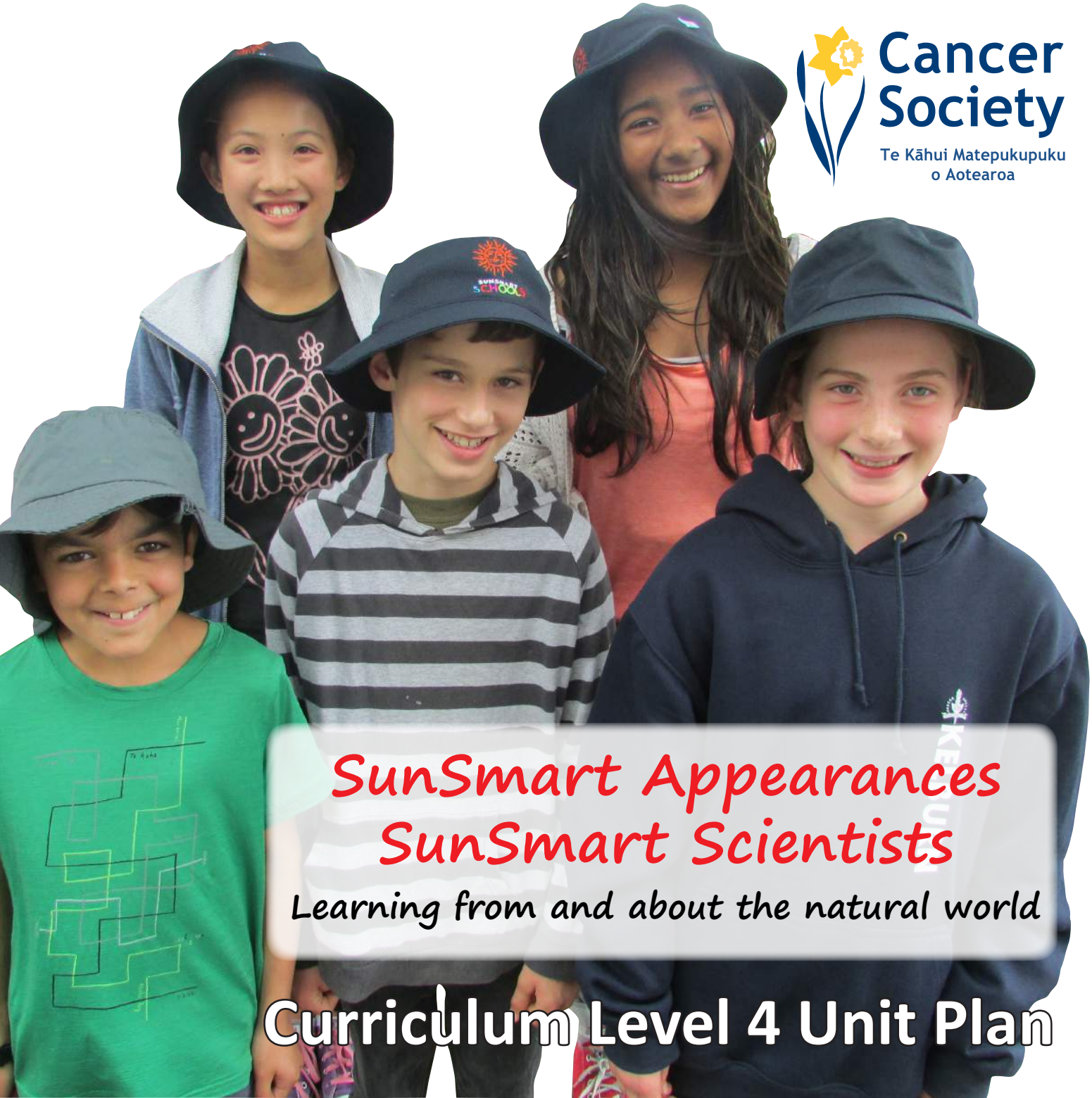
SUNSMART SCHOOLS

Cancer Society
Te Kāhui Matepukupuku o Aotearoa



SunSmart Appearances
SunSmart Scientists

Learning from and about the natural world

Curriculum Level 4 Unit Plan

Introduction

SunSmart Schools Aotearoa

The SunSmart Schools Accreditation Programme is run by the Cancer Society of New Zealand.

There are both risks and benefits from sun exposure. In New Zealand, the peak summer ultraviolet radiation (UV radiation) levels are 40% higher compared with corresponding latitudes in the northern hemisphere (eg. Southern Europe, mid USA). Excessive exposure to UV radiation from the sun can cause sunburn, skin damage and increase the risk of skin cancer.
Skin cancers are the most common cancers in New Zealand, and there is evidence they are increasing in incidence. From an early age, our children need to have the knowledge and behaviours that will protect them from harmful UV radiation. Students are in school when UV radiation levels are at their peak. Schools are uniquely placed to provide a sun-safe environment, educate students about sun protection behaviour and reduce the risk of skin cancer by becoming SunSmart. Energy from the sun includes heat, light and UV radiation. UV radiation cannot be seen or felt.
The Cancer Society encourages all New Zealanders to be SunSmart and "SLIP, SLOP, SLAP and WRAP".

The Cancer Society SunSmart Schools Programme accredits schools that have developed and implemented a sun protection policy for Terms 1 and 4. The policy must meet minimum criteria that ensure students and teachers are in a sun-safe environment.

The programme includes:

- 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.

Being a SunSmart school shows that your school:

- is committed to protecting students, staff and parents from the risks of UV radiation
- is raising awareness about the importance of sun protection among parents and students
- promotes the school within the community as one that is committed to the health and safety of its students
- has a sun protection policy that follows the Cancer Society minimum criteria
- promotes and supports positive sun protection behaviours such as appropriate hat wearing
- is developing and maintaining a sun-safe environment.

The SunSmart Schools Programme is supported by the findings of the Community Preventive Services Taskforce.[1] The Task Force recommends that primary and intermediate-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.

Sunsmart Schools 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 of the sun, energy and protection
c. support the principles of SunSmart and the New Zealand Curriculum (NZC)
d. use different examples/contexts to ensure appropriateness to different ethnic groups (particularly Māori, Pāsifika and Asian)
e. use Te Reo Māori concepts and language that will be woven into the resource
f. take an inquiry-based learning approach
g. use the SunSmart Schools website http://www.sunsmartschools.org.nz, the Cancer Society of New Zealand website http://www.cancernz.org.nz, the National Institute for Water and Atmospheric Research (NIWA) website http://www.niwa.co.nz and the Health Promotion Agency website http://www.hpa.org.nz/what-we-do/sun-safety

The Cancer Society of New Zealand would like to acknowledge and thank The Trusts Community Foundation and Infinity Foundation Ltd for part-funding the development of these resources.

1 http://www.thecommunityguide.org/cancer/skin/education-policy/primaryandmiddleschools.html

Further information in relation to UV Index Boards, becoming a SunSmart School and a sample SunSmart School policy are at the back of this resource.

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 on the next 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.

On the next page 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

Literacy

Science

Mathematics – Geometry & Measurement

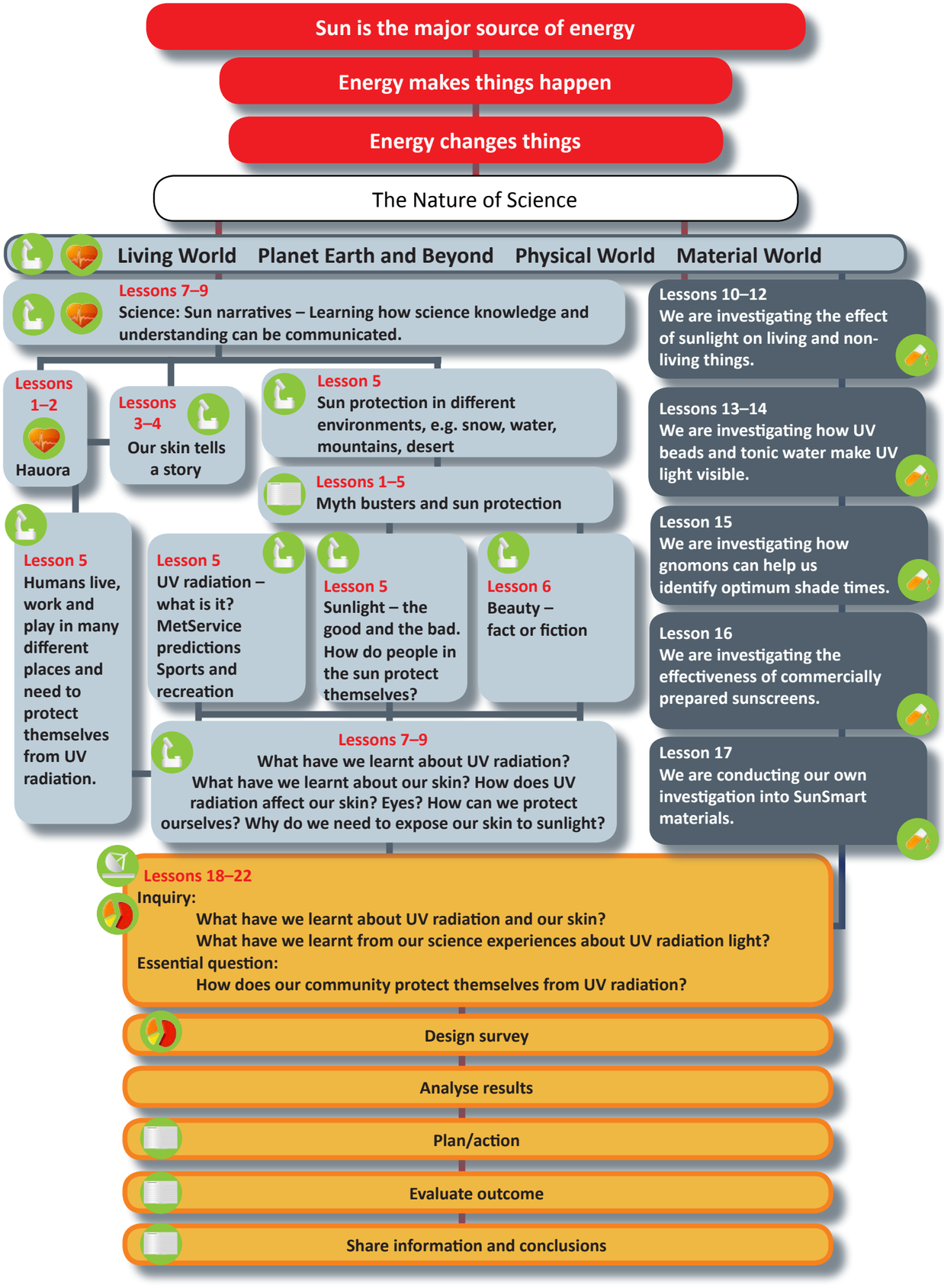
Science Experience

Mathematics – Number & Algebra

Technology

Mathematics – Statistics

Energy from the sun includes heat, light and UV radiation. UV radiation cannot be seen or felt.



