Achievement Objectives</b> Relevant to the activity, including possible links	<b>Specific Learning Outcomes</b> Students will be able to:
<b>Te Aho Arataki Marau mo te Ako Te Reo Māori</b>	<b>Tuamata</b>	<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• 4.1 request, offer, accept and decline things, invitations/suggestions</li> <li>• 4.2 communicate about plans for the immediate future</li> <li>• 4.3 communicate about obligations or responsibilities</li> <li>• 4.4 give and seek permission or agreement</li> <li>• 4.5 communicate about quality, quantity and the cost of things.</li> </ul>	<ul style="list-style-type: none"> <li>• request, accept or decline to participate in sunscreen survey</li> <li>• discuss, plan and record a checklist of what group members will do to prepare the survey</li> <li>• seek agreement from participants to take part in their survey</li> <li>• ask and answer questions about their survey results.</li> </ul>



Scientists investigate and use observation to ask questions about:

	<b>Understanding in Science</b>	<b>Investigating in Science</b>	<b>Communicating in Science</b>	<b>Participating and Contributing</b>
<b>Nature of Science</b> Achievement Objectives Level 4	<ul style="list-style-type: none"> <li>Appreciate that science is a way of explaining the world and that science knowledge changes over time.</li> <li>Identify ways in which scientists work together and provide evidence to support their ideas.</li> </ul>	<ul style="list-style-type: none"> <li>Build on prior experiences, working together to share and examine their own and others' knowledge.</li> <li>Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations.</li> </ul>	<ul style="list-style-type: none"> <li>Begin to use a range of scientific symbols, conventions and vocabulary.</li> <li>Engage with a range of science texts and begin to question the purposes for which these texts are constructed.</li> </ul>	<ul style="list-style-type: none"> <li>Use their growing science knowledge when considering issues of concern to them.</li> <li>Explore various aspects of an issue and make decisions about possible actions.</li> </ul>
<b>Living World</b> Achievement Objectives Level 4	<b>Life Processes</b> Recognise that there are life processes common to all living things and that these occur in different ways.			
<b>Material World</b> Achievement Objectives Level 4	<b>Properties and Changes of Matter</b> Compare chemical and physical changes.			
	<b>Chemistry and Society</b> 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"> <li>• confident</li> <li>• connected</li> <li>• actively involved</li> <li>• lifelong learners</li> </ul>	<p>Beliefs about what is important</p> <ul style="list-style-type: none"> <li>• high expectations</li> <li>• Treaty of Waitangi</li> <li>• cultural diversity</li> <li>• inclusion</li> <li>• learning to learn</li> <li>• community engagement</li> <li>• coherence</li> <li>• future focus</li> </ul>	<p>Expressed in thought and actions</p> <ul style="list-style-type: none"> <li>• excellence</li> <li>• innovation, inquiry and curiosity</li> <li>• diversity</li> <li>• equity</li> <li>• community and participation</li> <li>• ecological sustainability</li> <li>• integrity</li> </ul>	<p>Which of the key competencies? (NZC pp. 12–13)</p> <ul style="list-style-type: none"> <li>• thinking</li> <li>• using language, symbols and texts</li> <li>• managing self</li> <li>• relating to others</li> <li>• participating and contributing</li> </ul>	<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"> <li>• Creating a supportive learning environment</li> <li>• Encouraging reflective thought and action</li> <li>• Enhancing the relevance of new learning</li> <li>• Facilitating shared learning</li> <li>• Making connections to prior learning</li> <li>• Providing sufficient opportunities to learn</li> <li>• E-learning</li> <li>• Engaging Māori and Pasifika students and their communities</li> </ul>



# Links and Resources

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## TKI

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

Wellbeing, Hauora [http://www.wicked.org.nz/r/health/curriculum/statement/page31\\_e.php](http://www.wicked.org.nz/r/health/curriculum/statement/page31_e.php)

In the curriculum guidelines, *Te Aho Arataki* there are suggestions for possible learning and assessment activities for Curriculum Levels 1–2 <http://tereomāori.tki.org.nz/Curriculum-guidelines/Levels-1-8-Curriculum-Guidelines-for-Teaching-and-Learning-Te-Reo-Māori/Levels-1-and-2-Beginning-to-use-te-reo-Māori> and Curriculum Levels 3–4. In addition, there is helpful material collected online in *Te Whakaipurangi Rauemi*. <http://tereomāori.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.

## Science Concepts

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

[http://kidshealth.org/kid/watch/out/summer\\_safety.html](http://kidshealth.org/kid/watch/out/summer_safety.html)

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## Digistore

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## Cancer Society

<http://www.cancernz.org.nz/reducing-your-cancer-risk/SunSmart/>

WHO programme <http://www.who.int/uv/publications/en/primaryteach.pdf> Education

The WHO INTERSun programme <http://www.who.int/uv/interSunprogramme/activities/en/>

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

Sunscreen question and answers

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### Songs and Waiata

“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)

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### Online Links

<http://science.nationalgeographic.com/science/health-and-human-body/human-body/skin-article/>  
<http://kidshealth.org/kid/htbw/skin.html>  
<http://www.foundation.sdsu.edu/sunwisestampede/meetanimals.html>  
<http://www.cancerwa.asn.au/resources/2013-04-10-uv-radiation-learning-activities-book.pdf>  
<http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/ssactions.htm>  
<http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/protect.htm> [http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/protect\\_pop2.htm](http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/protect_pop2.htm)  
<http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/uv.htm>  
[http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/lab/lab\\_05.htm](http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/lab/lab_05.htm)  
[http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/applets/dd697\\_text.htm](http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/applets/dd697_text.htm)  
[http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/sunscreen\\_chemistry.htm](http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/sunscreen_chemistry.htm)  
<http://science.nationalgeographic.com/science/health-and-human-body/human-body/skin-article/>  
[http://pamhook.com/wiki/Key\\_Competency\\_-\\_Relating\\_to\\_others](http://pamhook.com/wiki/Key_Competency_-_Relating_to_others)  
<http://www.youtube.com/watch?v=jbM3PwcGi0g>  
<http://wellness.stelter.com/static/health.html#skin1>

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## 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><b>We are successful when we:</b></p> <ul style="list-style-type: none"> <li>can identify the factors that influence our everyday lives</li> <li>can explain how the environment and people around us influence us</li> <li>understand and can use some familiar health vocabulary in Māori</li> <li>can identify and explain our personal responsibility for our own actions and the responsibilities of others</li> <li>can identify and explain how health and wellbeing impact on the quality of our everyday lives</li> <li>can identify the things that keep our skin healthy (physical (taha tinana), mental/emotions (taha hinengaro), social (taha whānau) and spiritual (taha wairua).</li> <li>understand that all four elements above need to be in balance for us to feel happy, healthy and safe.</li> </ul> <p><b>Te Reo</b> – Learning intentions and success criteria rubrics for Te Reo – Ko au (I, me, myself) <a href="http://hereoora.tki.org.nz/Unit-plans/Unit-1-Ko-au/Learning-intentions-and-success-criteria">http://hereoora.tki.org.nz/Unit-plans/Unit-1-Ko-au/Learning-intentions-and-success-criteria</a></p> <p><b>Te wa Kai</b> using success criteria and assessment rubrics at <a href="http://hereoora.tki.org.nz/Learning-intentions-and-success-criteria">http://hereoora.tki.org.nz/Learning-intentions-and-success-criteria</a>.</p> <p>Evidence: to assess Tuamata Level 4</p> <p>Evidence: Teach and assess social and interpersonal skills, <b>Resource 26</b>. Student, peer and teacher assessment ongoing.</p>	<p><b>Prepare:</b></p> <p>Video clip 1 <a href="http://www.youtube.com/watch?v=v7mONiLzZTA">http://www.youtube.com/watch?v=v7mONiLzZTA</a></p> <p>Clip 2: <a href="http://science.nationalgeographic.com/science/health-and-human-body/human-body/skin-article/">http://science.nationalgeographic.com/science/health-and-human-body/human-body/skin-article/</a></p> <p><b>Resources:</b></p> <p>1 Pictures</p> <p>2 Hauora</p> <p>3a Fitzpatrick skin types</p> <p>3b What Factor Sunscreen</p> <p>3c My skin story</p> <p>4 Three-level guide</p> <p><b>Connect:</b></p> <ul style="list-style-type: none"> <li>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).</li> <li>Explain task, requirements and time frame.</li> </ul> <p><b>Activate:</b></p> <ul style="list-style-type: none"> <li>All watch video clip 1.</li> <li>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.)</li> <li>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?</li> </ul> <p><b>Our skin can also tell a story</b> about us. Teacher discusses the concept of different-coloured skin, aging etc., and goes to clip 2 to show students how their skin colour determines how quickly they burn. Teacher also clicks on the effects of aging button and shows students how the structure of the skin changes with age.</p>	<p><b>Refer to:</b></p> <p><a href="http://www.māorihealth.govt.nz/moh.nsf/pagesma/196">http://www.māorihealth.govt.nz/moh.nsf/pagesma/196</a> or Health and Physical Education Curriculum 1999.</p> <p><b>Pedagogical links:</b></p> <ul style="list-style-type: none"> <li>Creating a supportive learning environment</li> <li>Encouraging reflective thought and action</li> <li>Enhancing the relevance of new learning</li> <li>Facilitating shared learning</li> <li>Making connections to prior learning</li> <li>Providing sufficient opportunities to learn</li> <li>Engaging Māori and Pasifika students and their communities</li> </ul> <p><b>Key competencies:</b></p> <ul style="list-style-type: none"> <li>Thinking</li> <li>Using language, symbols and texts</li> <li>Managing self</li> <li>Relating to others</li> <li>Participating and contributing</li> </ul> <p><b>Literacy:</b></p> <p>Integrate different sources of information, processes and strategies to inform, shape and express ideas about health and wellbeing.</p> <p><b>Te Reo:</b></p> <p>Ongoing opportunities to assess Te Reo – Ko au (I, me, myself) <a href="http://hereoora.tki.org.nz/Unit-plans/Unit-1-Ko-au/Assessment-opportunities">http://hereoora.tki.org.nz/Unit-plans/Unit-1-Ko-au/Assessment-opportunities</a></p> <p><b>Te wā Kai:</b></p> <p><a href="http://hereoora.tki.org.nz/Unit-plans/Unit-3-Kai/Assessment-opportunities">http://hereoora.tki.org.nz/Unit-plans/Unit-3-Kai/Assessment-opportunities</a></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?<sup>1</sup> What story does a moko tell?<sup>2</sup> Are there other cultures that have tattoos that tell a story? Samoan, etc.? What is the word for tattoo in Samoan, Tongan, and 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 the country we or our ancestors came from? (Refer to [Resources 3a](#) and [3b](#)). 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 ancestry help support our hauora?
- In [Resource 3c](#) write down what you found out about your skin type.
- 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 18) 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.

