UV radiation and sun protection in *secondary schools*

Suggested level: Year 7–8 Mathematics

Driving question

Why do secondary schools need to be concerned about ultraviolet (UV) radiation and the risks associated with exposure to UV?

Learning Intention

To be able to apply my understanding and knowledge of probability and statistics to develop a comprehensive sun protection policy.

Success Criteria

- ✓ I can construct and compare a range of data displays.
- ✓ I can interpret statistics in the context of the data provided.
- ✓ I can describe data displays using mathematical terminology.
- ✓ I can identify and explain the issues around skin cancer and the purpose of having an established sun protection policy and program.

The Problem

Too much ultraviolet (UV) radiation exposure can cause sunburn, skin and eye damage and skin cancer. UV damage accumulated during childhood and adolescence is strongly associated with an increased risk of skin cancer later in life.

Australia has one of the highest rates of skin cancer in the world. Skin cancer is the most diagnosed cancer in Australia with two in three Australians being diagnosed with skin cancer in their lifetime.

Sun protection is recommended whenever UV levels reach 3 or higher, typically from mid-August to the end of April in Victoria.

For the best level of protection from UV radiation (when the UV level is 3 or above) SunSmart and Cancer Council recommend using a combination of sun protection measures:

- **Slip** on sun protective clothing that covers as much skin as possible.

- **Slop** on SPF50 broad-spectrum, water-resistant sunscreen.

- **Slap** on a sun protective hat that protects your face, head, neck and ears (broad-brimmed, bucket or legionnaire hats).

- **Seek** shade.

- **Slide** on sunglasses that meet AS/NZS1067.

SunSmart have developed the following graphic to simplify the message:

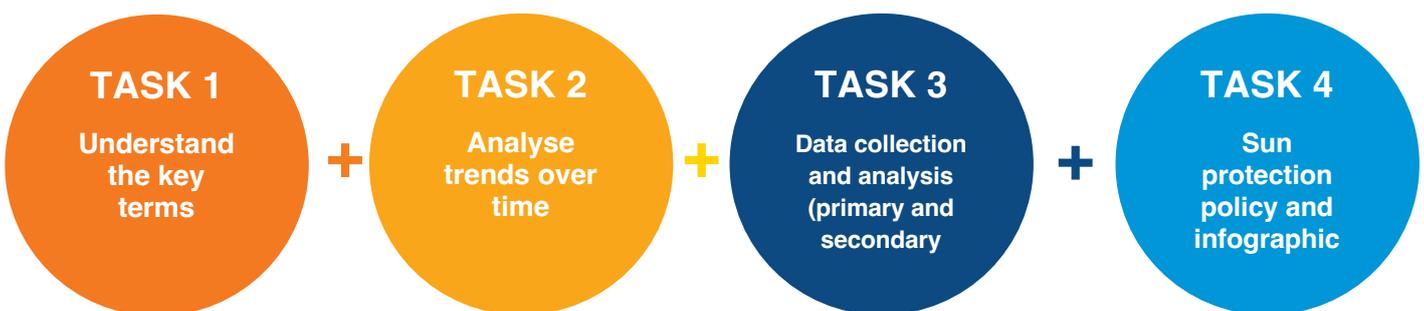| Slip	Slop	Slap	Seek	Slide

In Victoria, approximately 90% of primary schools are SunSmart School members and have a sun protection policy and practices in place. However, as students move into secondary school, parents, teachers, SunSmart and Cancer Council have identified that most students no longer use sun protection measures at school.

As a result, secondary school students have a greater risk of UV exposure and damage. You have been asked to develop a sun protection policy for your school that includes the following:

- sun protection behaviours
- physical and social-emotional environments
- messaging.

In addition to this, design an infographic that can be displayed around your school to encourage students and staff to use sun protection whenever the UV levels are ≥ 3.

TASKS

TASK 1
Understand the key terms

+

TASK 2
Analyse trends over time

+

TASK 3
Data collection and analysis (primary and secondary

+

TASK 4
Sun protection policy and infographic

Write a definition in your own words for the following terms. Use the Cancer Council website **(www.cancer.org.au/cancer-information/types-of-cancer/skin-cancer)** and/or the SunSmart website **(www.sunsmart.com.au/)** to start your research.

- Skin cancer
- Melanoma
- Ultraviolet (UV) radiation
- Prevention

Write a mathematical definition in your own words for the following terms. You may wish to use your textbook or the internet to help you develop your own definition.

- Mean
- Median
- Mode
- Population

Sun protection measures and the trends over time in adolescents

Use the following website link to view **Table 1 Trends in adolescents' weekend sun protection behaviours and sunburn. wiki.cancer.org.au/skincancerstats/Trends_in_sun_protection_behaviours**

Use the information provided in **Table 1: Trends in adolescents' weekend sun protection behaviour and sunburn** and the information provided below, to complete the questions below.

Number of adolescents surveyed:

2003 – 2004	2006 – 2007	2010 – 2011	2013 – 2014	2016 – 2017	Total
n = 699	n = 652	n = 1,367	n = 1,061	n = 894	n = **4673**

Citation: Tabbakh T, Dobbinson S. 2016-17 National Sun Protection Survey: Report 2 Sun protective behaviours and sunburn incidence on weekends among Australians in summer 2016-17. Melbourne, Australia: Centre for Behavioural Research in Cancer, Cancer Council of Victoria; 2018.

Question 1

Between 2003 and 2017 how many adolescents were surveyed in total?

Question 2

In 2003–2004 80% of adolescents surveyed responded that they spent more than 15 minutes outdoors. This fell to 77% in 2016–2017. Identify and explain two factors which may have contributed to this change. In your analysis calculate and state how many adolescents 80% accounted for, versus 77% (round your answers to the nearest whole number).