Links to the New Zealand Curriculum

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**	**Personal Health and Development** *Safety management* Access and use information to make and action safe choices in a range of contexts.	• demonstrate an understanding about good skin health • identify own skin type and the level of sun protection that is required • identify how exposure to UV radiation affects our skin health, causing it to burn or develop skin cancers • describe the ways we can best protect ourselves from the harmful effects of UV radiation.
		Personal identity Describe how social messages and stereotypes, including those in the media, can affect feelings of self-worth.	• critically analyse the stereotypes and media messages around beauty and tanned skin.
		Healthy Communities and Environments *Societal attitudes and values* Investigate and describe lifestyle factors and media influences that contribute to the wellbeing of people in New Zealand.	• examine issues and challenges associated with making SunSmart choices • analyse SunSmart messages and identify the strategies that are effective • investigate and compare the opinions of identified groups regarding SunSmart actions • take collective action to increase identified groups' understanding of how misleading advertising can be.
English		**Listening, Reading and Viewing** *Processes and strategies* Integrate sources of information, processes, and strategies with developing confidence to identify, form, and express ideas: • recognises and understands the connections between oral, written, and visual language • integrates sources of information and prior knowledge confidently to make sense of increasingly varied and complex texts • selects and uses appropriate processing and comprehension strategies with increasing understanding and confidence • thinks critically about texts with increasing understanding and confidence.	• identify, analyse and discuss aspects of media used to persuade consumers to use SunSmart products • read and critically review a range of texts • read, interpret and apply SunSmart information.
English		**Speaking, Writing and Presenting** *Processes and strategies* Integrate sources of information, processes and strategies confidently to identify, form and express ideas. • uses an increasing understanding of the connections between oral, written and visual language when creating texts • creates a range of texts by integrating sources of information and processing strategies with increasing confidence • seeks feedback and makes changes to texts to improve clarity, meaning and effect • is reflective about the production of own texts: monitors and self-evaluates progress, articulating learning with confidence.	• construct texts with an awareness of audience and purpose, using key strategies and language to persuade other readers • conduct a survey that integrates varying sources of information and conduct with an identified group • create and present an advertisement showcasing SunSmart messages for the school community.
Mathematics and Statistics	**Statistics**	**Statistical Investigation** *Plan and conduct investigations using the statistical inquiry cycle* • determining appropriate variables and data collection methods • gathering, sorting and displaying multivariate category, measurement and time-series data to detect patterns, variations, relationships and trends • comparing distributions visually • communicating findings, using appropriate displays.	• plan and conduct a survey investigating the opinions of a variety of identified groups • determine appropriate variables and data collection method • accurately gather, sort and display data in different ways • analyse data and detect patterns and variations.

Curriculum Areas Incorporated		Achievement Objectives Relevant to the activity, including possible links	Specific Learning Outcomes Students will be able to:
Te Aho Arataki Marau mo te Ako Te Reo Māori	**Taumata**	Students should be able to: 4.1 Request, offer, accept and decline things, invitations/suggestions. 4.2 Communicate about plans for the immediate future. 4.3 Communicate about obligations or responsibilities. 4.4 Give and seek permission or agreement. 4.5 Communicate about quality, quantity and cost of things.	• request, accept or decline to participate in sunscreen survey • discuss, plan and record a checklist of what group members will do to prepare the survey • seek agreement from participants to take part in their survey • ask and answer questions about their survey results.

Scientists investigate and use observation to ask questions about:

	Understanding in Science	Investigating in Science	Communicating in Science	Participating and Contributing
Nature of Science Achievement Objectives Level 4	• Appreciate that science is a way of explaining the world and that science knowledge changes over time. • Identify ways in which scientists work together and provide evidence to support their ideas.	• Build on prior experiences, working together to share and examine their own and others' knowledge. • Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations.	• Begin to use a range of scientific symbols, conventions and vocabulary. • Engage with a range of science texts and begin to question the purposes for which these texts are constructed.	• Use their growing science knowledge when considering issues of concern to them. • Explore various aspects of an issue and make decisions about possible actions.
Living World Achievement Objectives Level 4	**Life Processes** Recognise that there are life processes common to all living things and that these occur in different ways.			
Material World Achievement Objectives Level 4	**Properties and Changes of Matter** Compare chemical and physical changes.			
	Chemistry and Society Relate the observed, characteristic chemical and physical properties of a range of different materials to technological uses and natural processes.			

Links to Curriculum

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

Vision	Principles	Values	Key Competencies	Pedagogical Approaches
What we want for our young people: • Confident • Connected • Actively involved • Lifelong learners.	Beliefs about what is important: • High expectations • Treaty of Waitangi • Cultural diversity • Inclusion • Learning to learn • Community engagement • Coherence • Future focus.	Expressed in thought and actions: • Excellence • Innovation, inquiry and curiosity • Diversity • Equity • Community and participation • Ecological sustainability • Integrity.	Which of the key competencies? (NZC pp. 12–13) • Thinking • Using language, symbols and texts • Managing self • Relating to others • Participating and contributing.	Aspects of effective pedagogy (NZC pp. 34–36) are highlighted in the activity: • Creating a supportive learning environment • Encouraging reflective thought and action • Enhancing the relevance of new learning • Facilitating shared learning • Making connections to prior learning • Providing sufficient opportunities to learn • E-learning • Engaging Māori and Pāsifika students and their communities.

National Standards Assessment

The New Zealand Curriculum Reading and Writing Standards for Years 1–8

The Reading Standard – By the end of Year 8, students will read, respond to, and think critically about texts in order to meet the reading demands of the New Zealand Curriculum at Level 4. Students will locate, evaluate, and synthesise information and ideas within and across a range of texts appropriate to this level as they generate and answer questions to meet specific learning purposes across the curriculum.

The Writing Standard – By the end of Year 8, students will create texts in order to meet the writing demands of the New Zealand Curriculum at Level 4. Students will use their writing to think about, record, and communicate experiences, ideas, and information to meet specific learning purposes across the curriculum.

The New Zealand Curriculum Mathematics Standard for Years 1–8

The Mathematics Standard – Statistics

In contexts that require them to solve problems or model situations, students will be able to:

- investigate summary, comparison, and relationship questions by using the statistical enquiry cycle:
  - gather or access multivariate category, measurement, and time-series data
  - sort data and display it in multiple ways, identifying patterns, variations, relationships, and trends and using ideas about middle and spread where appropriate
  - interpret results in context, identifying factors that produce uncertainty
- express as fractions the likelihoods of outcomes for situations involving chance, checking for consistency between experimental results and models of all possible outcomes.

National Standards Assessment Tasks

Tasks to assess the **Reading Standard** – refer to Lessons 1–22.

Tasks to assess the **Writing Standard** – refer to Lessons 1–22.

Tasks to assess the **Mathematics Standard** – refer to Lessons 5–22.

Planned Assessments

Assessments should include both formative and summative, and any suggestions made in this unit need to be cognisant of student needs and abilities. Within the inquiry model, assessment should be ongoing, reflecting understanding at key points along the way.
See Resource 26 for assessment of group work skills.

Spotlight On

Inquiry-based learning, e-learning

Inquiry learning – developing rubrics http://www.galileo.org/research/publications/rubric.pdf

Links and Resources

If your firewall does not allow you to open a hyperlink, go to YouTube and type in the **name** of the resource. This should provide you with access to the resource.

TKI

Curriculum documents http://nzcurriculum.tki.org.nz/
Wellbeing, hauora http://health.tki.org.nz/Teaching-in-HPE/Curriculum-statement/Underlying-concepts/Well-being-hauora
In the curriculum guidelines, *Te Aho Arataki* there are suggestions for possible learning and assessment activities for Curriculum Levels 1–2 http://tereomaori.tki.org.nz/Curriculum-guidelines/Levels-1-8-Curriculum-Guidelines-for-Teaching-and-Learning-Te-Reo-Maori/Levels-1-and-2-Beginning-to-use-te-reo-Maori and Curriculum Levels 3–4. In addition, there is helpful material collected online in Te Whakaipurangi Rauemi. http://tereomaori.tki.org.nz/Teacher-tools. This collection elaborates on some of the communicative tasks outlined in Tasks and activities, including cloze tasks, dycomm tasks and information transfer tasks.

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

Digistore

http://digistore.tki.org.nz/ec/search?topic=Column+graphs

Cancer Society

http://www.sunsmartschools.org.nz
http://www.cancernz.org.nz/reducing-your-cancer-risk/sunsmart/
WHO programme http://www.who.int/uv/publications/en/primaryteach.pdf
The WHO INTERSun programme http://www.who.int/uv/intersunprogramme/activities/en/
Cancer Council West Australia has eight interesting and interactive learning activities that can be delivered as stand-alone activities or presented as a term's science work. The aim is to help students understand the science of light, with a focus on ultraviolet (UV) radiation http://www.cancerwa.asn.au/resources/2013-04-10-uv-radiation-learning-activities-book.pdf
Sunscreen questions and answers http://www.cancernz.org.nz/assets/files/info/SunSmart/Sunscreen%20QA%27s_14Feb2012%283%29.pdf

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)

Links

http://www.cancernz.org.nz/assets/files/info/SunSmart/Sunscreen%20QA%27s_14Feb2012%283%29.pdf
http://kidshealth.org/kid/htbw/skin.html
http://www.cancernz.org.nz/assets/files/info/SunSmart/Sunscreen%20QA%27s_14Feb2012%283%29.pdf
http://www.cancernz.org.nz/assets/files/info/SunSmart/IS_SunAltitude&Snow_19Oct2011.pdf
http://www.cancernz.org.nz/reducing-your-cancer-risk/sunsmart/the-ultraviolet-index/the-ultraviolet-index/
http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/teachers/applets/flash/ss_dress.htm
http://www.aad.org/dermatology-a-to-z/health-and-beauty/general-skin-care/sun-protection/sunscreen-labels/how-to-select-a-sunscreen
http://www.cancernz.org.nz/reducing-your-cancer-risk/sunsmart/sunsmart-information-sheets/
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/lab/lab_01.htm
http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/game/game_01.htm
http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/effects_pop1.htm
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/risky_01_pop1.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/electomagnet_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/brainiac/data_graphing_pop1.htm
http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/skin_pop1.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/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://www.youtube.com/watch?v=jbM3PwcGi0g
http://sunsmart.org.nz/being-sunsmart/sunsmart-myths