Students can go to to improve their knowledge about our skin. Students can also go to to see if they are able to identify the difference between SunSmart 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)

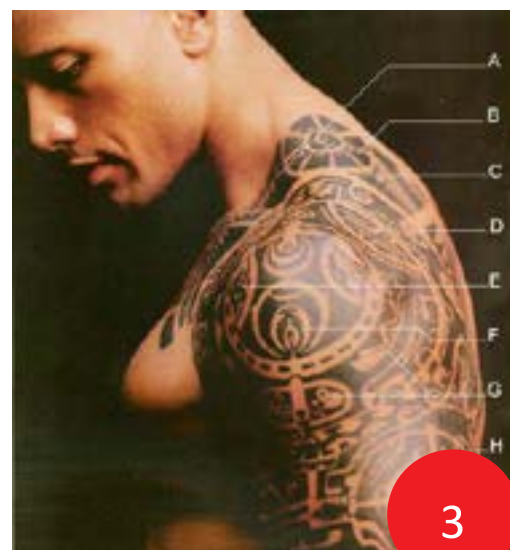
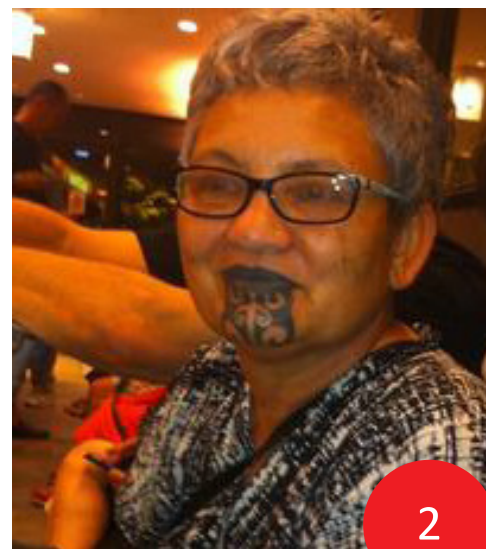
Put the number of the photo in the box below:

A. Physical (taha tinana)

B. Mental/emotions (taha hinengaro)

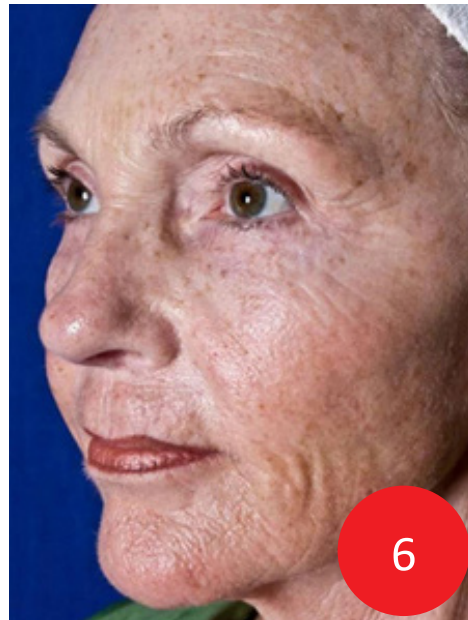
C. Social (taha whānau)

D. Spiritual (taha wairua)





Lessons 1-4, Resource 1



Newborn baby against mother's skin

How did you decide where each photo belonged? Where 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 Organization.

### 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

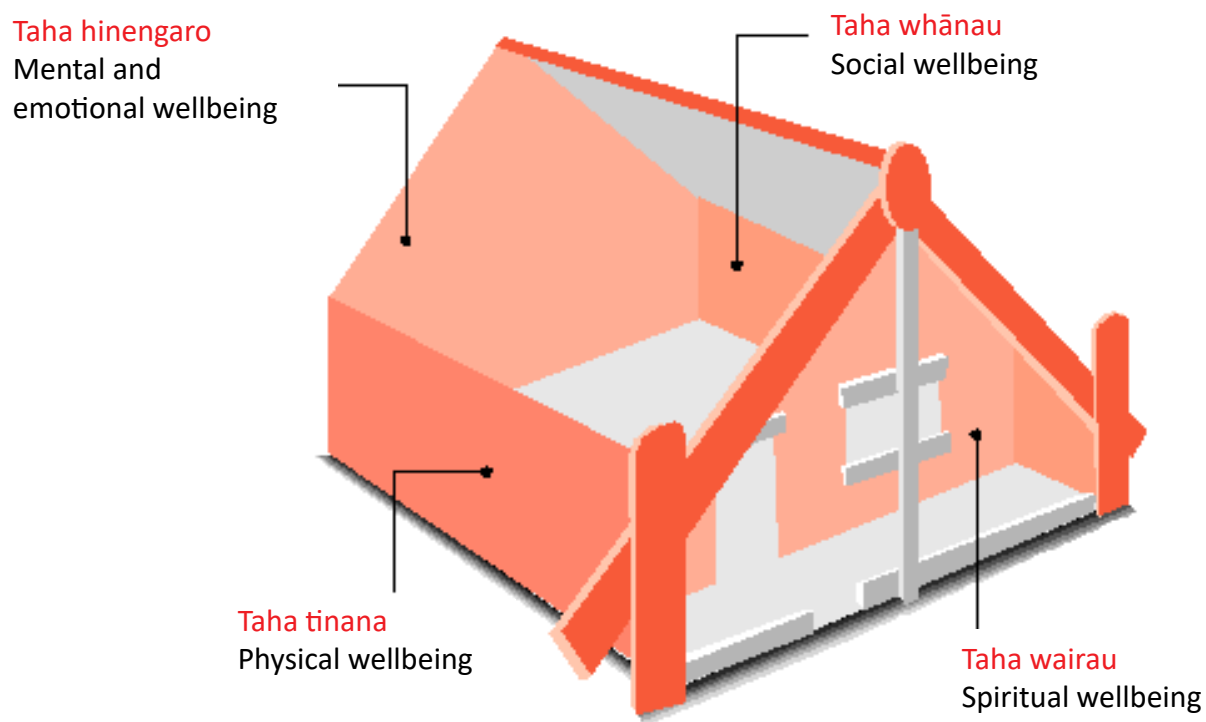
### Taha Wairua – Spiritual Wellbeing

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

# 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

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 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.
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.

# Lessons 1–4, Resource 4

## Three-Level Guide

Students need to justify their choices by referring to the text.

### How do I use the three-level guide?

- Make sure students understand the purpose of the task, i.e. to reach an understanding of the text at three levels.
- Stress that this is not a simple 'true or false' activity and that Level 3 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. Humans are animals, too.	
3. Hauora is a Maori 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 (family).	
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. Like animals, humans can protect themselves from the Sun by <i>Slipping</i> into the shade, <i>Slopping</i> on a hat, <i>Slapping</i> on Sunscreen and <i>Wrapping</i> on sunglasses or light long-sleeved clothing.	
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 ultraviolet radiation (UVR).	
13. The ultraviolet radiation (UVR) is what causes our skin to burn.	
14. There is more ultraviolet radiation (UVR) at night because the Moon reflects the rays.	
15. There is more ultraviolet radiation (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 ultraviolet radiation (UVR) as the ultraviolet radiation (UVR) bounces off your skin.	
17. Ultraviolet radiation (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 ultraviolet radiation (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.	
20. New Zealand and Australia have high levels of radiation because there is a hole in the ozone layer which means that it does not filter the ultraviolet radiation (UVR) as well as it should.	
21. The hole in the ozone layer was caused by New Zealanders and Australians using too many spray-can under-arm deodorants instead of roll on deodorants.	

Answers:

1 ✓ 2 ✓ 3 ✓ 4 x 5 x 6 ✓ 7 x 8 x 9 ✓ 10 ✓ 11 ✓ 12 x 13 ✓ 14 x 15 ✓ 16 x 17 ✓  
18 ✓ 19 ✓ 20 ✓ 21 x

## Lesson 5

# Knowledge Attack – UVR and UVI

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

Assessment Opportunities	Structure
<p><b>Learning outcomes</b></p> <p>We are successful in our learning when we can:</p> <ul style="list-style-type: none"><li>• explain what UVR and UVI are</li><li>• use the information sheets to identify facts about our skin and the Sun</li><li>• read and interpret information on UVR levels</li><li>• use the information on skin and UVR and UVI as a basis for decisions about Sun protection.</li></ul>	<p><b>Prepare:</b></p> <ol style="list-style-type: none"><li>1. <b>Resource 5a</b> and <b>5b</b>, ‘Love the skin you’re in’ and ‘50 incredible facts about skin’ found at <a href="http://www.beautyflash.co.uk/skin-facts.html">http://www.beautyflash.co.uk/skin-facts.html</a></li><li>2. <b>Resource 6</b>, ‘Twelve incredible facts about UVR’ in A3 size, one copy for each group of three students.</li><li>3. Data projector</li><li>4. Enough sets of crayons or coloured pencils for students to have a set if they are working in groups of three. (Each group must have green, yellow, orange, red and purple colours.)</li></ol> <p><b>Connect:</b></p> <p>We have identified that our skin tells a story about who our ancestors are likely to have been, the amount of Sun protection we need, our age and our lifestyle. 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><b>Activate:</b></p> <ol style="list-style-type: none"><li>1. Students are placed in pairs and given a copy of <b>Resource 5a</b>, ‘Love the skin you’re in’ and access on a computer to ‘50 incredible facts about skin’ <a href="http://www.beautyflash.co.uk/skin-facts.html">http://www.beautyflash.co.uk/skin-facts.html</a>. Students complete <b>Resource 5a</b> and <b>5b</b>. Students are placed into groups of three. Each group receives an A3 copy of <b>Resource 6</b>, ‘Twelve incredible facts about UVR’. They provide the graphics/pictures for the information (i.e. infographics). A good example of infographics can be found in the ‘50 Incredible Facts About Skin’ <a href="http://www.beautyflash.co.uk/skin-facts.html">http://www.beautyflash.co.uk/skin-facts.html</a></li><li>2. Resource. Students need to have access to the internet and can go to the websites below to help them find out more information.<ol style="list-style-type: none"><li>a. <a href="http://www.cancernz.org.nz/assets/files/info/SunSmart/IS_SunAltitude&amp;Snow_19Oct2011.pdf">http://www.cancernz.org.nz/assets/files/info/SunSmart/IS_SunAltitude&amp;Snow_19Oct2011.pdf</a></li></ol></li></ol> <p><b>Gallery:</b></p> <p>Once students have completed the ‘infographics’ (<b>Resource 6</b>), the A3 sheets from each group are displayed 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>

## Lesson 5

# Knowledge Attack – UVR and UVI

### Structure

#### UVI – Teacher Re-visits:

- the Cancer Society SunSmart messages of Slip, Slop, Slap, Wrap, Stay
- UVR in sunlight are the rays that burn our skin
- even though we cannot see or feel UVR, we can measure it
- the ultraviolet index (UVI) measures the level of UVR in the environment.