Question 3

Select three other sun protection behaviours, for example hat use, that adolescents were surveyed about. Describe the trends observed. Calculate and state how many adolescents the sun protection behaviours accounted for in your analysis, for example if 38% of adolescents surveyed wore hats in 2003–2004, this would account for 266 adolescents reporting wearing hats in 2003–2004 (round your answers to the nearest whole number).
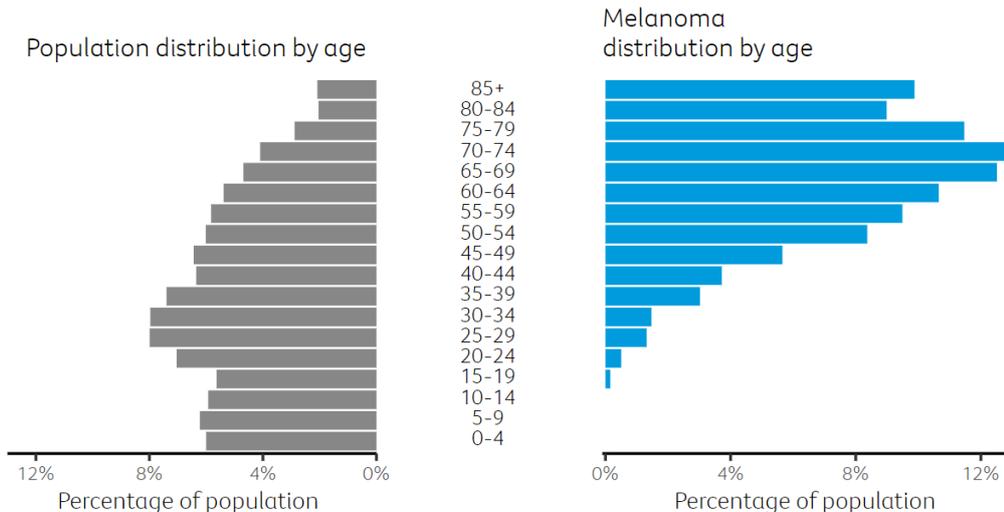
TASK 3

Data collection and evidence

Using the following website link **www.cancervic.org.au/research/vcr/cancer-fact-sheets/ melanoma** view the **2020 Victorian population by (i) age distribution and (ii) melanoma distribution by age** and answer the questions below.

Figure 2: Distribution of melanoma incidence in 2020, compared to the distribution of the Victorian population in 2020, by 5-year age brackets

Source: Victorian Cancer Registry (2022)

Source: https://www.cancervic.org.au/research/vcr/cancer-fact-sheets/melanoma

Question 1

Identify the median of the Victorian population distribution by age (to the closest whole percentage) and Identify the median melanoma diagnosis distribution by age (to the closest whole percentage).

Question 2

Identify the modal melanoma diagnosis distribution by age (to the closest whole percentage).

Question 3

Calculate the approximate number of Victorians who were aged 15 to 19 and 20 to 24 in 2020 using the following website link to assist in calculating your answers **www.population.net.au/population-of-victoria/**

Question 4

Using your answers calculated in Question 3, calculate the approximate number of Victorian people aged 15 to 19 and 20 to 24 who were diagnosed with melanoma in 2020. Show your working out.

Question 5

i) **Evidence collection** – Interview 25 people in your school (students and staff) to complete the table located on the last page. Place an x in the corresponding box if they practice any of the five sun protection measures (Slip, Slop, Slap, Seek and Slide) during a school day. You do not need to identify the person.

   a) Is the information collected and recorded in the table an example of **numerical** or **categorical** data?

   b) Can it be further categorised as nominal/ordinal or discrete/continuous data?

   c) Explain why it is an example of either **qualitative** or **quantitative** data.

ii) Calculate what percentage of people surveyed used each of the different sun protection measures? Show your working out.

Sun protection measure	Slip (clothing)	Slop (sunscreen)	Slap (hat)	Seek (shade)	Slide (sunglasses)
Percentage (%) of people surveyed					

iii) Which sun protection measure represents the modal value? What proportion of the population surveyed does this represent?

iv) Which sun protection measure did people use the least? What proportion of the population surveyed does this represent?

v) Construct a data display e.g, pie chart or a bar chart, to display the data you have collected.

Sun protection policy and infographic

Using the evidence provided and your research data collected and analysed, create a sun protection policy for your school. In your policy make sure to emphasise *why* it is important to have a sun protection policy in secondary schools.

Use student friendly language, graphics (graphs are encouraged) and statistics to support your reasoning.

You may wish to look at the sample school policy provided by SunSmart at:
www.sunsmart.com.au/advice-for/schools-early-childhood/sunsmart-sample-policies
and information on protecting your skin provided by SunSmart at
www.sunsmart.com.au/protect-your-skin

Make sure to include the following in your policy:

- **Purpose** – Why is it important to have a sun protection policy and measures in place at your school? Use the evidence, graphs, statistics and any research conducted to support your purpose.

- **How** does having a sun protection policy and measures in place support your school's mission and vision? You may need to research this one!

- **What** does sun protection look like at your school? What could your school do more of to ensure sun protection is a priority? Be sure to use the five forms of protection (Slip, Slop, Slap, Seek and Slide) recommended by SunSmart and the Cancer Council and tailor it to your school.

TASK 3 Data collection and evidence table

Question 5 – Evidence collection table

	Slip (clothing)	Slop (sunscreen)	Slap (hat)	Seek (shade)	Slide (sunglasses)
1					
2					
3					
4					
5					
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