Useful links

http://www.sciencelearn.org.nz/Contexts/You-Me-and-UV/Sci-Media/Video/Why-are-UV-levels-high-in-New-Zealand-summer
http://www.sciencelearn.org/Contexts/You-Me-and-UV/Sci-Media/Video/UV-Index-time-lapse-map-for-New-Zealand
http://www.sciencelearn.org.nz/Contexts/You-Me-and-UV/Sci-Media/Video/UV-Index-time-lapse-map-for-New-Zealand
http://www.niwa.co.nz/UV-forecasts
http://www.sunsmartschools.co.nz/teachers/video/results
http://tinyurl.com/Sunbeds-Sunlamps
http://tinyurl.com/ISEyeProtection
http://tinyurl.com/HatProtection
http://tinyurl.com/IS-Sunscreen
http://tinyurl.com/BuiltShade
http://tinyurl.com/IS-ProtectiveClothing
http://www.cancernz.org.nz/reducing-your-cancer-risk/sunsmart/the-ultraviolet-index/example-of-daily-uvr-levels-over-a-summers-day/
http://www.cancernz.org.nz/reducing-your-cancer-risk/sunsmart/the-ultraviolet-index/the-ultraviolet-index/
http://tinyurl.com/VitaminDConsensus
http://tinyurl.com/SunExposureInPregnancy
http://tinyurl.com/IS-VitaminD
http://tinyurl.com/VitaminDQ-A
http://www.sunsmartschools.co.nz/schools/hats
http://www.sunsmartschools.co.nz/info/uv
http://www.sunsmart.com.au/skin-cancer/solariums
http://www.sunsmart.com.au/tools/videos/current-tv-campaigns/dark-side-of-tanning.html
http://www.youtube.com/watch?v=ASO9FM6gDLs&feature=related
Note with the last YouTube link: skin cancer is New Zealand's most common cancer, but on the video it says second most common as it is a Canadian video. Our messaging is be SunSmart from September to April especially between 10am and 4pm. You can get sunburnt on cool and/or cloudy days.
Real stories
http://www.cancer.org.au/preventing-cancer/sun-protection/sunsmart-schools/real-stories-secondary-school-resource.html
Dear 16 year old me http://www.youtube.com/watch?v=_4jgUcxMezM
The dark side of tanning http://www.youtube.com/watch?v=58dCTnIN40w
It's a beautiful day for cancer http://www.youtube.com/watch?v=y95qkDC-z-o
Leatha face http://www.youtube.com/watch?v=UeUtBeZEDAk
Dangers of a deadly tan http://www.youtube.com/watch?v=HTHcNj4KRa8&feature=youtu.be
For shade please use
http://www.sunsmartschools.co.nz/Guidelines_Under_Cover.pdf

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

Introduction and 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
We are successful when we: • can identify the factors that influence our everyday lives • can explain how the environment and people around us influence us • understand and can use some familiar health vocabulary in Māori • can identify and explain our personal responsibility for our own actions and the responsibilities of others • can identify and explain how health and wellbeing impact on the quality of our everyday lives • can identify the things that keep our skin healthy – physical (taha tinana), mental/emotional (taha hinengaro), social (taha whānau) and spiritual (taha wairua) • understand that all four elements above need to be in balance for us to feel happy, healthy and safe. **Te Reo** – Learning intentions and success criteria rubrics for Te Reo http://hereoora.tki.org.nz/Unit-plans/Unit-1-Ko-au/Learning-intentions-and-success-criteria Evidence: to assess Taumata Level 4 Evidence: Teach and assess social and interpersonal skills. Student, peer and teacher assessment ongoing.	**Prepare:** Video clip http://science.nationalgeographic.com/science/health-and-human-body/human-body/skin-article/ **Connect:** • Assign students into groups of three or four. Allocate and define tasks of collector, recorder, reporter, timekeeper (use of these roles is encouraged throughout the unit). • Explain task, requirements and timeframe. **Activate:** • What jobs does our skin do for our body? (protects organs, manages body: temperature by sweating etc.) • Why is it important to look after our skin? What happens if we don't look after our skin? How should we look after our skin? **Our skin can also tell a story** about us. Teacher discusses the concept of different-coloured skin, ageing etc,. and goes to clip to show students how their skin colour determines how quickly they burn. Teacher also clicks on the effects of ageing button and shows students how the structure of the skin changes with age.	**Refer to:** http://www.health.govt.nz/our-work/populations/maori-health/maori-health-models or Health and Physical Education Curriculum 1999. **Pedagogical links:** • Creating a supportive learning environment • Encouraging reflective thought and action • Enhancing the relevance of new learning • Facilitating shared learning • Making connections to prior learning • Providing sufficient opportunities to learn • Engaging Māori and Pāsifika students and their communities. **Key competencies:** • Thinking • Using language, symbols and texts • Managing self • Relating to others • Participating and contributing. **Literacy:** Integrate different sources of information, processes and strategies to inform, shape and express ideas about health and wellbeing. **Te Reo:** Ongoing opportunities to assess Te Reo http://hereoora.tki.org.nz/Unit-plans/Unit-1-Ko-au/Assessment-opportunities

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 tā moko?[1] What story does a moko tell?[2] Are there other cultures that have tattoos that tell a story? Samoan, etc.? What is the word for tattoo in Samoan, Tongan, and Hindi, etc.? What do the symbols mean? What stories do they tell?

Demonstrate:

- Introduce the concept of hauora through the diagram (Resource 2a) on the board and headings beside each wall.
- Teacher provides background to headings – physical (taha tinana), mental/emotional (taha hinengaro), social (taha whānau), and spiritual (taha wairua)). See Resource 2b 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 in Resource 1. 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 to the three-level guide (Resource 4a) and complete individually. Use Resource 4b, Teacher's Notes for background. Answers: 1 ✓ 2 ✓ 3 ✓ 4x 5 x 6 ✓ 7x 8 x 9 ✓ 10 ✓ 11 ✓ 12 x 13 ✓ 14 x 1 5✓ 16 x 1 7✓ 1 8✓ 1 9✓ 20 x. Teacher collects their answers as they will be returned to the students later in the unit (in Lesson 18) when students will be asked to revisit their answers. Once they have more understanding and knowledge, students will be able to answer or change their responses.

Students can go to http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/skin_pop1.htm to improve their knowledge about our skin. Students can also go to http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/effects_pop1.htm to see if they are able to identify the difference between Sun-Smart myths and facts.

1. Tā 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 hapū of the person, and for men, the remainder of the face tells the history. Rangitāne o Wairarapa and Greater Wellington Regional Council

There is no right or wrong answer for this activity. We are exploring our own ideas and interpretations.

Decide which photos are examples of:

A. Physical (taha tinana)

B. Mental/emotional (taha hinengaro)

C. Social (taha whānau)

D. Spiritual (taha wairua)

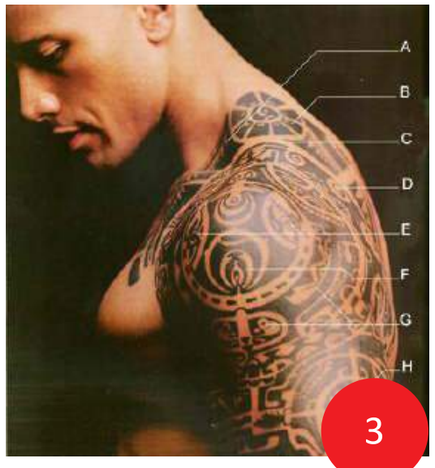
Put the number of the photo in the box below:

A. Physical (taha tinana)

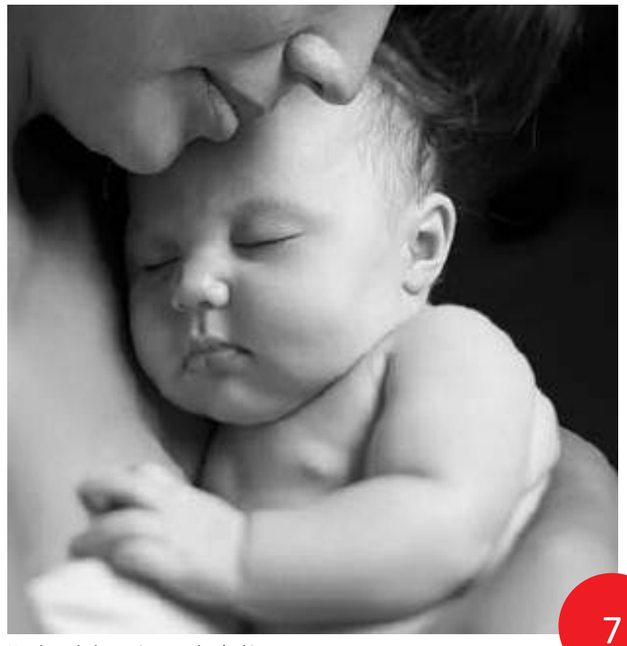
B. Mental/emotional (taha hinengaro)

C. Social (taha whānau)

D. Spiritual (taha wairua)



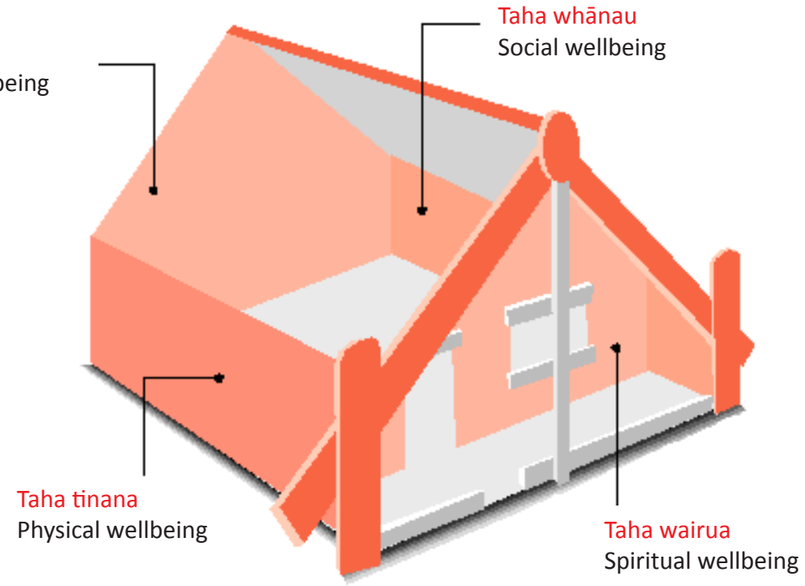
Lessons 1–4, Resource 1



Newborn baby against mother's skin

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

Lessons 1–4, Resource 2a
Hauora concept



Dr Mason Durie's Te Whare Tapa Whā model compares hauora with 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 2b, Teacher's Notes
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.

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 Scandinavian	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 light brown Mediterranean, Hispanic	Low
5.	Rarely sunburn Tan profusely	Brown-skinned darker Mediterranean, South-East Asian, Eastern Indian	Very low
6.	Never sunburn Deeply pigmented	African American	Minimal

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

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

Fitzpatrick scale

Any sign of skin colour darkening is a sign of sun damage. There is nothing healthy about a tan.

Skin types	Characteristics	Examples
Type 1	High risk of sun sensitivity, always burns, never tans.	Red hair with freckles, some New Zealanders.
Type 2	Very sun sensitive, burns easily, tans minimally.	Fair skinned, fair haired, Northern European, many New Zealanders.
Type 3	Sun-sensitive skin, sometimes burns, slowly tans to light brown.	Central European, many New Zealanders.
Type 4	Skin burns minimally, always tans to moderate brown.	Mediterranean European, some South Americans, some New Zealanders.
Type 5	Skin rarely burns, tans well, darkly pigmented skin.	Some South Americans, some Africans, some Indians, some New Zealanders.
Type 6	Darkest pigmented skin.	Some South Americans some Africans, some Indians, some New Zealanders.

Note: Albino – extremely high risk of negative sun reaction.

It is important to distinguish between natural (constitutive) skin colour and additional acquired from UV radiation exposure (facilitative), which is associated with skin damage.
There is evidence that Māori are represented in all categories.
There is a growing literature on 'people of colour' and 'ethnic skin' but not much about Pacific peoples, in particular.
The *British Journal of Dermatology* recently had a whole special supplement: Ethnic Skin: a New Era for Studying Human Cutaneous Diversity, October 2013, Volume 169, Issue Supplement s3, Pages iii–v, 1–97.