In 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.

4. Teacher shows students the website on the datashow, including today's and yesterday's UV index, and the UVI forecast.

5. Teacher outlines that UVR is affected by the following:

- the season
- time of day
- geographical location
- altitude
- cloud cover.

6. Teacher takes students to <http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/uv.htm>. Talks about the graph, (x-axis is the time of the day and y-axis is the UVI level and what the different colours mean). Teacher clicks on 'Check this'. Teacher clicks on 'Winter' to show the UVI for winter. In winter when is the UVI at its highest level? When is it at its lowest level?

Teacher then clicks on 'Summer'. When is the UVI at its highest level? When is it at its lowest level? What is different about this graph when compared to the winter graph? Why is the UVI rate higher in summer than in winter? Teacher goes to [http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/protect\\_pop2.htm](http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/protect_pop2.htm) and students complete the cloze test individually and then discuss their answers.

Teacher goes back to

and clicks on 'test yourself'. Students complete the UV index and exposure test in pairs. Teacher clicks on 'check' to go over the answers.

#### UV Index Graphs

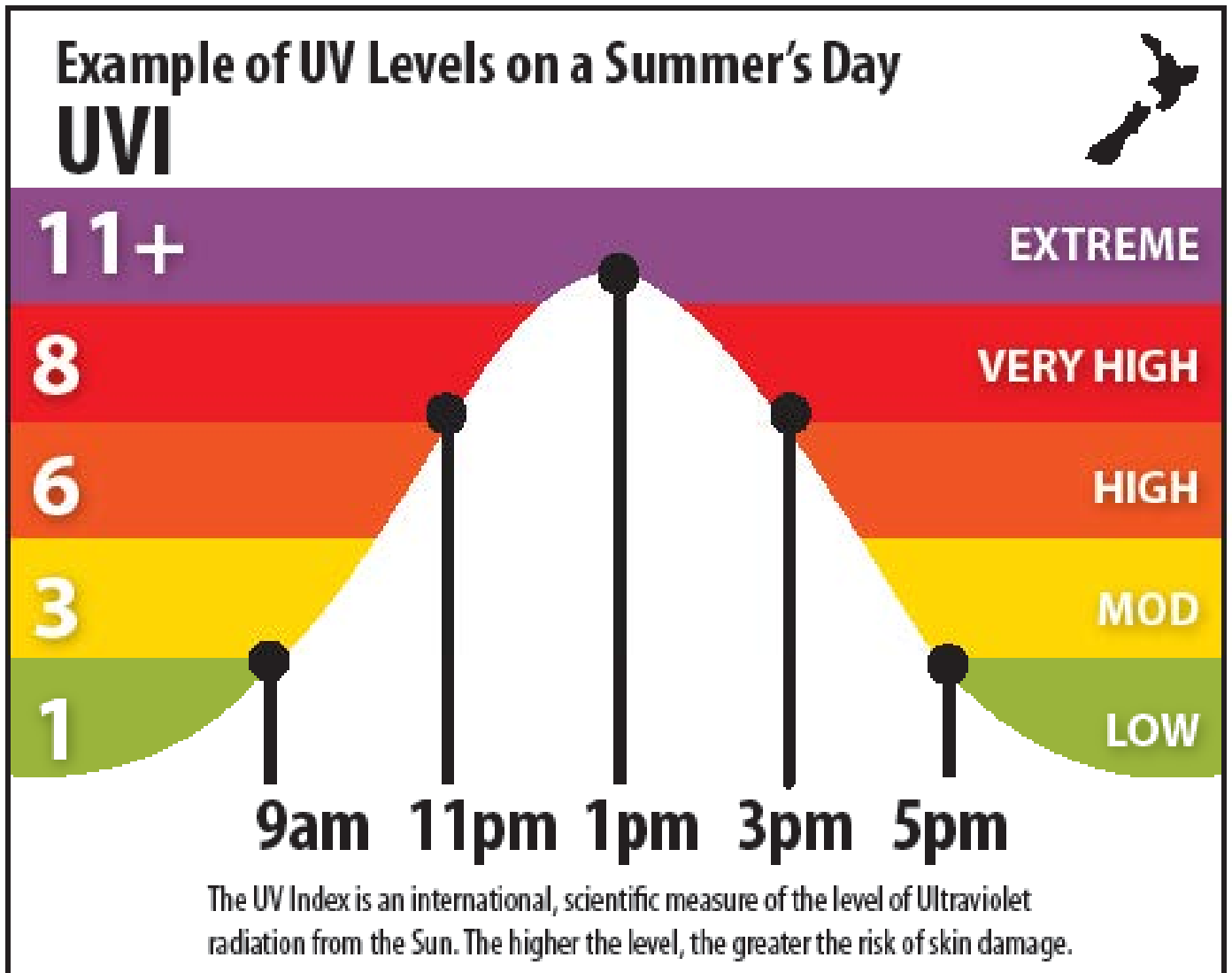
Teacher returns to

When the UVI is 3 or above, Sun protection is needed.

What does the graph (on next page) tell us about when we will need Sun protection in New Zealand?

## Lesson 5

### Knowledge Attack – UVR and UVI



#### Structure

Teacher then clicks on 'Mean and Peak UVI levels (taken at solar noon) throughout the year at five New Zealand centres' on the page which will take them to the tables below.

Table 1: Mean UVI Levels throughout the Year at Five New Zealand Centres

Table 2: Peak UVI Levels (Solar Noon) Throughout the Year at Five New Zealand

Teacher will also have to show students where the main centres are located in New Zealand by going to <http://www.metservice.com/national/home>

What do the graphs below tell us about:

(Table 1) The cities that most often have an average (mean) UVI of 3 or above?

Are there any surprises for you?

(Table 2) The cities that most often have the high UVI scores (3 or above) throughout the year?

Are the same cities as those you noted in Table 1? Why is this?

## Lesson 5

# Knowledge Attack – UVR and UVI

### Structure

#### Consolidation:

1. Teacher (or if possible, students) go to the following sites and answer the following questions: Click on <http://www.niwa.co.nz/our-services/online-services/uv-and-ozone/todays-uv-index>. Which city has the highest UVI?
2. Click on <http://www.niwa.co.nz/our-services/online-services/uv-and-ozone/forecasts>. Note the x-axis is based on a 24-hour clock. Imagine you are planning the programme for a camp in Gisborne for year seven students from your school. You want the students to play an outdoor game of touch rugby; what time of the day would you schedule it so that students would be less likely to burn?
3. Imagine you are also planning the programme for a camp in Christchurch for year eight students from your school. You want the students to play an outdoor game of touch rugby; what time of the day would you schedule it so that students would be less likely to burn? Is this time different or the same as it would be for the school camp in Gisborne?
4. How could you use the NIWA site to ensure that you and your family and friends do not get badly burnt when you are playing sport or having a picnic or swimming?

Table 1: Mean UVI Levels throughout the Year at Five New Zealand Centres

	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 includes clouds

Table 2: Peak UVI Levels (Solar Noon) Throughout the Year at Five New Zealand


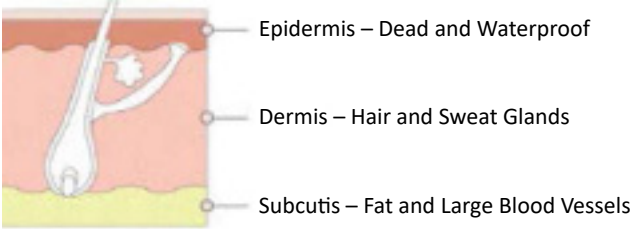
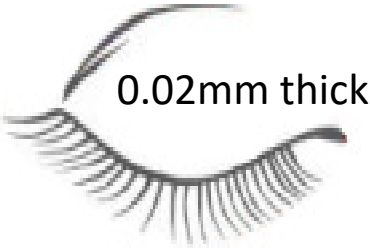
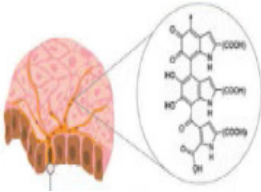
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Auckland	13	11	7	4	2	2	3	5	6	8	11	13
Wellington	13	9	6	3	2	1	2	4	5	8	11	12
Christchurch	12	8	5	3	1	1	2	3	4	8	10	11
Central Otago	10	8	5	2	1	1	1	3	4	7	10	11
Invercargill	8	7	4	2	1	1	1	2	3	5	9	10

Note: Peak UVI is when cloudless

# Lesson 5, 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>#1</p>	<p>Skin is the human body's largest organ.</p>
<p>2 Square Meters</p> 	
	
 <p>0.02mm thick</p>	
<p>Large tentacle-like cells called melanocytes produce and distribute melanin.</p> 	

# Lesson 5, 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	

## Lesson 5, Resource 6

# Twelve Incredible Facts About Skin

Work in a group of three. Look at the fact in the right hand column, B, which describes a fact about ultraviolet radiation. Go to [www.nzta.govt.nz](#) to read more about ultraviolet radiation. In Column A draw a simple picture/graphic that describes the information. If there are three of you in the group, you could share the task by drawing four pictures each.

Column A	Column B
	The risk of sunburn is greater when you are at a high altitude, e.g. up a mountain or in the snow, rather than by the sea.
	Ultraviolet radiation from the Sun cannot be seen or felt but it causes sunburn and skin cancer.
	A person surrounded by snow receives UVR from the sky as well as UVR reflected off the snow.
	Snow, pool water, concrete and the surf all reflect UVR.
	Reflection from fresh snow can double the amount of UVR you are exposed to when outside.
	UVR can go through clouds.
	UVR can affect our eyes and cause 'snow blindness'.
	When in the snow, protect your eyes by wearing sunglasses or goggles that filter UVR, are close fitting and wrap around.
	To avoid sunburn in the snow or when you are near water, wear: <ul style="list-style-type: none"> <li>• a hat that covers your head and ears</li> <li>• long sleeves and trousers</li> <li>• SPF 30+ sunscreen on your face</li> <li>• SPF 30+ lip balm</li> <li>• sunglasses/goggles.</li> </ul> Stay indoors or in the shade around lunchtime.
	The ultraviolet index measures the level of UVR in the environment.
	The ultraviolet index is highest between September and April (especially between 10am and 4pm) in New Zealand, so Sun protection will be needed during this time.
	When going to the beach or a pool, wear a dark-coloured rash suit if you want the best UVR protection.



## Lesson 6

# Beauty is in the eye of the beholder



*Overview: Even though we know that our skin needs protecting, many of us still deliberately go into the Sun to tan our skin. Why is that? Has it always been that way?*

Assessment Opportunities	Structure
<p>We are successful in our learning when we can:</p> <ul style="list-style-type: none"><li>• carry out an action and test our ideas</li><li>• use data we collect to make explanations and decisions</li><li>• use data to explain which sunscreen is the most effective.</li></ul>	<p><b>Lesson 6</b></p> <p><b>Prepare:</b></p> <p><a href="http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/risky_01_pop1.htm">http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/risky_01_pop1.htm</a></p> <p><a href="http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/risky_01_pop2.htm">http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/risky_01_pop2.htm</a></p> <p><b>Resource 7</b>, Beauty – Fact or Fiction</p> <p><b>Resource 8</b>, Tan Timeline</p> <p><b>Resource 9</b>, Forcefield Analysis</p> <p><b>Connect:</b></p> <p>Teacher leads in with, “We have learnt about how incredible our skin is, how our skin tells a story about us and why we need to protect our skin from UVR. Let’s see how many risks we currently take and what we know about skin cancer.”</p> <p><b>Activate:</b></p> <ol style="list-style-type: none"><li>1. Students go to <a href="http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/risky_01_pop1.htm">http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/risky_01_pop1.htm</a> and <a href="http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/risky_01_pop2.htm">http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/risky_01_pop2.htm</a></li></ol> <p>This provides an opportunity for students to check their attitudes and behaviours in relation to sunbathing and tanning, as well as their knowledge about the risk factors for skin cancer. They check their score.</p> <p>Teacher points out that even though we know that our skin needs protecting, many of us still deliberately go into the Sun to tan our skin. Why is that? Has it always been that way?</p> <p>Demonstrate:</p> <ol style="list-style-type: none"><li>2. Students then read the information and complete the tasks on <b>Resource 7</b>, Beauty – Fact or Fiction</li><li>3. Students complete <b>Resource 8</b>, Tan Timeline</li><li>4. Students complete <b>Resource 9</b>, Forcefield Analysis</li></ol>

## Lesson 6, Resource 7

### Beauty – Fact or Fiction?

Below are a number of statements. Work in pairs to identify if you think the statement is true (T) or false (F). You may need to search for answers on the internet.

Statement	T/F
1. Coco Chanel accidentally invented the suntan when she was tanned from being in the Sun while on a yacht in the Mediterranean in the early 1920s.	
2. Studies have shown that modern white Americans, Australians, Asians and Europeans believe tanned skin is a sign of health.	
3. People think you're wealthy if you have a tan. It implies that you have just got off a plane from somewhere exotic.	
4. The World Health Organization has found that people who have been using tanning devices before age 30 are 75% more likely to develop melanoma.	
5. A tan makes people look slimmer and it hides cellulite.	
6. In the 1920s outdoor lessons were set up in the UK by the health authorities to allow children to get maximum amounts of sunshine – they were known as 'schools in the Sun', and sunlight was found to be a cure for rickets.	
7. When at least 20 minutes of sunshine enters the retina of the human eye, it results in the production of serotonin (a chemical in our brain which makes us feel happy).	
8. Commercial skin-lightening creams have been popular among black South Africans since the 1930s.	
9. Chinese beachgoers are so concerned about tanning that many don a balaclava-like accessory known as the 'face-kini'.	
10. Some people are especially at risk. Never use sunbeds if you: <ul style="list-style-type: none"> <li>• have pale skin that doesn't tan easily, or lots of freckles or moles</li> <li>• have had skin cancer before</li> <li>• are under 18 (even people under 30 are at higher risk).</li> </ul>	
11. Skin-lightening creams are used in India and by black Americans	
12. In Asian culture, the lighter you are, the less desirable you are.	
13. John Harvey Kellogg (1852–1943) invented cornflakes, peanut butter, electric blankets and sunbeds.	
14. "Wheatish" is a term used to describe brown freckles on white American's skin.	
15. Sunbeds expose users to higher levels of dangerous UV radiation than the Sun. They increase your risk of melanoma and other skin cancers.	
16. "There is certainly no absolute standard of beauty. That precisely is what makes its pursuit so interesting."	



The 'face-kini'

Some helpful links:

<http://vintageforthought.blogspot.co.nz/2013/05/the-beauty-concept.html>  
<http://www.theguardian.com/commentisfree/2012/feb/19/history-of-tanning>  
[http://www.google.co.nz/imgres?imgurl=http://i.dailymail.co.uk/i/pix/2012/08/17/article-2189877-149474B3000005DC-245\\_634x455.jpg&imgrefurl=http://www.dailymail.co.uk/news/article-2189877/Meet-Face-Kini-latest-craze-hit-Chinas-beaches-bathers-wear-masks-beat-suns-harmful-rays.html&h=455&w=634&sz=46&tbid=5edy5O-vAt97cM:&tbnh=90&tbnw=125&-zoom=1&usg=\\_\\_DsJdluOO6PtACKmTN43YU095QF4=&docid=0iufyl74MolgmM&sa=X&ei=-BoaSUsaAB8bOkgXas4HQCw&sqj=2&ved=0CDYQ9QEwAw](http://www.google.co.nz/imgres?imgurl=http://i.dailymail.co.uk/i/pix/2012/08/17/article-2189877-149474B3000005DC-245_634x455.jpg&imgrefurl=http://www.dailymail.co.uk/news/article-2189877/Meet-Face-Kini-latest-craze-hit-Chinas-beaches-bathers-wear-masks-beat-suns-harmful-rays.html&h=455&w=634&sz=46&tbid=5edy5O-vAt97cM:&tbnh=90&tbnw=125&-zoom=1&usg=__DsJdluOO6PtACKmTN43YU095QF4=&docid=0iufyl74MolgmM&sa=X&ei=-BoaSUsaAB8bOkgXas4HQCw&sqj=2&ved=0CDYQ9QEwAw)  
[http://www.slate.com/articles/news\\_and\\_politics/explainer/2012/10/romney\\_s\\_spray\\_tan\\_when\\_did\\_white\\_people\\_start\\_deliberately\\_tanning\\_themselves.html](http://www.slate.com/articles/news_and_politics/explainer/2012/10/romney_s_spray_tan_when_did_white_people_start_deliberately_tanning_themselves.html)  
[http://news.bbc.co.uk/2/hi/uk\\_news/magazine/6763443.stm](http://news.bbc.co.uk/2/hi/uk_news/magazine/6763443.stm)

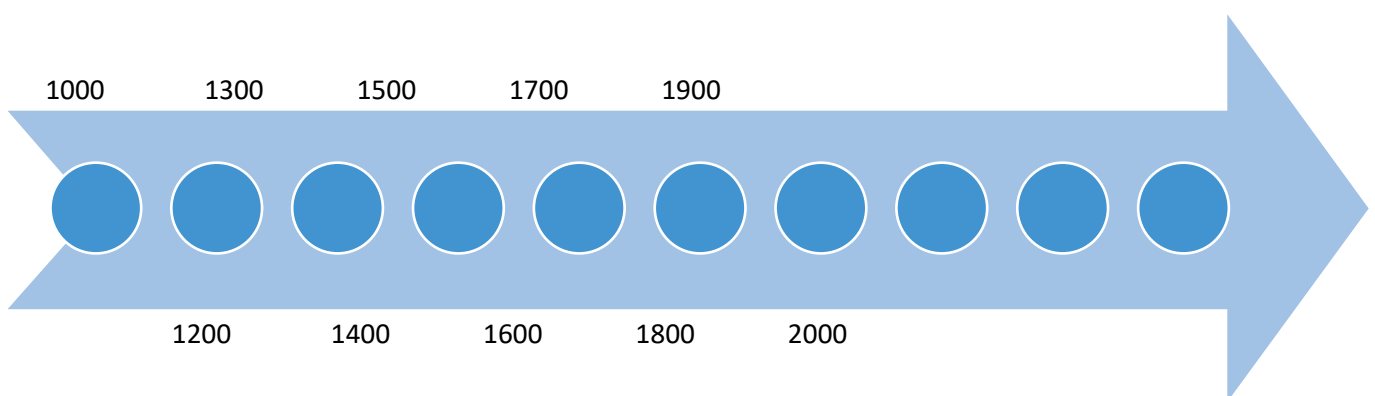
Answers: 1.T, 2.T, 3.T/F, 4.T, 5.F, 6.T, 7.T, 8.T, 9.T, 10.T, 11.T, 12.F, 13.T 14.F, 15.T, 16 T

## Lesson 6, Resource 8

### Tan Timeline

Place each of the events in the appropriate place on the timeline. Some events span over hundreds of years. You will have to go onto the internet and use your research skills to help you identify the time period of each event.