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, 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 4a
Three-level guide

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

Statement	✓ or X
1. Animals have lots of different ways to protect themselves from the sun.	
2. Humans are animals.	
3. Hauora is a Māori word that 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 Fitzpatrick, 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 sunburnt on cool or cloudy days.	
9. Humans can protect themselves from the sun by SLIPPING into the shade and a collared long sleeved shirt, SLAPPING on a hat, SLOPPING on sunscreen and WRAPPING on some sunglasses.	
10. Sunlight is made of all different sorts of energy and light.	
11. The light the earth receives from the sun contains ultraviolet radiation (UVR).	
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 in New Zealand.	
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. The hole in the ozone layer was caused by people using too many spray underarm deodorants instead of roll-on deodorants.	

Three – level guide

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

How do I write a three-level guide?

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

Lessons 1–4, Resource 4b, Teacher's Notes

Three-level guide

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

How do I use the three-level guide?

- Make sure students understand the purpose of the task, i.e. to reach an understanding of the text at three levels.
- Stress that this is not a simple 'true or false' activity and that level three in particular will not have 'right or wrong' answers.
- Model the process with a practice guide or with a first question at each level.
- Allow plenty of time to complete all stages of the task.
- You may wish to follow this process for students in the classroom:

➔ Stage one: students work individually
➔ Stage two: students work in groups – preferably multi-level/mixed ability
➔ Stage three: present or record and discuss similarities and differences between group responses, especially at applied level.

Lesson 5
Knowledge attack – UV radiation and UVI

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

Assessment Opportunities	Structure
Learning Outcomes **We are successful when we can:** • explain what UV radiation and UVI are • use the information sheets to identify facts about our skin and the sun • read and interpret information on UV radiation levels • use the information on skin and UV radiation and UVI as a basis for decisions about sun protection.	**Prepare:** • Resource 5a and 5b and Resource 6 in A3 size, one copy for each group of three students. • http://www.cancernz.org.nz/assets/files/info/SunSmart/IS_SunAltitude&Snow_19Oct2011.pdf • http://www.cancernz.org.nz/assets/files/info/Information%20Sheets/Info%20Sheets%202011/IS_SunProtectionatBeaches&SwimmingPools_20Oct11.pdf • http://www.cancernz.org.nz/reducing-your-cancer-risk/sunsmart/the-ultraviolet-index/example-of-daily-uvr-levels-over-a-summers-day/ • Data projector • 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.) **Connect:** 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. **Activate:** 1. Students are placed in pairs and given a copy of Resource 5a and 5b. Students complete Resource 5a by matching the images with the correct fact in Resource 5b. Answers: A1, B4, C7, D9, E2, F5, G10, H3, I6, J8. Students are placed into groups of three. Each group receives an A3 copy of Resource 6. They provide the graphics/pictures for the information (i.e. infographics). A good example of infographics can be found at http://www.educationcounts.govt.nz/__data/assets/pdf_file/0005/140576/Auckland-Hibiscus-and-Bays11.pdf or http://www.cometauckland.org.nz/webfiles/CometNZ/files/2013ED_SNAP_GT_BARRIER-1.pdf Students need to have access to the internet and can go to the websites below to help them find out more information. • http://www.cancernz.org.nz/assets/files/info/SunSmart/IS_SunAltitude&Snow_19Oct2011.pdf • http://www.cancernz.org.nz/assets/files/info/Information%20Sheets/Info%20Sheets%202011/IS_SunProtectionatBeaches&SwimmingPools_20Oct11.pdf 2. Once students have completed the infographics (Resource 6), 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 – the visual images that successfully explain the facts.

Structure

3. UVI – teacher revisits:
- the Cancer Society SunSmart messages of Slip, Slop, Slap and Wrap
- UV radiation in sunlight are the rays that burn our skin
- even though we cannot see or feel UV radiation, we can measure it
- the ultraviolet index (UVI) measures the level of UV radiation 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 UV radiation is affected by:
- season
- time of day
- geographical location
- altitude
- cloud cover
- characteristics of the immediate physical environment, albedo effects, not just snow and water.

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 and students complete the cloze test individually and then discuss their answers.

Teacher goes back to http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/uv.htm

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

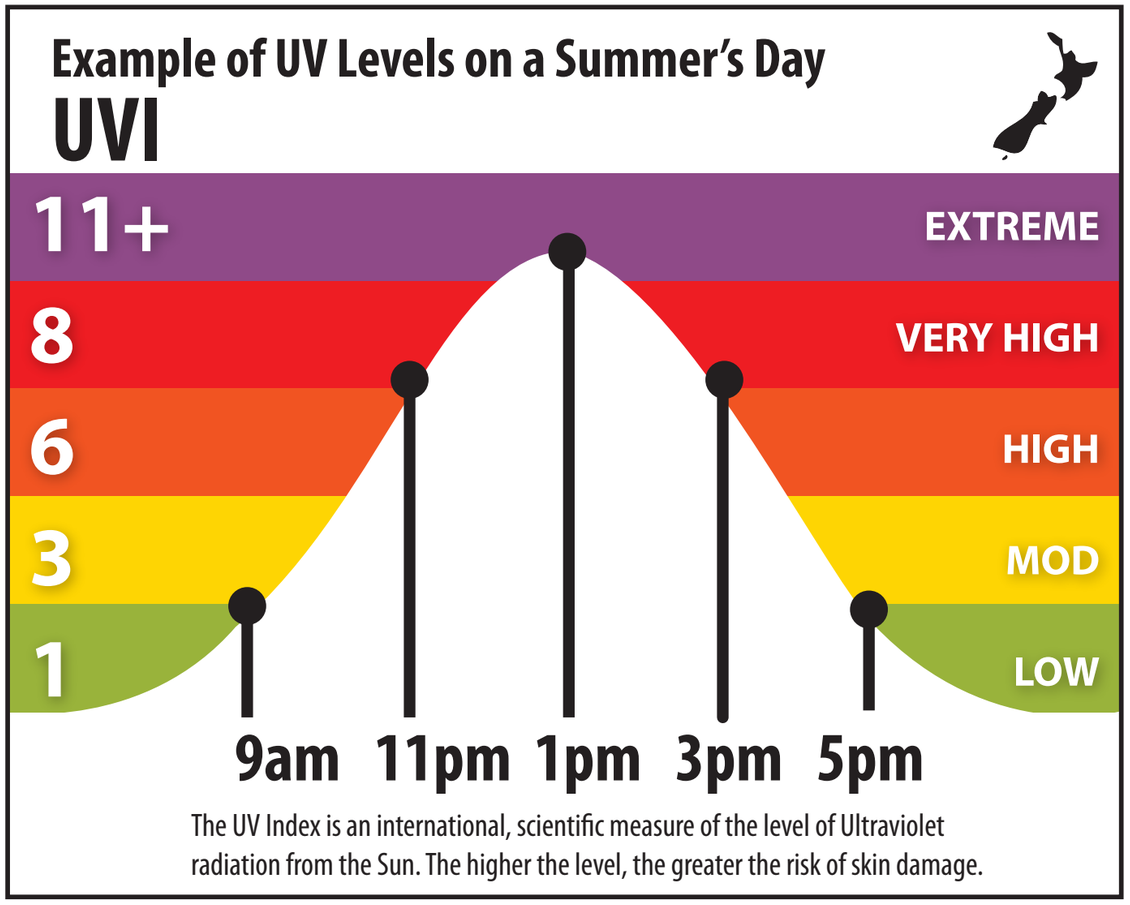
UV index graphs

Teacher returns to http://www.cancernz.org.nz/reducing-your-cancer-risk/sunsmart/the-ultraviolet-index/example-of-daily-uvr-levels-over-a-summers-day/

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?

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



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 Centres

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 those you noted in Table 1? Why is this?

Structure

Consolidation:

Teacher (or if possible, students) go to the following sites and answer the following questions:

1. 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 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 7 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 8 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

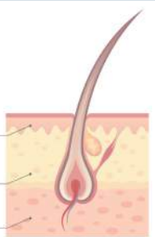
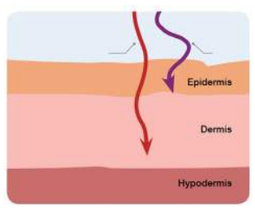
Note: Mean UVI includes clouds

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

	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

Look at the image in Column A, which describes a fact about your skin. Go to Resource 5b which lists 10 facts about our skin. Match each of the 10 facts about your skin with the image in Resource 5a. Write the fact in Column B of Resource 5a.

Column A	Column B
a. 	The skin is the largest organ in the body
b. 	
c. 	
d. 	
e. 	

Lesson 5, Resource 5a
Love the skin you're in

Column A	Column B
f. 	
g. 	
h. 	
i. 	
j. 	

Lesson 5, Resource 5b
Love the skin you're in

10 facts about your skin

1. The skin is the largest organ in the body.
2. UVA rays penetrate the dermis. UVB rays penetrate the epidermis.
3. In winter, you can get sunburnt at high altitudes.
4. The thinnest part of your skin is found on your eyelid.
5. Skin colour is the result of a protein called melanin.
6. You need to SLIP, SLOP, SLAP and WRAP to protect your skin.
7. The thickest part of your skin is found on your foot.
8. There are a lot of different skin colours, but everybody has to protect the skin they're in.
9. Your skin has three layers.
10. You can get sunburnt even on cloudy days.

UV radiation is cumulative over your life span. Your skin remembers all skin damage, sunburn and tanning

Lesson 5, Resource 6
12 incredible facts about UV radiation

Work in a group of three. Look at column B, which describes facts about ultraviolet radiation. Go to http://www.cancernz.org.nz/assets/files/info/SunSmart/IS_SunAltitude&Snow_19Oct2011.pdf and http://www.cancernz.org.nz/assets/files/info/Information%20Sheets/Info%20Sheets%202011/IS_SunProtectionatBeaches&SwimmingPools_20Oct11.pdf to read more about ultraviolet radiation. In column A, draw a simple picture/graphic that describes the information. 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.
	Ultraviolet radiation from the sun cannot be seen or felt but it causes sunburn and skin cancer.
	A person surrounded by snow receives UV radiation from the sky as well as UV radiation reflected off the snow.
	Snow, water and concrete all reflect UV radiation.
	Reflection from fresh snow can double the amount of UV radiation you are exposed to when outside.
	UV radiation can go through clouds.
	UV radiation can cause damage to your eyes.
	When in the snow, protect your eyes by wearing sunglasses or goggles that filter UV radiation, are close fitting and wrap around.
	To avoid sunburn in the snow or when you are near water, wear: • a hat that covers your head and ears • long sleeves and trousers • SPF 30 sunscreen on your face • SPF 30 lip balm • sunglasses/goggles. Stay indoors or in the shade around lunchtime.
	The ultraviolet index measures the level of UV radiation 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 shirt for better UV radiation protection.

Lesson 6
The risks

Overview: Even though we know that our skin needs protecting, many of us still deliberately go into the sun to tan our skin. What risks are we taking?