1. Renaissance European women drew blue lines onto their faces to create the illusion of translucency.
2. European and American women used lead- and arsenic-based lightening treatments on their face as they considered pale skin a mark of wealth and leisure.
3. Skin-whitening creams are used in South Africa and India.
4. Coco Chanel received a tan while on holiday.
5. White Americans, Australians, Asians and Europeans believe tanned skin is a sign of health.
6. Doctors began to prescribe sunbathing for a variety of ailments, e.g. tuberculosis.
7. Dark skin was associated with serfdom and toiling in fields all day.
8. The trend for whiteness halted after the industrial revolution. This is because the working classes lived in cramped dwellings and worked in mines and factories. Any leisure time available was taken indoors, to avoid the smog and soot of the streets.



Answers: 1: 1400-1700; 2: 1800; 3: 1900; 4: 1920; 5: 2000; 6: 1900; 7: 1400-1700; 8: 1700-1800.

## Lesson 6, Resource 9

### Forcefield Analysis

The concept of beauty has been shaped over thousands of years by religion, economics, art, music, politics and scientific discoveries. Even though the concept of beauty changes with time, the determination to achieve the 'ideal' image of beauty remains the same.

Complete the forcefield analysis below to show the driving forces and restraining forces you experience in relation to protecting yourself from skin cancer.



Strategies to strengthen	Driving forces	Aim	Restraining forces	Strategies to overcome
Slip, slop, slap, wrap	Having light-coloured skin	<b>To protect my skin against skin cancer</b>	Having 'tanned' skin is associated with being attractive	Use natural fake-tan products out of a bottle
	UVR in NZ is very high		Having to wear SunSmart clothing	
			In winter there is no Sun so I can use sunbeds or solariums	

# Lesson 7-17

## Science Investigations

### Part Two – Thinking Like SunSmart Scientists

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

#### OVERVIEW:



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



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



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



## Lessons 7–9

# Secondary Sources and Personal Experiences

Assessment Opportunities	Structure
<p><b>Lessons 7–9</b> <b>Science Experiences</b></p> <p>We are successful when we can:</p> <ul style="list-style-type: none"> <li>• explain how science can help us to find out about and understand the centre of our solar system</li> <li>• share what we already know about the Sun and where/how we gained that knowledge</li> <li>• view and analyse secondary sources</li> <li>• carry out a plan of action to test our ideas</li> <li>• prepare equipment to use in investigations</li> <li>• understand that our senses help us collect data</li> <li>• use the data we collect to make explanations</li> <li>• use tools and measurements to describe change</li> <li>• explain the relationship between exposure to the Sun and changes in size, colour and temperature</li> <li>• use our data to think about what is happening and why?.</li> </ul>	<p><b>Lesson 7–9</b></p> <p>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.</p> <p>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 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.</p> <p>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><b>The Empirical Nature of Science</b></p> <p>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.</p> <p><a href="http://www.sciencelearn.org.nz/Nature-of-Science/Tenets-of-the-nature-of-science">http://www.sciencelearn.org.nz/Nature-of-Science/Tenets-of-the-nature-of-science</a></p> <p>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><b>Just How Powerful is our Sun?</b></p> <p>What we already know about the Sun.</p> <p>How science can help us to find out about and understand the centre of our Solar System.</p> <p><b>Prepare:</b></p> <p>Preview the following sources:</p> <ol style="list-style-type: none"> <li>1. Our solar system (view <a href="http://solarsystem.nasa.gov/planets/">http://solarsystem.nasa.gov/planets/</a>)</li> </ol> <p>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.</p> <p>“The Surface of the Sun as you have never seen it.” NASA clip of the Sun: <a href="https://www.youtube.com/watch?v=tY2n2CHMXfi">https://www.youtube.com/watch?v=tY2n2CHMXfi</a></p> <p>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</p>

## Lessons 7–9

# Secondary Sources and Personal Experiences

### Structure

depth through introducing powerful, dynamic images and vocabulary. The clip could be used to help students write their own “voice-over.” 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 beauty. And life.”

#### **Connect and Activate:**

Students view both video clips <https://www.youtube.com/watch?v=tY2n2CHMXfl> and <http://solarsystem.nasa.gov/planets/>

- Organise students in groups of four (see **Resource 10a, 10b and 10c**). 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 10a, 10b and 10c** 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 **Resource 10a, 10b and 10c** they place **Resource 10b** on the wall at one end of the classroom (as pre-organised by the teacher) and **Resource 10c** 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 <http://solarsystem.nasa.gov/planets/>. 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.

#### **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 heritage (skin type) and what we do to shape the details (avoiding over exposure that leads to Sun damage -surface/other levels- premature aging, skin lesions, carcinomas. Link back to previous lessons ( e.g. Fitzpatrick Skin Types, **Resource 3**).

# Lessons 7–9, Resource 10a

## Ten Things I Know About the Sun

Write down ten things you know about the Sun

1.....  
.....

2.....  
.....

3.....  
.....

4.....  
.....

5.....  
.....

6.....  
.....

7.....  
.....

8.....  
.....

9.....  
.....

10.....  
.....

**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 personal experience or observation.
4. Once you have made the decision, glue each statement on the appropriate sheet (Resource 10b if it is from a secondary source or Resource 10c if it is from personal experience or observation).



Lessons 7–9, Resource 10b

Things I Know About the Sun from Secondary Sources

Lessons 7–9, Resource 10c

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=tY2n2CHMXfi>
2. <https://voicethread.com/>  
or 'Fotobabble' <http://www.fotobabble.com/> or a storyboard app.
3. 'The Sun is a Mass of Incandescent Gas'  
[http://www.youtube.com/watch?v=me06I9GDM\\_k](http://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](http://www.youtube.com/watch?v=Mk_NM5V7Bas)

#### Connect:

6. 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=tY2n2CHMXfi>
7. On **Resource 11** record words they would use and what wonderings they have about the Sun as a result of this clip.
8. Was the clip successful in creating interest and adding ideas and facts ?
9. 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.

## Lessons 7–9

# Secondary Sources and Personal Experiences

### Structure

View clips:

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

[http://www.youtube.com/watch?v=me0619GDM\\_k](http://www.youtube.com/watch?v=me0619GDM_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](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=me0619GDM\\_k](http://www.youtube.com/watch?v=me0619GDM_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 11**. 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](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 11  
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 beauty. And life.

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 12a](#)).
- Take photos of each plant. Insert photo on chart in [Resource 12b](#). 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 12b](#).
- 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

### Lessons 10-12, 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 12c](#)).

#### 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  $1\frac{1}{2}$  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  $1\frac{1}{2}$  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. We need to be SunSmart when we are exposed to the Sun.**

# Lessons 10–12, Resource 12a

Our Plant

STARTING DATE:

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

POSITION: In the Sun/no sunlight/shade



Measurement of biggest leaf: .....

Colour of biggest leaf: .....

Measurement of smallest leaf: .....

Colour of smallest leaf: .....

Height of plant: .....



# Lesson 10-12, Resource 12b

## Record Sheet

In the Sun/no sunlight/shade  
DAY : DATE

Insert Photo

Measurement of biggest leaf: .....

Colour of biggest leaf: .....

Measurement of smallest leaf: .....

Colour of smallest leaf: .....

Height of plant: .....

In the Sun/no sunlight/shade  
DAY : DATE

Insert Photo

Measurement of biggest leaf: .....

Colour of biggest leaf: .....

Measurement of smallest leaf: .....

Colour of smallest leaf: .....

Height of plant: .....

In the Sun/no sunlight/shade  
DAY : DATE

Insert Photo

Measurement of biggest leaf: .....

Colour of biggest leaf: .....

Measurement of smallest leaf: .....

Colour of smallest leaf: .....

Height of plant: .....

In the Sun/no sunlight/shade  
DAY : DATE

Insert Photo

Measurement of biggest leaf: .....

Colour of biggest leaf: .....

Measurement of smallest leaf: .....

Colour of smallest leaf: .....

Height of plant: .....

In the Sun/no sunlight/shade  
DAY : DATE

Insert Photo

Measurement of biggest leaf: .....

Colour of biggest leaf: .....

Measurement of smallest leaf: .....

Colour of smallest leaf: .....

Height of plant: .....

In the Sun/no sunlight/shade  
DAY : DATE

Insert Photo

Measurement of biggest leaf: .....

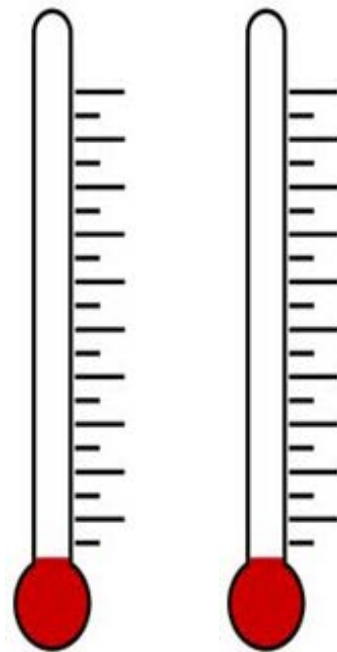
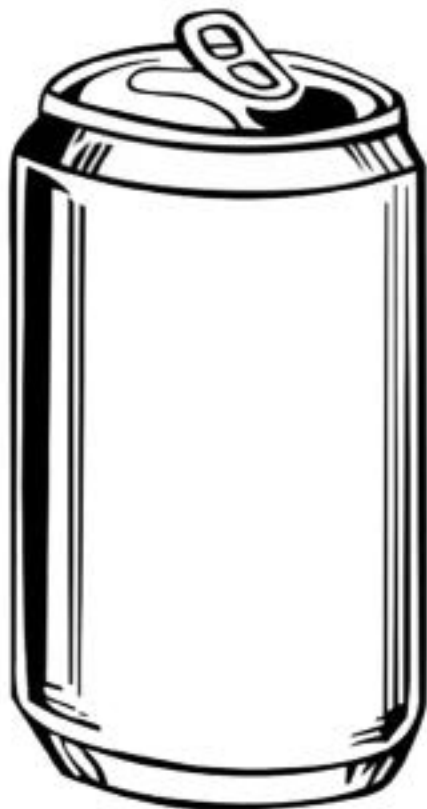
Colour of biggest leaf: .....

Measurement of smallest leaf: .....

Colour of smallest leaf: .....

Height of plant: .....

Lesson 10-12, Resource 12c  
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 13 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.

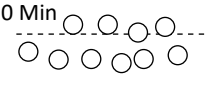
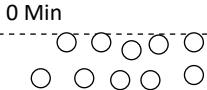
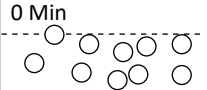
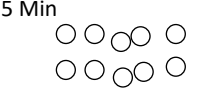
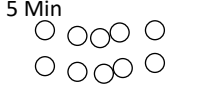
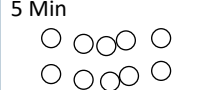
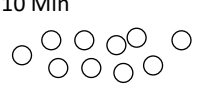
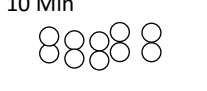
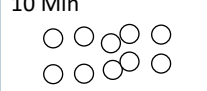
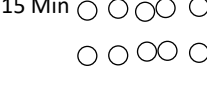
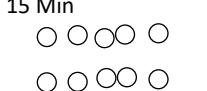
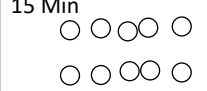
##### Connect:

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 a time interval of 15 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		
5 Min 	5 Min 	5 Min 
Intensity		
10 Min 	10 Min 	10 Min 
Intensity		
15 Min 	15 Min 	15 Min 

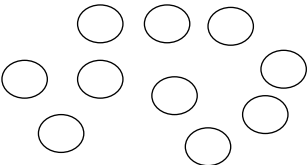
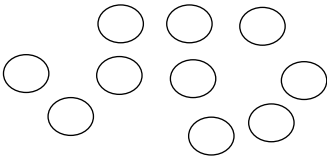
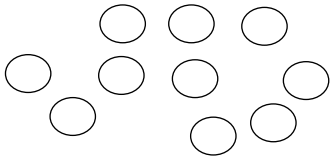
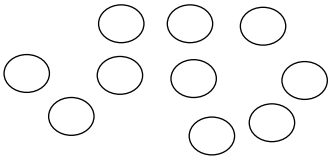
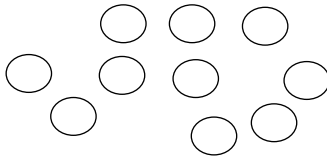
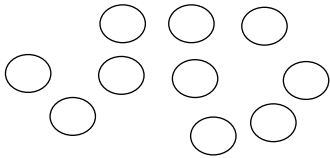
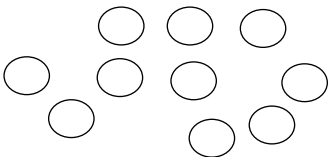
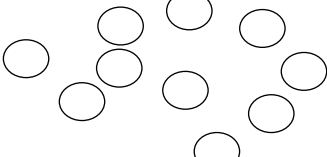
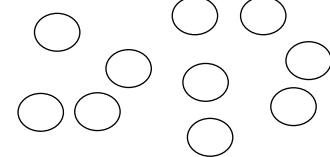
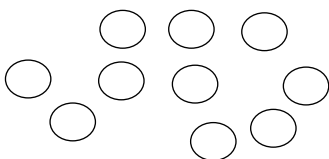
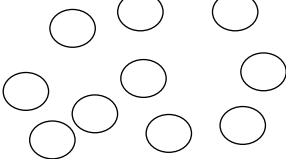
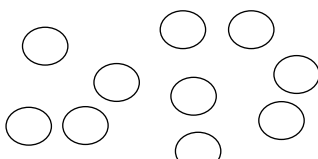
##### Consolidate:

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?

# Lesson 13, Resource 13

## UV Bead Recording Sheet

### UV Bead Detectives

SHADE	WINDOW SILL	FULL SUN
0 minutes 	0 minutes 	0 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
15 minutes 	15 minutes 	15 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><b>Lesson 14</b> We are successful when we can:</p> <ul style="list-style-type: none"> <li>demonstrate how scientists can use chemicals to reveal the presence of something that is not visible to the naked eye</li> <li>use our science experiences to inform our SunSmart choices</li> <li>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</li> <li>carry out an action and test our ideas</li> <li>use the results of the experience to explain the presence of UVR in sunlight.</li> </ul>	<p><b>Lesson 13</b> <b>Teacher Note: The most dramatic results will occur around noon when the Sun is directly overhead and in summer.</b></p> <p><b>Prepare:</b></p> <ul style="list-style-type: none"> <li>two clear, plastic cups per group</li> <li>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</li> <li>one litre of tonic water</li> <li>one litre of tap water</li> <li>black paper, polythene, felt, or cloth (approximately 21 cm x 30 cm).</li> </ul> <p><b>Connect</b> 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> <p><b>Activate and Demonstrate:</b> Students follow the instructions in <b>Resource 14a</b> and <b>14b</b>, 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><b>Consolidate:</b> 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"> <li>Did both liquids appear the same? (No, the tap water should show no change.)</li> <li>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.)</li> <li>What is contained in the sunlight that causes the observed results? (Ultraviolet radiation.)</li> <li>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.)</li> <li>Have you observed similar occurrences in other materials? (Answers will vary. Some students might be aware of the fluorescence of minerals under UV light.)</li> <li>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.)</li> <li>You may want to consider doing this activity at different times of the day so that students can compare the differences.</li> </ol>

## Lesson 14, Resource 14a

### 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 14b](#).

#### 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 14a](#) and [14b](#), 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 14b  
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 15**. 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 16**). 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.



Lesson 15, Resource 15  
Shadow Images



Lessons 6–22: Part Two—Thinking Like SunSmart Scientists

# Lesson 15, Resource 16

## 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 6–22: Part Two—Thinking Like SunSmart Scientists

## Lesson 16

# Protective Potions Sunscreen Investigation

*Overview: We are investigating the effectiveness of commercially prepared and student made sunscreen.*

Assessment Opportunities	Structure
<p><b>Lesson 16</b> <b>We are successful when we can:</b></p> <ul style="list-style-type: none"><li>• carry out an action and test our ideas</li><li>• use data we collect to make explanations and decisions</li><li>• use data to explain which sunscreen is the most effective.</li></ul>	<p><b>Lesson 16</b> <b>Prepare:</b> <b>Resource 17a</b>, Sunscreen background</p> <ul style="list-style-type: none"><li>• Four bottles of sunscreen (varying brands and SPF ratings, e.g. 15, 30, 80). Teacher will not let the students know what the SPF rating is for each of the sunscreens until after the experiences have been completed.</li><li>• A sample of each sunscreen for each group of students. Therefore each group will have four samples of four different sunscreens, labelled 1, 2, 3 and 4.</li><li>• Ingredients for student-made sunblock as detailed in <b>Resource 17b</b>, sunblock recipe.</li><li>• sunscreen testing results</li><li>• five Ziploc plastic bags</li><li>• five sets of UV beads</li><li>• camera.</li></ul> <p><b>Activate:</b></p> <ol style="list-style-type: none"><li>1. Students read the information and complete the tasks on <b>Resource 17a</b>, Sunscreen background.</li><li>2. Teacher provides the ingredients for the students to work in groups (of no more than four students) to make their own sunscreen as described in <b>Resource 17b</b>.</li><li>3. Students make their own sunscreen.</li></ol> <p><b>Demonstrate:</b></p> <ul style="list-style-type: none"><li>• Each group of students receives a sample of each of the four commercial sunscreens labelled 1, 2, 3, 4.</li><li>• The sunscreen developed by each group becomes their fifth sample.</li><li>• In total they will have four commercial samples and one student-made sample of sunscreen.</li><li>• Students photograph UV beads before placing in the bag. Place UV beads in each of the five plastic Ziploc bags.</li><li>• Students smear sunscreen from sample 1 on the first plastic bag and number this 1. Likewise, sample 2 on the second plastic bag and number this 2, etc. until they have five plastic bags containing UV beads and smeared in each of the five samples.</li><li>• What do students predict will happen?</li><li>• Students place the five plastic bags in the direct sunlight from 10am in the morning until 2.30pm.</li><li>• Students open the bags at 2.30pm. Students photograph UV beads after removing them from the plastic bag. Students observe and record the colour of the UV beads on <b>Resource 17c</b>, Sunscreen Recording Sheet.</li><li>• Students answer the questions on <b>Resource 17c</b>, Sunscreen Recording Sheet</li><li>• Were there any surprises?</li></ul>

## Lesson 16, Resource 17a

# Sunscreen Background

*Sunscreens protect our skin by absorbing or reflecting ultraviolet radiation. Some do both.*

### **Physical Filters**

Physical filters form a layer on the skin that ultraviolet radiation cannot pass through, e.g. zinc oxide. They reflect ultraviolet radiation away from your skin.

### **Chemical Sunscreens**

Chemical sunscreens form a layer that absorbs ultraviolet radiation. This must be put on 20 minutes before going outside.

No sunscreen protects against all ultraviolet radiation, so make sure that you protect yourself with what you wear. Swimming and sweating can remove sunscreen, so remember to reapply every two hours.

### **Task One**

Find out what you already know about sunscreen.

Go to [http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/sunscreen\\_chemistry.htm](http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/sunscreen_chemistry.htm)

Click on test yourself and find out how much you already know about sunscreens.

### **Task Two**

Go to [http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/sunscreen\\_chemistry.htm](http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/sunscreen_chemistry.htm)

And click on 'check this out'. Are any of these sunscreens available? Click on the labels to find out.

# Lesson 16, Resource 17b

## Homemade Sunblock Lotion



See <http://www.gonative.co.nz/shop/Butters/Shea+butter+unrefined.html> for ingredients or go to a health food shop in your area.