Assessment Opportunities	Structure
We are successful in our learning when we can: • carry out an action and test our ideas • use data we collect to make explanations and decisions • use data to explain which sunscreen is the most effective.	**Lesson 6** **Connect:** 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 UV radiation. Let's see how many risks we currently take and what we know about skin cancer." **Activate:** Students go to http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/risky_01_pop1.htm and http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/risky_01_pop2.htm 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. 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. What risks are we taking? Students view the following links http://tinyurl.com/Sunbeds-Sunlamps http://www.sunsmart.com.au/skin-cancer/solariums http://www.sunsmart.com.au/tools/videos/current-tv-campaigns/dark-side-of-tanning.html http://www.youtube.com/watch?v=ASO9FM6gDLs&feature=related **Demonstrate:** Students then complete the tasks on Resource 7, 8 and 9. Resource 7 answers: 1. T, 2. T, 3. T, 4. T, 5. T, 6. T, 7. T, 8. T, 9. T Resource 8 answers: 1400–1700, 2. 1800, 3. 1900; 4. 1920, 5. 1900, 6. 1400–1700. Resource 9 answers: 1. high, 2. darker, 3. damage, 4. beach, 5. Slap, 7. Slop, 8. 10, 9. 4, 10. shade

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.

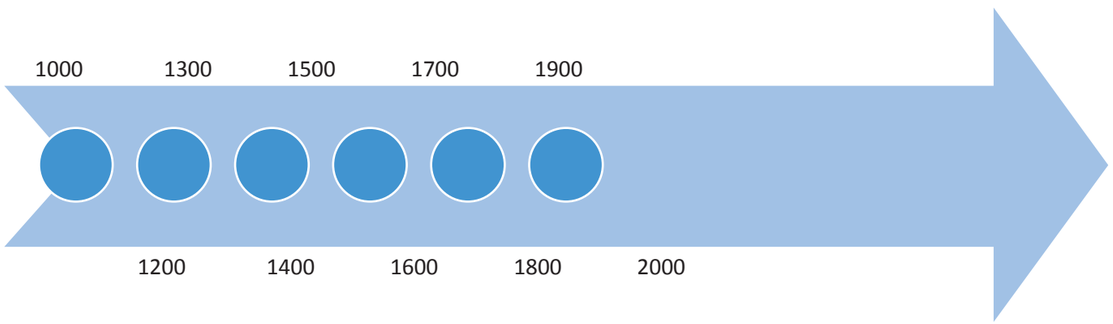
Statement	T/F
1. Coco Chanel accidentally made the suntan fashionable when she was tanned from being in the sun while on a yacht in the Mediterranean in the early 1920s.	
2. Studies have shown that modern fair-skinned Americans, Australians and Europeans believe tanned skin is a sign of health. As there is nothing healthy about a tan, their perception is incorrect.	
3. The World Health Organization has found that people who have been using tanning devices before age 30 are 75% more likely to develop melanoma.	
4. 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 that makes us feel happy).	
5. Commercial skin-lightening creams have been popular among dark-skinned South Africans since the 1930s.	
6. Chinese beachgoers are so concerned about tanning that many don a balaclava-like accessory known as the 'face-kini'.	
7. John Harvey Kellog (1852–1943) invented cornflakes, peanut butter, electric blankets and sunbeds.	
8. Sunbeds expose users to higher levels of dangerous UV radiation than the sun. They increase your risk of melanoma and other skin cancers.	
9. There is certainly no absolute standard of beauty. That precisely is what makes its pursuit so interesting.	

Lesson 6, Resource 8
Tan timeline

Below six statements that describe people's attitudes towards tanning. Look at the timeline below and decide at what point in time people held those attitudes. Write the number of the statement next to the century on the timeline.

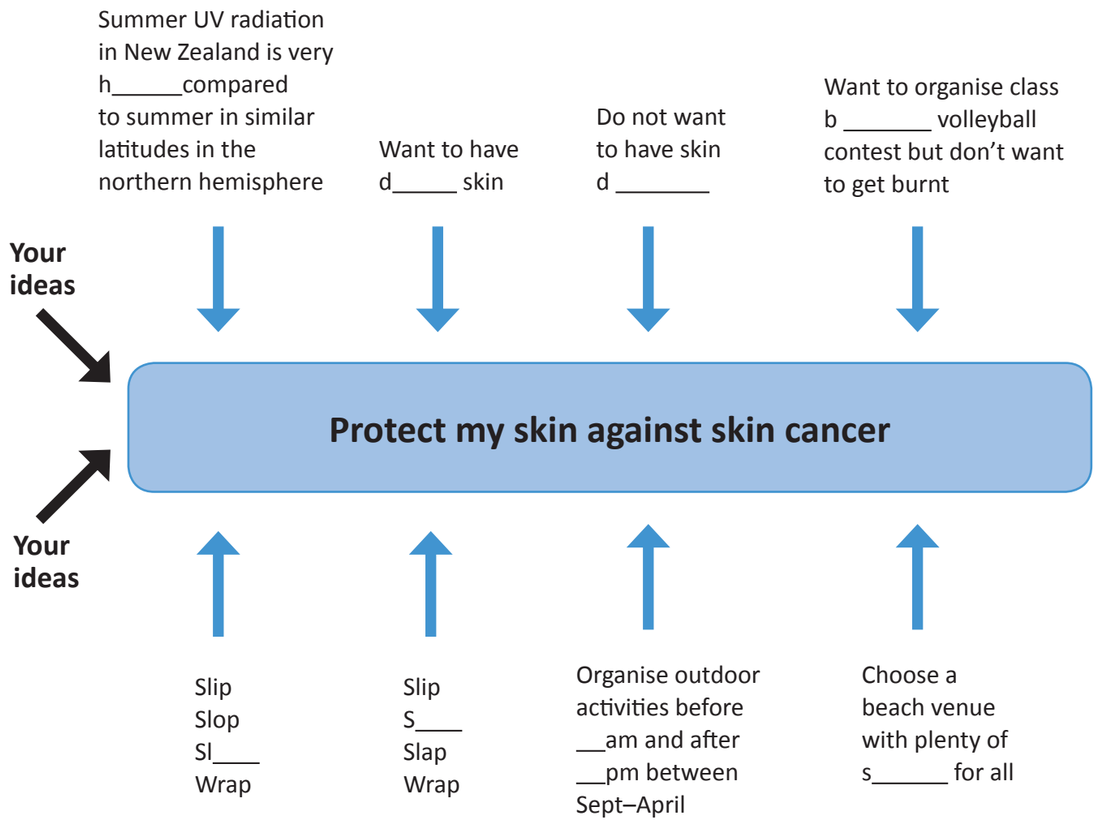
The concept of beauty has been shaped over thousands of years by religion, economics, art, music, politics and scientific discoveries. Even though the concept of beauty changes with time, the determination to achieve the 'ideal' image of beauty remains the same. In the last century, tanning became fashionable, and hopefully in the next century, we can change that.

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, Asia and India.
4. Coco Chanel received a tan while on holiday.
5. Dark skin was associated with serfdom and toiling in fields all day.
6. 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.



Lesson 6, Resource 9
Challenges and solutions

So far, we have identified a number of challenges we face living in New Zealand's harsh sun. Fill in the missing words below.



Thinking like SunSmart scientists

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

Energy from the sun includes heat, light and UV radiation. UV radiation cannot be seen or felt.

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.

Assessment Opportunities	Structure
Lessons 7–9 We are successful when we can: • explain how science can help us to find out about and understand the centre of our solar system • share what we already know about the sun and where/how we gained that knowledge • view and analyse secondary sources • carry out a plan of action to test our ideas • prepare equipment to use in investigations • understand that our senses help us collect data • use the data we collect to make explanations • use tools and measurements to describe change • explain the relationship between exposure to the sun and changes in size, colour and temperature • use our data to think about what is happening and why.	**Lessons 7–9** Students will have amassed quite a body of information about the sun. Some of this will be from media messages, previous school studies, personal interest and personal experience. The focus of these lessons is to help students to surface their present understandings and knowledge and to identify how they know what they know. Directing students in an explicit way will draw their attention to how, as humans, we draw upon multiple sources to make sense of the natural world. This series of lessons will add to their present understanding/knowledge of the sun by asking students to engage with and analyse a number of texts and the information/ideas present. They will need direction to think about these texts not just as sources of facts/information but to consider what knowledge/understandings were required in order to construct them. Students should be encouraged to think about how successful the examples are. Asking the students to identify what they know as a result of personal experiences/noticings re the sun will help to reinforce that scientific understanding. Knowledge starts with observations. **The empirical nature of science** This means that science is based on and derived from observations of the world around us from which interpretations are made. Scientists depend on empirical evidence to produce scientific knowledge. Any scientific explanation must be consistent with empirical evidence, and new evidence brings the revision of scientific knowledge. http://www.sciencelearn.org.nz/Nature-of-Science/Tenets-of-the-nature-of-science Building student knowledge about how scientists gain knowledge with regards to the sun and by participating in guided and student-designed investigations will enable them to have confidence to make decisions about how they manage their exposure to the sun's energy. **Just how powerful is our sun?** • What we already know about the sun. • How science can help us to find out about and understand the centre of our solar system. **Lesson 7** **Prepare:** Preview the following sources: Our solar system http://solarsystem.nasa.gov/planets/ This interactive chart from NASA allows students to see how the sun is central. Clicking on each planet, orbital pathways, etc. gives a brief synopsis of the information embedded in this chart. It may be useful to allow students time to navigate this chart at another time. The surface of the sun as you have never seen it https://www.youtube.com/watch?v=bM7bcSD4K8o&feature=youtube_gdata 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

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=bM7bcSD4K8o&feature=youtube_gdata and http://solarsystem.nasa.gov/planets/

- Organise students in groups of four. Supply each student with paper strips to record/draw what they know about the sun (Resource 10a). 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 use Resource 10b and 10c to 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:

- Once each group has completed the activity, 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 is a major source of energy. This means we need to think about how that energy changes both living and non-living things. SunSmart people are aware that this energy defines our individual skin story. The type of skin we have is linked to our heritage (skin type), and what we do to our skin (avoiding over-exposure that leads to sun damage, both on the surface and deeper, leading to premature ageing, skin lesions, carcinomas. Link back to previous lessons (e.g. Fitzpatrick skin types, Resource 3).

10 things I know about the sun

Write down 10 things you know about the sun

1.....

.....

2.....

.....

3.....

.....

4.....

.....

5.....

.....

6.....

.....

7.....

.....

8.....

.....

9.....

.....

10.....

.....

Instructions:

1. Write down 10 things you know about the sun.
2. Cut each of the above 10 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 we know about the sun from secondary sources

Lessons 7–9, Resource 10c

Things we know about the sun from our experiences

Structure

Prepare
Lessons 8–9

Teacher to view clips and apps before use in class:

https://www.youtube.com/watch?v=bM7bcSD4K8o&feature=youtube_gdata

https://voicethread.com/

or Fotobabble http://www.fotobabble.com/ or a storyboard app.