Teachers will need to provide the following ingredients for each group of students:

### Ingredients

- 50 mls shea butter
- 25 mls coconut oil
- 1 oz zinc oxide
- 8 drops of tea tree oil

Procedure for students to follow:

1. Melt the shea butter and coconut oil together (put all of the ingredients in a mason/pickling jar, and set it in boiling water until melted or place the jar covered with paper towel into the microwave and heat until melted).
2. Remove from heat and stir in zinc oxide. Pour into container.
3. Let cool completely before use. Store at room temperature.



# Lesson 16, Resource 17c

## Sunscreen Recording Sheet

In this experiment, we are using UV beads to indicate whether or not the sunscreen has stopped UV rays going through the plastic bag. UV beads contain pigments that react with ultraviolet light from the Sun, even on a cloudy day. We are using the UV beads to test the UV-blocking effectiveness of five different sunscreens. We are working in groups of no more than four students.

### Procedure:

- Each group will receive a sample of each of the four commercial sunscreens, labelled 1, 2, 3, 4.
- The sunscreen developed earlier by your group becomes your fifth sample.
- In total you will have four commercial samples and one student-made sample of sunscreen.
- You will have five sets of UV beads. Take a photo of the UV beads before placing them in the plastic bags. Place UV beads in each of the five plastic Ziploc bags.
- Smear sunscreen from sample 1 on the first plastic bag and number this 1. Likewise, sample 2 on the second plastic bag and number this 2, etc. until you have five plastic bags containing UV beads and smeared in each of the five samples.
- What do you predict will happen?
- Place the five plastic bags in the direct sunlight from 10am in the morning until 2.30pm.
- Open the bags at 2.30pm, take a photo of the beads from each sample, observe and record the colour of the UV beads below.

Sample	Colour of UV beads before placing in the plastic bag	Colour of UV beads after removing from the plastic bag
1.		
2.		
3.		
4.		
5.		

### Questions:

1. In which samples did the beads change colour?
2. In which sample did the beads change colour the most?
3. In which sample did the beads change colour the least?
4. What does this tell us about the ability of the sunscreens to block UV radiation?
5. Which is the most effective sunscreen?

# Lesson 17

## Sunscreen Recording Sheet

Student-designed investigations using UV beads– investigating the effectiveness of sunhats made of different materials

Assessment Opportunities	Structure
<p><b>Lesson 17</b>  <b>We are successful when we can:</b></p> <ul style="list-style-type: none"> <li>use our knowledge of how UV beads work to test a variety of sun hats</li> </ul>	<p><b>Lessons 17</b>            Investigating the effectiveness of sunhats made of different materials.</p> <p><b>Where did you get that hat? And is it any use? Does the material a hat is made from make a difference to its effectiveness?</b></p> <p><b>Prepare:</b>            Teacher provides a selection of four hats per group, one of which is the school uniform hat or recommended style. (Try to have some open-weave straw hats as well.) Teacher to also ask students to bring hats from home to try out.</p> <p><b>Connect:</b>            Teacher reiterates what they have learnt so far. “We know the times of day that we should avoid being in the Sun if possible. Sometimes we cannot avoid exposure. We can limit the effect of the UVR by providing a means of blocking the light. We are encouraged to wear sunhats. In New Zealand schools, Labour Weekend usually signals the time of year that we are told to wear our sunhat. Students often do not like a particular style that the school has chosen. Think about your uniform hat or a cricket umpire’s hat. What design features do they have? Discuss in your group.”</p> <p><b>Activate:</b>            In their group the students complete <b>Resource 18</b>, Sunhat Investigation Recording Sheet.            The group identifies how they will test the variety of hats using the packs of UV beads, and how they will record what happens. The groups might consider using:</p> <ul style="list-style-type: none"> <li>photos as evidence</li> <li>full Sun</li> <li>a 30-minute time period.</li> </ul> <p><b>Demonstrate:</b>            Students develop cartoon/short film about how to protect yourself from UVR (see <b>Resource 23</b>).</p> <p><b>Consolidation:</b>            Students discuss their findings in their group. Were there any surprises? Is material selection an important aspect of designing an effective sunhat? How do we know that?</p>

# Lesson 17, Resource 18

## Sunhat Recording Sheet

Recording findings from an investigation into the effectiveness of sunhats made of different materials.

In this investigation you are going to use UV beads to identify how effective four sunhats are in blocking out UVR. The four hats have been made from four different materials. It is suggested that you use:

- photos as evidence
- full Sun
- a 30-minute time period.

Discuss and decide with your group how you will use the packs of UV beads to test the four hats (procedure). You will also need to decide how you will record what happens during your investigation (recording results). Use the headings and guidelines below to help you.

Procedure:

Results:

Hat Sample	Colour of UV beads	?
1.		
2.		
3.		
4.		

Findings

(What happened? Were there any surprises? Which material was the most effective at blocking UVR? Why? Which was the least effective? Why? Is choosing the material an important part of designing an effective sunhat? How do we know that?)



# Lessons 18–22

## OVERVIEW:

- What have we learnt about UVR?
- What have we learnt about our skin?
- How does UVR effect our skin?
- How can we protect ourselves from UVR?

## Essential question:

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

Assessment Opportunities	Structure
<p><b>Lessons 18–22</b>  <b>We are successful when we can:</b></p> <ul style="list-style-type: none"> <li>• work co-operatively as part of a group</li> <li>• identify possible challenges with the interview process and provide solutions</li> <li>• identify and demonstrate effective interviewing techniques</li> <li>• give and receive constructive feedback</li> <li>• make improvements based on the feedback received</li> <li>• demonstrate the oral, reading and written communication skills required to conduct a survey (asking people to take part, reading questions clearly, recording answers).</li> </ul>	<p><b>Lessons 18–22</b>  <b>Prepare:</b>  <b>Resource 19</b></p> <p><b>Connect:</b></p> <ul style="list-style-type: none"> <li>• At what time of year and day is UVR strongest in New Zealand?</li> <li>• At what time of the year and day is UVR strongest where we live? (i.e. UVI 3 or more).</li> <li>• What do we about how UVR affects our skin?</li> <li>• What can we do to protect our skin from UV Radiation? See <b>Resource 19d</b>, Slip, Slop, Slap and wrap, and Resource Scientific Explanations</li> </ul> <p>Complete <b>Resource 19a, 19b, 19c</b> and <b>19d</b>.            Revisit <b>Resource 4</b>. Are there any changes you would like to make to your answers?</p> <p><b>Activate:</b>            Preparing For and Conducting a Survey (<b>Resource 20</b>), Survey and Survey Tally Sheet (<b>Resource 21</b>), Analysing Results (<b>Resource 22</b>), and Action Plan (<b>Resource 23</b>).</p> <p><b>Demonstrate:</b>            Students develop cartoon/short film about how to protect yourself from UVR (see <b>Resource 20</b>).</p> <p><b>Consolidation:</b>            Presentation to peers and whānau. Whānau who attend the presentation receive a student-made sunscreen. (See <b>Resource 25</b>, Group Reflection).</p>

## Lessons 18-22, Resource 19a

# Top 15 Ways That The Sun Can Improve Your Health

*Our investigations have shown us that humans and all living things need the Sun. The Sun is not all bad. Here are the top fifteen ways in which the Sun can improve your health*

Taken from <http://www.mirror.co.uk/lifestyle/dieting/15-reasons-why-the-sun-is-good-for-you-623393>

Tick the ways the Sun improves your health

<p><b>1. It cheers you up</b></p> <p>SUNSHINE boosts levels of serotonin – the body’s natural happy hormone. That’s why we tend to feel happier and more energetic when the Sun shines. Regular Sun can stave off moderate depression, particularly if combined with exercise, such as a walk in the park. It’s also been shown that exercising outdoors creates more endorphins in the body than exercising indoors.</p>	
<p><b>2. Reduces heart disease</b></p> <p>A STUDY in the British Medical Journal showed that people in the UK are more likely to die of heart disease in winter than in summer, which is believed to be because of low levels of vitamin D. Where you live in the UK also matters. Blackpool has 27 per cent more hours of sunshine a year than Burnley – and 9 per cent fewer deaths from coronary heart disease. Cholesterol levels also rise in winter, according to reports in medical magazine The Lancet, and this is because our vitamin D levels fall. Dr Holick found that exposing people with high blood pressure to UVB rays in a tanning salon lowers blood pressure by similar amounts as prescribed drugs.</p>	
<p><b>3. Prevents diabetes</b></p> <p>VITAMIN D may help to prevent the onset of diabetes. “A study in Finland found children given a vitamin D supplement for several years had an 80 per cent reduced risk of developing Type I diabetes as young adults,” says Dr Holick.</p> <p>A deficiency in vitamin D is also thought to contribute to Type II diabetes, according to a recent study by Dr Barbara Boucher at St Bartholomew’s and the Royal London Hospitals.</p>	
<p><b>4. Beats SAD</b></p> <p>SEASONAL Affective Disorder (SAD) – or the winter blues – is a depression specifically caused by lack of sunlight. Lightboxes can be used to treat it, although increased exposure to natural sunlight is more beneficial. Get out for an hour’s walk in the morning during autumn and winter months, and sit outside for 15 minutes a day in summer.</p>	
<p><b>5. Helps prevent MS</b></p> <p>MULTIPLE sclerosis (MS) is a disease of the central nervous system, leading to tremors and even paralysis. The cause is not known but scientists have noted that exposure to sunlight in childhood appears to dramatically reduce the risk of developing this disease in later life. Scientists have also noted that the incidence of MS is lower in sunnier countries.</p>	
<p><b>6. Prevents cavities</b></p> <p>THE Sun could even help to keep your teeth strong. A dental study found the prevalence of cavities was greater in children from Scotland, the North-West, Wales and Merseyside – areas with less than average sunshine. The proportion of 12-year-olds with untreated cavities was three times greater in Scotland than in the South West Thames region.</p>	
<p><b>7. Relieves aches and pains</b></p> <p>Being out in the Sun helps to warm the body’s muscles and eases stiffness, reducing the pain caused by inflammatory conditions such as arthritis.</p>	