The sun is a mass of incandescent gas/ They might be giants
http://www.youtube.com/watch?v=3JdWlSF195Y
or try http://www.youtube.com/watch?v=me06I9GDM_k
Sun Safe Play Everyday
http://www.youtube.com/watch?v=Zc2wE5dVx3Y
Sun Safety – Who's at risk of skin cancer?
http://www.youtube.com/watch?v=Mk_NM5V7Bas

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

Connect:

Introduce the clip Surface of the Sun As You've Never Seen It and provide students with transcript of the voice over (Resource 11).
Tell students: 'This clip uses NASA footage. There is a common misunderstanding that scientists can only use facts to describe things that they notice, investigate and want to explain about the natural world. However, the work of science is carried out by human beings, and all human beings respond to events and things that fill us all with awe and wonder.'
Ask them to think about how the three elements of visuals, voice and music work together to convey just how amazing and powerful our sun is.
Read through the transcript before viewing. In groups, students can identify poetic language and content-specific language. Do these two approaches work well together?
Remind students to think about how different techniques are used to add a level of engagement with the content. View Surface of the Sun As You've Never Seen It
https://www.youtube.com/watch?v=bM7bcSD4K8o&feature=youtube_gdata
On Resource 11, record words they would use and what wonderings they have about the sun as a result of this clip.
Was the clip successful in creating interest and adding ideas and facts?
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:

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 should this information be factored into our decision-making around our exposure to the sun's energy?
Using a compilation of sun images, students can make presentations that reflect poetic and content-specific language. Use Voicethread https://voicethread.com/
or Fotobabble http://www.fotobabble.com/ 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

Structure

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, students need opportunities to practise this kind of approach and to share the thinking that is generated as a result. Scientific understanding/knowledge is cumulative and also tentative. Ideas are tested and sometimes revisited as new information comes to hand.

View clip The sun is a mass of incandescent gas http://www.youtube.com/watch?v=3JdWlSF195Y or try http://www.youtube.com/watch?v=me06I9GDM_k)

- 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. 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 clips http://www.youtube.com/watch?v=Zc2wE5dVx3Y and http://www.youtube.com/watch?v=Mk_NM5V7Bas
Use similar analysis as above. Focus on what information is conveyed, who the message is aimed at and whether it is successful. 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
Sunlight investigation

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

Structure

Lessons 10–12

These 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.

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?

Part A

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

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:

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 a 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 12a. 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 12a.
- Place two plants in each location. Ensure that each specimen is labelled (1, 2, 3, 4, 5 or 6) so that the group can identify their plant. Students should organise who will take photos and record observations.
- Group to take photos of each plant every 2–3 days for 2 weeks and make a wall display of the picture diary. Record student plant progressions under photos.
- At the end of 2 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.

Structure

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 12b).

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 bands.
- Instruct students to wrap their cans.
- Distribute student recording chart (Resource 12b). 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 $1^1/_2$ 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 $1^1/_2$ 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. Ultraviolet radiation from the sun can change and damage our skin. We need to be SunSmart when we are exposed to the sun.**

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 12a
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

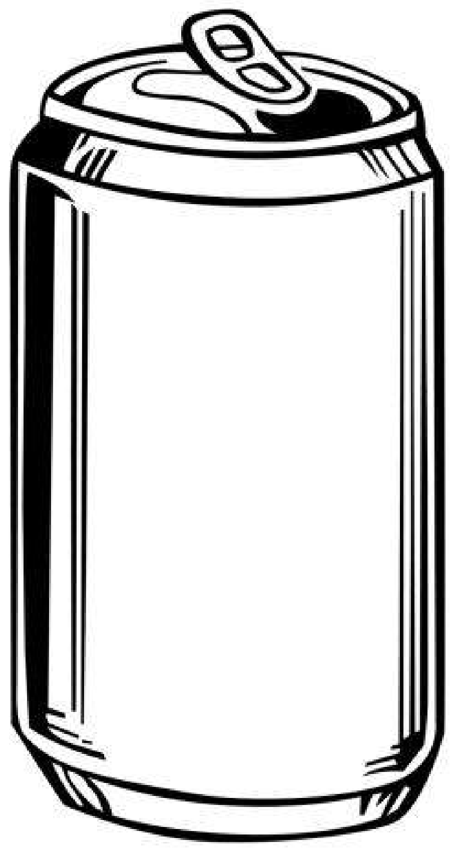
Measurement of biggest leaf: ....
Colour of biggest leaf: ....
Measurement of smallest leaf: ....
Colour of smallest leaf: ....
Height of plant: ....

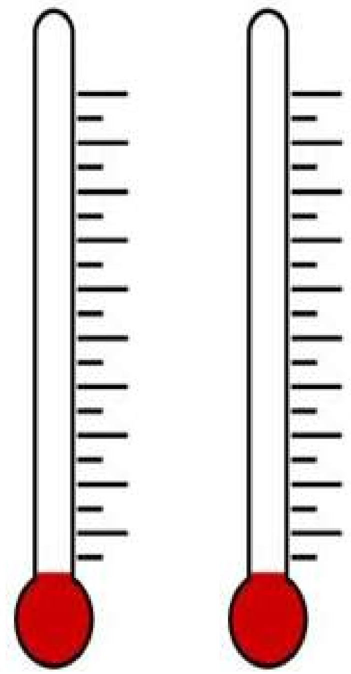
In the sun/no sunlight/shade
DAY : DATE

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 12b
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 12

Prepare:

- Resource 13 recording sheet (one per student)
- Coloured 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 or felt, 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 UV radiation, 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, its harmful effects on our skin will be obvious.

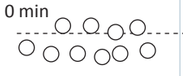
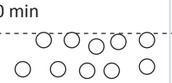
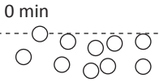
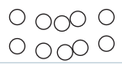
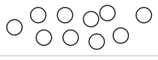
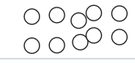
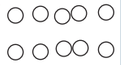
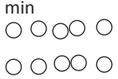
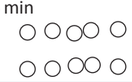
Activate:

Work in groups of four.

1. Hold up a box. Inside this box, there are some small ziplock bags containing UV beads. 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 UV radiation in three different locations – exposed to sunlight next to the window, exposed to full sunlight outdoors and exposed to sunlight 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 coloured 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 10 beads. These beads and bags will be required again for another investigation.
5. Take 5 minutes to discuss locations and roles. Share tasks.

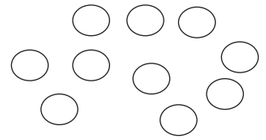
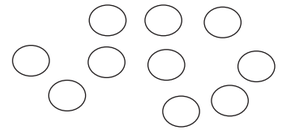
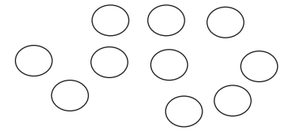
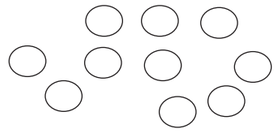
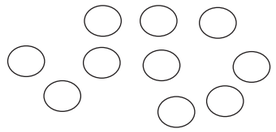
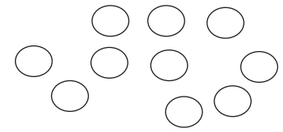
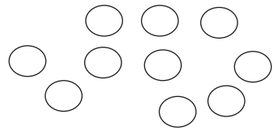
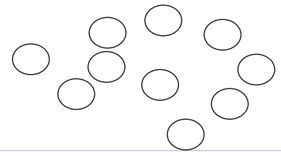
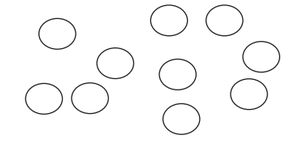
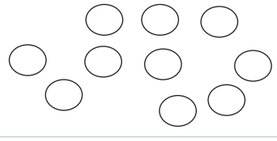
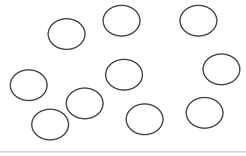
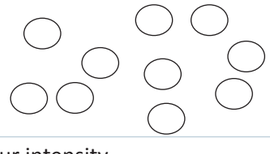
Consolidate:

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?

Shade	Windowsill	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 

Lesson 13, Resource 13
UV bead recording sheet

UV bead detectives

SHADE	WINDOWSILL	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
Lesson 14 **We are successful when we can:** • demonstrate how scientists can use chemicals to reveal the presence of something that is not visible to the naked eye • use our science experiences to inform our SunSmart choices • explain that light from the sun is made up of a mixture of many different colours of light, even though to the eye the light looks almost white • carry out an action and test our ideas • use the results of the experience to explain the presence of UV radiation in sunlight.	**Lesson 14** **Teacher note: The most dramatic results will occur around noon when the sun is directly overhead and in summer.** **Prepare:** • Two clear, plastic cups per group • Use permanent marker to label one cup T and the other W. Provide a cup labelled T and a cup labelled W to each group. • 1 litre of tonic water. • 1 litre of tap water. • Black paper, polythene, felt or cloth (approximately 21 cm x 30 cm). **Connect:** We have learnt that we cannot see or feel UV radiation. Today, we are going to use the quinine in tonic water to show that there is UV radiation 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 UV radiation and then reflect this back so that we can see that part of the light spectrum that is usually invisible to our naked eye. **Activate and demonstrate:** Students follow the instructions in Resource 14a. 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. **Consolidate:** The following is a guide for teacher questioning. Looking at the top 5cm of the liquids, what do you see? (The upper centimetres of the tonic water cup should "glow" blue.) 1. Did both liquids appear the same? (No, the tap water should show no change.) 2. 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.) 3. What is contained in the sunlight that causes the observed results? (Ultraviolet radiation.) 4. 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.) 5. Have you observed similar occurrences in other materials? (Answers will vary. Some students might be aware of the fluorescence of minerals under UV light.) 6. How might the position of the sun affect your results? (The higher the sun is in the sky, the shorter the path length through the atmosphere (ozone layer), allowing more ultraviolet to get through.) You may want to consider doing this activity at different times of the day so that students can compare the differences.

Lesson 14, Resource 14a
Tonic water detective reveals UV radiation

Your teacher will give your group two clear plastic cups. One is labelled T and the other is labelled W.

- Fill the tonic water cup (labelled T) almost to the brim.
- Fill the tap water cup (labelled W) 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 Resource 14b.

Questions

Looking at the top 5 cm of the liquids, what do you see?

Do both liquids appear the same?

Try looking at the cups and without the black paper/polythene/felt/cloth. Does this affect your observation?

Consolidate:

Complete Resource 14b, showing the two cups used in the investigation. Label. Use symbols to indicate the passage of light into each cup.

Share your drawings and annotations with the group. Decide whose diagram best illustrates the equipment, the result and the passage of light.

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 UV radiation

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 (Resource 16).
Equipment needed for teacher: timer or watch.

Connect:

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.
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:

Day 1:

The tracing of the human gnomon will need to be done at regular intervals, e.g. every 2 hours, on the hour, starting at 9am.
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).
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-coloured chalk. Take a photo and record the prediction on the charts.
6. At 2.00pm, 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?

Teacher note: Remember, the shorter your shadow, the higher the UV index.

Lesson 15, Resource 15
Shadow images

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? _____

Lesson 16
Protective potions sunscreen investigation

Overview: We are investigating the effectiveness of commercially prepared sunscreen.

Assessment Opportunities	Structure
Lesson 15 **We are successful when we can:** • carry out an action and test our ideas • use data we collect to make explanations and decisions • use data to explain which sunscreen is the most effective. Teacher note: The Cancer Society recommends 1 teaspoon of sunscreen per limb and 1 teaspoon for the body (this is based on an average person of 65kg and is 35 ml for one full body application).	**Lesson 15** **Prepare:** • 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 experiments have been completed. • A teaspoon (5 ml) of sunscreen for each group of students. Each group will have four samples of four different sunscreens labelled 1, 2, 3 and 4. • Sunscreen testing results. • Five ziplock plastic bags. • Five sets of UV beads. • Camera. **Activate:** Students read the information and complete the tasks on Resource 17a. **Demonstrate:** • Each group of students receives a sample of each of the four commercial sunscreens labelled 1, 2, 3, 4. • In total, they will have four commercial samples. • Students photograph UV beads before placing in the bag. Place UV beads in each of the five plastic ziplock bags. • 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 four plastic bags containing UV beads and smeared in one of the samples plus one bag with no sunscreen. • What do students predict will happen? • Students place the five plastic bags in direct sunlight from 10am in the morning until 2.30pm. • 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 Resource 17b and answer the questions. • Were there any surprises?

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. Apply sunscreen generously at least 20 minutes before sun exposure. Reapply sunscreen frequently and every 2 hours especially after swimming, towelling, exercising and perspiring. Swimming and sweating can remove sunscreen.

Task 1
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
Click on 'Test Yourself' and find out how much you already know about sunscreens.

Task 2
Go to: http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/sunsmart/brainiac/sunscreen_chemistry.htm
Click on 'Check This Out'. Are any of these sunscreens suitable? Click on the labels to find out.

Lesson 16, Resource 17b
Sunscreen recording sheet

In this experiment, we are using UV beads to indicate whether the sunscreen has stopped UV rays going through a 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 four 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.
- In total, you will have four commercial samples
- 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 ziplock 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 four plastic bags containing UV beads and smeared in one of the four samples plus one bag with no sunscreen.
- 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. No sunscreen		

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
Sunhat investigation

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

Assessment Opportunities	Structure
Lesson 17 **We are successful when we can:** • use our knowledge of how UV beads work to test a variety of sunhats	**Lesson 17** Investigating the effectiveness of sunhats made of different materials. **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?** **Prepare:** 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. **Connect:** 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 UV radiation by providing a means of blocking the light. We are encouraged to wear sunhats. In New Zealand schools, Term 4 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 style features do they have? Discuss in your group." **Activate:** In their group, the students complete Resource 18. 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: • photos as evidence • full sun • a 30-minute time period. **Consolidation:** 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?

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

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

Assessment Opportunities	Structure
Lessons 18–22 **We are successful when we can:** • work co-operatively as part of a group • identify possible challenges with the interview process and provide solutions • identify and demonstrate effective interviewing techniques • give and receive constructive feedback • make improvements based on the feedback received • demonstrate the oral, reading and written communication skills required to conduct a survey (asking people to take part, reading questions clearly, recording answers).	**Lessons 18–22** **Connect:** • At what time of year and day is UV radiation strongest in New Zealand? • At what time of the year and day is UV radiation strongest where we live (i.e. UVI 3 or more)? • What do we know about how UV radiation affects our skin? • What can we do to protect our skin from UV radiation? Complete Resource 19a, 19b, 19c and 19d (which has more than one correct answer – discuss). Answers to Resource 19b: 1. burn, 2. damage, 3. kill, 4. sunburn, 5. skin, 6. darkens, 7. cancer, 8. up, 9. objects, 10. destroy Read Resource 19d together. Revisit Resource 4a. Are there any changes you would like to make to your answers? **Procedure:** Work through Resource 20, Teacher's Notes and have students complete the survey using Resource 21. 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. Work through Resource 22, Teacher's Notes and Resource 23, Teacher's Notes. Students develop a presentation about how to protect yourself from UV radiation (Resource 24). **Consolidation:** Presentation to peers and whānau (Resource 25).

Writing a bio poem

Read the sample bio poem below and how it was made.
Then use the template provided on the next page to develop your own bio poem about vitamin D.

Amalie "Emmy"

German mathematician and teacher;

Loving, innovative, inspiring, intelligent, pacifist;

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

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

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

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

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

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

Who lived in Germany from 1882 to 1933 and fled to the U. S. from 1933 until her death in 1935.

During the Nazi rule because she was a Jewish, liberal woman.

Noether

The student above developed the poem by completing the following template.

BIO POEM – TEMPLATE

Line 1	Mathematician's first name
Line 2	Description
Line 3	Four characteristics of this person
Line 4	Contemporary of _____(minimum 2 other people)
Line 5	Keenly interested in_____(minimum 3 areas)
Line 6	Who wrote_____(titles of books or other writings)
Line 7	Who is remembered as/for_____
Line 8	Whose contributions include_____
Line 9	Who wanted or wanted to change_____
Line 10	Who lived in_____(geographical and time reference)
Line 11	During_____(historical reference)
Line 12	Last name

Sample of a Bio-Poem written by a student

Bio poem on vitamin D

Now write your own bio poem. You will need to read the information on the following sites in order to complete the bio poem. http://www.cancernz.org.nz/assets/files/info/SunSmart/VitaminD_Q&A_14Mar2012(1)(1).pdf
http://www.cancernz.org.nz/reducing-your-cancer-risk/sunsmart/vitamin-d/
http://www.cancernz.org.nz/assets/files/info/SunSmart/IS_VitaminD_14Mar2012.pdf

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

Lessons 18–22, Resource 19b
Top 10 ways that the sun can damage your health

In groups of three, identify 10 ways that too much sun can damage your health. Use all the knowledge and observations you have made to complete the statements below by putting in the missing word.

1. The sun's UV radiation can _____your skin.
2. The sun's UV radiation can _____your eyesight.
3. The sun's UV radiation can _____ skin cells.
4. The sun's UV radiation can cause _____, which destroys the top layer of your skin.
5. The sun's UV radiation ages our _____ .
6. When exposed to the sun's UV radiation, skin produces more of the brown melanin, which _____the skin and gives us limited protection.
7. Over-exposure to the sun's UV radiation causes at least 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.

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.	A. Snow, pool water, concrete and the surf all reflect UV radiation.
2. Wear a broad-brimmed, bucket hat or a cap with flaps.	B. UV radiation can affect our eyes.
3. Wear a long-sleeved shirt.	C. The UV radiation index (UVI) is highest between September to April (especially between 10am and 4pm) in New Zealand.
4. Wear broad-spectrum sunscreen of at least SPF 30 or above.	D. New Zealand and Australia (southern hemisphere) have less ozone overhead than in the northern hemisphere, which is one of the reasons why more UV radiation reaches us.
5. Wear lip balm with a sunscreen in it or zinc on lips and nose.	E. Humans with fair skin burn faster in the sun and need to cover up most of their skin.
6. Wear wrap-around sunglasses.	F. Water reflects UV radiation.
7. When going to the beach or a pool, wear a dark-coloured rash shirt for better UV radiation protection.	G. The skin on our face and eyelids is very delicate and thinner than it is on other parts of our body.

Slip, Slop, Slap, Wrap

Ways we can protect ourselves from the sun.

SLIP into some sun-protective clothing – a shirt with a collar and sleeves – and into some shade

SLOP on some sunscreen – broad-spectrum of at least SPF 30

SLAP on a broad-brimmed or bucket hat or a cap with flaps

WRAP on a pair of sunglasses – make sure they meet the Australian/New Zealand standard

Preparing for and conducting a survey

Let's find out what SunSmart actions 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 the person, muffled voices, speaking too quickly. Create a checklist of interview technique reminders.

- In groups of 4, students interview each other and record their findings on the survey sheet (Resource 21). One student to conduct interview, one to record, and one 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 for their survey so that they get different ages, genders and ethnicities using the structure shown below.

People to survey	Male/Female	Who in our group is responsible	Completed
5–10 years old Ethnicity:			
11–20 years old Ethnicity:			
21–30 years old Ethnicity:			
31–50 years old Ethnicity:			
51 years or over Ethnicity:			

Lessons 18–22, Resource 21
SunSmart survey

Name _____

Male	Female

Age group

5–10	11–20	21–30	31–50	51+

Ethnicity

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

SunSmart Action	Never	Sometimes	Always
Stay in the shade between 10am and 4pm Sept–April			
Wear a broad-brimmed, or bucket hat, or cap with flaps			
Wear a long-sleeved shirt			
Wear broad-spectrum sunscreen of at least SPF 30			
Wear lip balm with a sunscreen in it or zinc on my lips and nose			
Wear wrap-around sunglasses			
Wear a rash shirt when near or in the water			

Lessons 18–22, Resource 22, Teacher's Notes
Analysing results

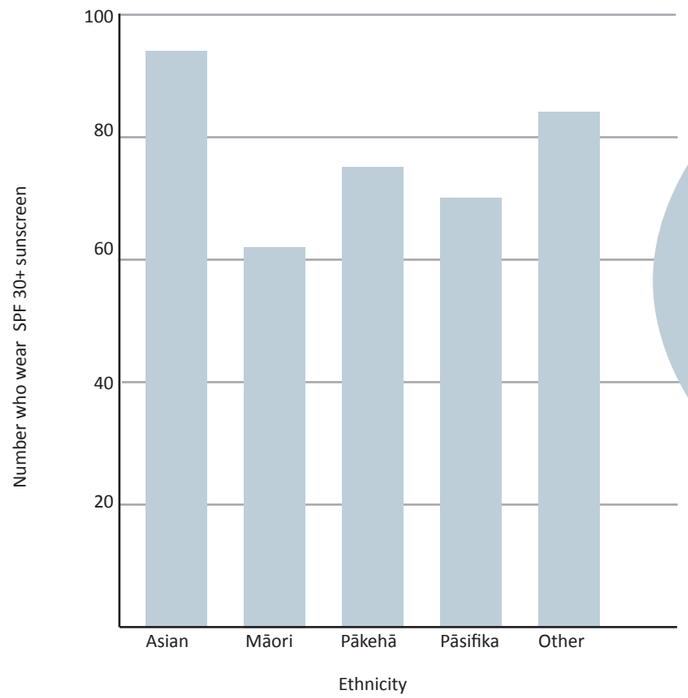
Students collate their results (for the five people they surveyed) by tallying up the totals on their spare survey sheet. Teacher asks each group;

- 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, Teacher's Notes
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 are:

- Slip on a collared shirt with sleeves and into the shade
- Slop on broad-spectrum SPF 30 sunscreen
- Slap on a broad-brimmed hat
- Wrap on wrap-around 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 could also review their school's sun protection policy to see if it fits with the Cancer Society minimum criteria – see "steps to becoming a SunSmart School" and http://www.sunsmartschools.co.nz/schools/accreditation/become-a-sunsmart-school

Students then work with their group to decide:
a) how they will present the findings from the survey
b) their message to encourage the school community to use all SunSmart actions
c) how to develop our schools SunSmart policy.

They could present their message as a short film or cartoon (see http://www.youtube.com/watch?v=8nX7Ik_xo04).

See Resource 24 for a presentation plan and Resource 25 for a group reflection sheet:
http://www.sunsmartschools.co.nz/schools/accreditation/become-a-sunsmart-school
http://sunsmartschools.org.nz/schools/accreditation
http://sunsmartschools.org.nz/schools/accreditation/become-a-sunsmart-school

Useful link: http://www.sunsmartschools.co.nz/teachers/video/results

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 school?
5. Strategies for effective group work
6. Essential group dynamics
7. Social skills score cards – Levels 1–4

Resource 26
Group work – what works

1. 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 their 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.