## Lessons 18–22, Resource 19a

# Top 15 Ways That The Sun Can Improve Your Health

*Our investigations have shown us that humans and all living things need the Sun. The Sun is not all bad. Here are the top fifteen ways in which the Sun can improve your health*

<p><b>8. Reduces risk of cancers</b> ALTHOUGH over exposure to the Sun increases your risk of skin cancer, vitamin D provided by sunlight can actually help to significantly reduce your risk of other types of cancer. A study carried out by the US National Cancer Institute found that people exposed to high levels of sunlight were significantly less likely to die from breast and colon cancer. A similar effect was seen in bladder, womb, oesophagus and stomach cancer.</p>	
<p><b>9. Boosts fertility</b> THE Sun reduces levels of the hormone melatonin which suppresses fertility, so it is more likely you'll conceive in summer. Sunlight not only makes you more fertile, it increases the length of your fertility. A study in Turkey discovered that women who get less than an hour of sunlight a week reach menopause seven to nine years earlier. Sunlight also boosts testosterone levels in men, which makes summer the perfect time for baby-making.</p>	
<p><b>10. Gives you more energy</b> MELATONIN also regulates sleep, so having lower levels of this hormone in your body gives you more get up and go. This is why you need less sleep in summer but still feel livelier. Plus, being woken by natural light rather than an alarm clock helps you feel more positive.</p>	
<p><b>11. Eases IBD</b> PEOPLE with Crohn's disease or other inflammatory bowel disorders (IBD) generally have low levels of vitamin D in their bodies, according to several studies. Sunlight is the best way to boost vitamin D in these cases. Although it is available in some foods (including meat, eggs, oily fish and some breakfast cereals), levels are low and poor absorption of fat – a common complication of inflammatory bowel disease – may make it difficult for sufferers to absorb vitamin D from their diet.</p>	
<p><b>12. Beats period problems</b> ABOUT one in five women of childbearing age suffer from polycystic ovary disease which causes abnormal periods, unwanted body hair and infertility. Half of 14 women treated with vitamin D and calcium by Dr Susan Thys-Jacobs at St Luke's-Roosevelt Hospital, Columbia University in New York, recovered normal periods and two became pregnant. Dr Thys-Jacobs also found that women with premenstrual syndrome are likely to be deficient in vitamin D.</p>	
<p><b>13. Helps skin conditions</b> EXPOSURE to the Sun can help to heal such skin conditions as psoriasis, acne and eczema. Regular controlled Sun exposure is often prescribed for sufferers. For serious cases, contact your GP. For minor cases, try exposing affected areas of skin to the Sun for up to 30 minutes before covering up or slapping on the sunscreen – but make sure you never burn.</p>	
<p><b>14. Boosts your immune system</b> SUNLIGHT encourages the production of white blood cells, which help to boost your immune system and fight infection.</p>	
<p><b>15. Helps you lose weight</b> HIGHER levels of serotonin in our bodies not only makes you feel happy but it also suppresses the appetite, so you'll eat less in warmer weather. Go out in the Sun at least three times a week to boost levels of vitamin D.</p>	

Taken from <http://www.mirror.co.uk/lifestyle/dieting/15-reasons-why-the-sun-is-good-for-you-623393>

## Lessons 18-22, Resource 19b

# Top 10 Ways That The Sun Can Damage Your Health

In groups of three, identify ten ways that too much the 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. The Sun's UVR can burn your skin.
2. The Sun's UVR can damage your eyesight.
3. The Sun's UVR can kill skin cells.
4. The Sun's UVR can cause sunburn which destroys the top layer of your skin
5. The Sun's UVR ages our skin.
6. When exposed to the Sun's UVR, skin produces more of the brown melanin, which darkens the skin and gives us limited protection.
7. Over exposure to the Sun's UVR causes 90% of all skin cancer cases in NZ
8. The Sun heats up objects.
9. The Sun melts objects.
10. Too much Sun destroys living and non-living things.

# Lessons 18–22, Resource 19c

## SunSmart Science



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

Column A	Column B
1. Stay in the shade around lunchtime.	1. Snow, pool water, concrete and the surf all reflect UVR.
2. Wear a broad-rimmed, dark-coloured hat/cap with flaps.	2. UVR can affect our eyes.
3. Wear a long-sleeved shirt.	3. The UVR index (UVI) is highest between September to April (especially between 10am and 4pm) in New Zealand.
4. Wear SPF 30 or above sunscreen.	4. New Zealand and Australia have a hole in the ozone layer which means that it does not filter the UVR as well as it should.
5. Wear lip balm with a sunscreen in it or zinc on my lips and nose.	5. Humans with light skins burn faster in the Sun and need to cover up most of their skin.
6. Wear wraparound sunglasses.	6. Water reflects UVR.
7. Wear a dark-coloured rash suit when near or in the water.	7. The skin on our face and eyes is very delicate and thinner than it is on other parts of our body.



# Lessons 18-22, Resource 19d

## Slip, Slop, Slap, Wrap

Ways we can protect ourselves from the Sun.



**SLIP** into the shade



**SLAP** on a broad-rimmed or cap with flaps



**SLIP** into a long-sleeved shirt



**SLOP** on Slop on broad-spectrum SPF 30+ sunscreen



**WRAP** on wrap-around sunglasses



**WRAP** on light-coloured clothing

## Lessons 18–22, Resource 20

# 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 18–22, Resource 21

## 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	Tokean	Fijian	SE Asian	Chinese	Indian

SunSmart Action	Never	Sometimes	Always
Stay in the shade between 10am and 4pm			
Wear a broad-rimmed, dark-coloured hat or cap with flaps			
Wear a long-sleeved shirt			
Wear broad-spectrum SPF 30+ sunscreen			
Wear lip balm with a sunscreen in it or zinc on my lips and nose			
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 a broad-rimmed, dark-coloured hat or cap with flaps				
Wear a long-sleeved shirt				
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 18-22, Resource 22

## 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.

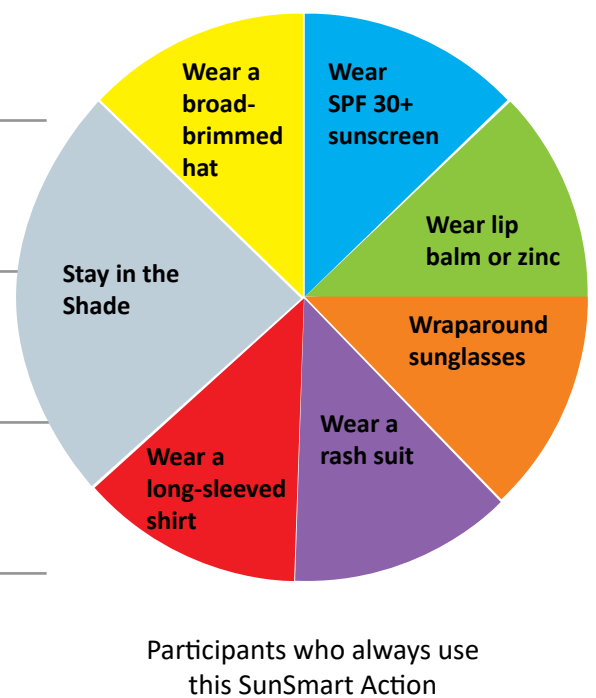
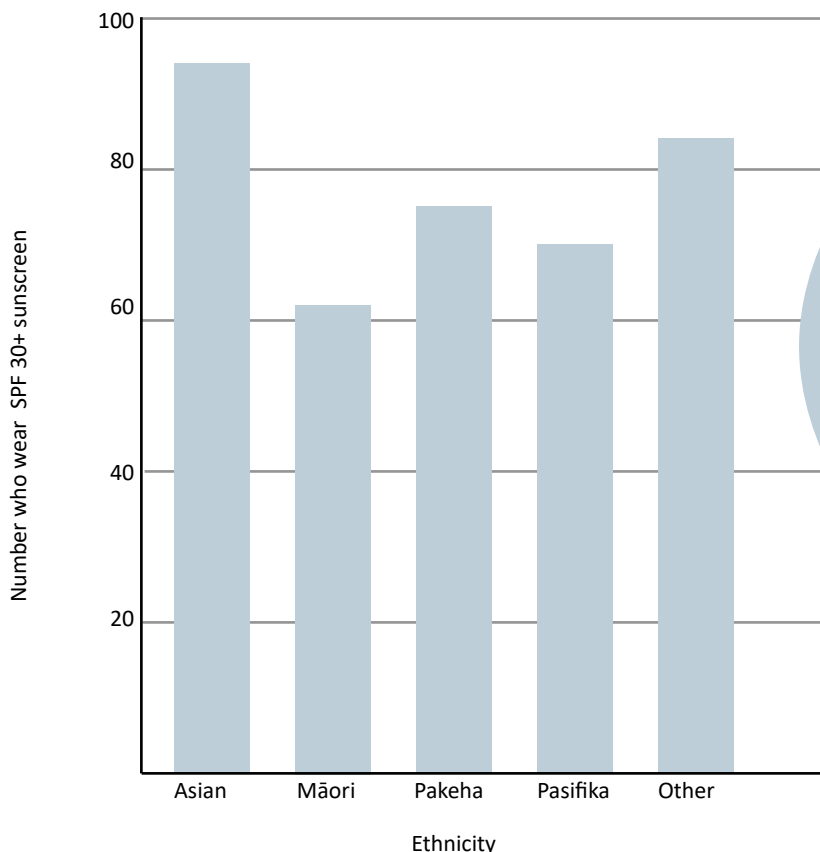
- Have you noticed if there are any similarities or differences between what the males and females have reported? I wonder why that is?
- Have you noticed if there are any similarities or differences between the age groups and what they have reported? I wonder why that is?
- Have you noticed if there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



Participants who always use this SunSmart Action

## Lessons 18-22, Resource 23

### 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
  - Slap on a broad-rimmed hat
  - Slop on broad-spectrum SPF 30+ sunscreen
  - Wrap on wraparound 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.



Image used with permission of Pets Best

# Lessons 18-22, Resource 24

## 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 18-22, Resource 25

## 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 26

### 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 26

## 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 26

### 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 26

# 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 or 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 26

## 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 26

# 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 26

## 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 26

# 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 26

## 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 22

## 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								