2. 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 you talk, form the group quickly, take responsibility for your own and the group's behaviour, resolve conflict constructively
4. Remember, you 'sink or swim' together
5. Each group member is responsible to the group for contributing their fair share
6. Each group member is responsible for the outcome – they need to show up to class
7. Be patient with those who find it difficult to understand the first time

Group members:

List of rules for our group:

My role in this group is: _____

Signed: _____

Date: _____

Resource 26
Group work – what works

3. 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 sank		We worked together to ensure that we swam rather than sank	
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	

4. What group work strategies are effective in your school?

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 outcast; 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

5. Strategies for effective group work

1. **Group size**
   Maximum 5 (3 or 4 is ideal).
2. **State objectives and set goals**
   For example, give each group an egg, 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 6. 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.

6. Essential group dynamics

Below is a list of essential elements important to establishing a co-operative group. These will be important when working together in groups or as a class.

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								

Social skills score card
Level 3

Student's name:
Date:

	Interviewing	Coaching	Teaching	Negotiating	Brainstorming	Resolving conflict	Building on others' ideas	Being trustworthy
Student								
Peer								
Teacher								

Social skills score card
Level 4

Student's name:
Date:

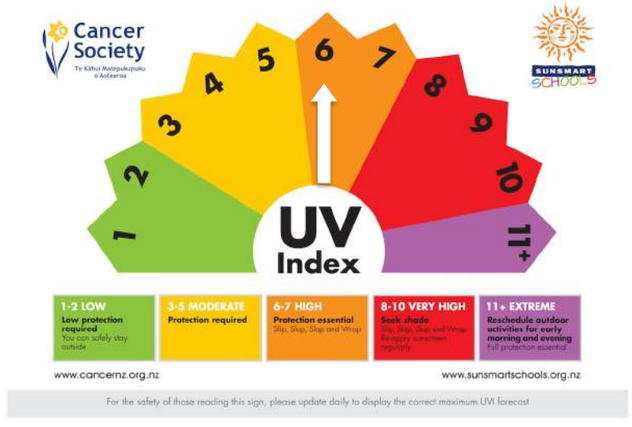
	Creative group problem-solving	Planning and organising	Decision-making	Negotiating curriculum	Research	Resolving conflict	Accepting others' differences	Being trustworthy
Student								
Peer								
Teacher								

How to monitor the UV Index Board

The UV Index (UVI) Board is a great tool students can use to monitor UV radiation levels for your area.

How to use:

1. Go to http://www.niwa.co.nz/UV-forecasts
2. Click on the nearest town/city to your school
3. Once you have clicked on the town, information will be displayed that will show:
   - the date today
   - the maximum (clearsky) UVI forecast for the day
   - the location
4. Measure across from the top of the bell-shaped curve to the UVI number on the left side of the graph. This number is the maximum UVI for the day.
5. Move the arrow on your board to display the maximum UVI for the day



For more information on sun protection in schools, visit the SunSmart Schools website http://www.sunsmartschools.co.nz/

Cancer Society

Cancer Society
Te Kāhui Matepukupuku o Aotearoa

SUNSMART SCHOOLS

Tips and Ideas

Update the UV Index Board every morning to display the correct daily maximum UV forecast.	**Include the daily UV Index in other school activities**, e.g. at school, assembly, on school radio, on PC's, in school newsletters, etc.
Think about the best place to display the sign. As many students as possible need to see the sign. It's also useful to place it somewhere that parents and visitors can see it. This will help reinforce what is being taught at school.	**Students could think up other visual ways of displaying the UV Index level.** Each level could have a different brightness of sun, or pictures of trees, hats, etc. could be put up on a board to show what type of protection is needed when the day has a higher level of UV radiation.
Mapping the UV Index for the year according to month is a great idea to get the students to monitor and to see the pattern that the UV Index can take. This could be used for further discussion.	**Seeing the UV Index each day**, even when it is cloudy, helps students to understand why they need to protect themselves not just from bright sun but also from UV radiation between September and April.
Update the board every day throughout the school year, not just in the summer months. This will help students to understand the reasons why wearing hats and other SunSmart behaviours are required during Terms 1 and 4 (as New Zealand has a very high UV Index during these terms).	

For more information on sun protection in schools, visit the SunSmart Schools website http://www.sunsmartschools.co.nz/

First, have a commitment to improving sun safety in your school community.

Complete the online SunSmart Schools Accreditation Application to see how well your school is doing at meeting the Cancer Society's minimum criteria for accreditation. You will need your school's MoE number:
http://database.sunsmartschools.co.nz
Review your school sun protection policy. A sample policy is provided here: http://www.sunsmartschools.co.nz/schools/accreditation/become-a-sunsmart-school
Submit your sun protection policy online
OR
download the printable application form http://www.sunsmartschools.co.nz/schools/accreditation/become-a-sunsmart-school
Attach your current sun protection policy.
Send the application form and your policy to your local division of the Cancer Society by email or post.

After you have applied for accreditation your local Cancer Society health promoter will contact you. They will advise you if there are areas to be included/amended in your policy to meet the minimum criteria for accreditation. Once you have made any necessary changes, your policy can be resubmitted online.
Once you have become accredited, you will receive a SunSmart Schools Accreditation Certificate, a sign for your school building or gate and a media release for your local newspaper.

Minimum criteria for SunSmart schools accreditation

The sun protection policy is implemented during Terms 1 and 4, when ultraviolet radiation levels are most intense.
All staff, students and parents/caregivers are to be informed of the sun protection policy and its intended practices.
All students wear broad-brimmed (minimum 7.5cm brim), legionnaire or bucket hats (minimum 6cm brim, deep crown) when outside.
See: http://www.sunsmartschools.co.nz/schools/hats.
Students not wearing a hat are required to play in allocated shade areas.
The use of broad-spectrum sunscreen of at least SPF 30 is encouraged.
The use of sun-protective clothing is encouraged (e.g. shirt with sleeves and a collar).
Staff are encouraged to act as role models by practising SunSmart behaviours.
SunSmart education programmes are included in the curriculum at all levels every year.
The sun protection policy is reflected in the planning of all outdoor events (e.g. camps, excursions, sporting events).
Outdoor activities are rescheduled, whenever possible, to minimise time outdoors between 10am and 4pm.
The school has sufficient shade or is working towards increasing the number of trees and permanent shade structures to provide adequate shade in the school grounds.
You can find some helpful tips and documents here: http://www.sunsmartschools.co.nz/schools/shade

The board of trustees and principal review the sun protection policy regularly, including making suggestions or improvements at least once every 3 years.

Steps to becoming a SunSmart school

SunSmart policy

A comprehensive sun protection policy for schools covers the following four areas:

- Behaviour – reducing exposure to ultraviolet radiation e.g. through use of sunhats, clothing, broad-spectrum sunscreen of at least SPF 30.
- Environment – promoting the provision and use of shade and rescheduling activities.
- Curriculum – educating about sun protection and skin cancer prevention.
- Policy review – undertaking review at least 3 yearly.

A SunSmart policy needs to:

- be developed in consultation with the whole school community of board of trustees, staff, students, parents and caregivers
- outline the way in which the school will protect students and staff from the harmful effects of ultraviolet radiation
- meet the minimum criteria for SunSmart Schools accreditation with regard to behaviour, curriculum, environment and policy review.

To help you develop a comprehensive sun protection policy, a sample policy is available for download here:
http://www.sunsmartschools.co.nz/schools/accreditation/become-a-sunsmart-school

Evaluation of your sun protection policy

The Cancer Society's role is to encourage and assist schools to become sun safe, not to judge or compare progress with other schools.
Your school's application form and sun protection policy will help the Cancer Society assess your school's existing sun protection strategies to assist schools to become accredited.
Not every strategy in the application form needs to be included in your policy. The assessment will be based on the minimum criteria for SunSmart Schools accreditation.

Working towards meeting the criteria for SunSmart Schools accreditation

Some schools' existing sun protection policy will already meet the criteria for SunSmart accreditation.
Other schools may need to review their existing sun protection policy to meet the minimum criteria (or develop a new policy if they do not already have one). It is important that the whole school community is involved in the development of the policy so there is a commitment to it. For some schools, it may take a period of time to develop a policy that covers all areas of the essential criteria. There is no time limit by which a school has to become accredited.

Contact your local Cancer Society centre to help you with your application and to develop a policy that meets the minimum criteria for SunSmart Schools accreditation.

Sample SunSmart Schools Accreditation Policy for Primary and Intermediate Schools

Why we need this policy

New Zealand has among the highest melanoma rates in the world. Excessive exposure to ultraviolet radiation (UVR) from the sun causes sunburn, skin damage and increases the risk of skin cancer. Getting sunburnt in childhood and adolescence will increase the risk of melanoma and other skin cancers in later life.

This sun protection policy will apply during Terms 1 and 4, (especially between 10am and 4pm). However, from the beginning of September UVR levels are increasing. Therefore, sun protection should be used in September when children are outdoors for extended periods (e.g. sports days). During the winter months sun protection is not usually needed except at high altitudes in highly reflective environments, for example, in snow, or skiing.

This policy is adopted from (DATE) so that children attending (SCHOOL NAME) are protected from excessive exposure to UVR from the sun.

Being SunSmart

- Require children to wear broad-brimmed (minimum 7.5cm), legionnaire or bucket hats (minimum 6cm brim and a deep crown) when they are outside (for example, during interval, lunch, sports, excursions and activities).
- Provide hats for children to borrow.
- Encourage students to wear clothing that protects their skin from the sun even when out of uniform (for example with sleeves and collars, and rash tops when swimming outside).
- Implement a "No Hat, Play in the Shade" policy. Require children without hats or with bare shoulders to play in the shade or indoors.
- Work with the school community to promote students□ use of SPF 30+ broad-spectrum sunscreen.[1]
- Make sunscreen available to students at school outdoor activities, particularly at sports days and similar events.
- Encourage all staff to role model SunSmart behaviour, for example use appropriate hats within the school grounds and during outdoor school activities.
- Regularly publicise and reinforce the SunSmart Policy (for example through newsletters, school website, parent meetings, and student and teacher activities).
- Talk to parents about the school□s SunSmart Policy at enrolment and encourage parents to practise SunSmart behaviour, i.e in school newsletters and enrolment packs.

A Curriculum that includes SunSmart education

- Include SunSmart education and activities as part of the schools curriculum at all levels each year. For curriculum resources visit the SunSmart Schools website www.sunsmartschools.co.nz

Building a SunSmart environment

- Work towards developing and improving existing shade in areas where students gather. Shade can be both built (shade verandas) and natural (trees).
- Include a sun exposure assessment in the Risk Analysis and Management system for any Education Outside The Classroom (EOTC) plan for outdoor activity.
- Hold outdoor activities in areas with plenty of shade whenever possible.[2]
- Consider the possibility of rescheduling suitable outdoor events/activities to early morning / late afternoon.
- Allow children access to indoor shade such as indoor sports and recreational facilities/gymnasia during lunch breaks.

Supporting and evaluating SunSmart behaviour

- Ensure on-going assessment of SunSmart behaviour, shade and curriculum emphasis.
- The Board of Trustees and Principal will review the schools SunSmart policy at least every three years.

1. Sunscreen should not be the only or primary form of sun protection.
2. The highest clear-sky UVR levels occur around the middle of the day. The Cancer Society recommends planning trips to venues with adequate shade or providing your own shade (umbrellas or tents).

Policy prepared by: _____ (Name or title e.g. BoT) on

Policy approved by: _____ (Name or title e.g. BoT) on

Policy will be reviewed on_____

SUNSMART SCHOOLS

Cancer Society
Te Kāhui Matepukupuku o Aotearoa