

UV radiation and sun protection in secondary schools

Suggested level: Year 9-10 Mathematics

Victorian F–10 Curriculum links:
Mathematics
Level 9 and
Mathematics
Level 10

Driving question

Why is it important for secondary school students to be concerned about ultraviolet (UV) radiation and the risks associated with exposure to UV?

Learning Intention

To be able to apply my understanding of probability and statistics to explain the importance of secondary school students understanding the risks associated with UV exposure.

Success Criteria

- ✓ I can construct and compare a range of data displays.
- ✓ I can understand and explain key terms associated with probability and statistics e.g. mean, median and mode.
- ✓ I can construct and compare a range of data displays.
- ✓ I can interpret statistics in the context of data.
- ✓ I can describe data displays.
- ✓ I can identify and investigate the issues associated with UV radiation (skin cancer) and explain the importance of having a sun protection policy and program.



Slip



Slop



Slap



Seek



Slide

The Problem

Data collected from Victorian hospital emergency department presentations for sunburn during summer 2019–20 indicated one in two sunburn presentations were children and adolescents aged 0–19 years.

Furthermore, teenagers represented 32% of all presentations, the highest percentage of all age groups. In the March 2021 media release, the Head of SunSmart said “it was shocking to see so many young people requiring emergency care for sunburn and it was a clear indication that more needs to be done to convince young people this is something they need to take seriously.

We know that UV damage during childhood and adolescence significantly increases the risk of skin cancer. Over time, the damage adds up – the more you’re exposed, the greater your risk. This is not a disease you can afford to ignore at any age. We need to remind young people that what they do today in terms of UV exposure, can have a significant impact on their risk of skin cancer down the track – and it may be sooner than they think.”

As a result of this, you have been approached to develop a presentation for the next whole school assembly that requires you to inform the students at your school on the importance of sun protection protocols and understanding the risks associated with being exposed to UV radiation.

TASKS



TASK 1

Introduction



Australia has one of the highest rates of skin cancer in the world. Two in three Australians will be diagnosed with skin cancer during their lifetime. 99% of non-melanoma skin cancers and 95% of melanoma skin cancers are due to UV exposure.

Question 1

- i) Find out the number of people (both staff and students) that are in your school community.
- ii) Find out how many students are in Years 9 to 12 at your school.

Question 2

If two in three Australians are diagnosed with skin cancer, statistically how many people in your school community may be affected by skin cancer during their lifetime?

Question 3

In 2020, melanoma rates in 15–19-year-old people were 0.2% of the population. Of the students in Years 9 to 12 at your school, how many students would this represent?

TASK 2

Research and analysis of current data



Use the following webpages to help with your analysis and research:

www.sunsmart.com.au/uv-radiation/what-is-uv

www.cancer.org.au/cancer-information/causes-and-prevention/sun-safety/uv-index

www.cancervic.org.au/research/vcr

Question 1

Is the UV level dependent on the temperature? Explain your answer.

Question 2

Write a brief summary – explain what UV radiation is and what the UV Index is.

Question 3

Using the website: www.cancervic.org.au/research/vcr view the VCR Data explorer and navigate to the 'Diagnoses' tab and select **Melanoma** as the data to view (keep the time interval from 1982 to 2021).

- i) Examine the histogram that looks at **the number of melanoma diagnoses per 100,000 by age at diagnoses**.
- a) Describe the skew of the graph. Make sure in your description that you are comparing the skew for both men and women. Are there any outliers evident?
- Select 'Counts' and explore the number of **newly diagnosed melanoma cases by age at diagnosis** for males and females (select the button for each gender, as this will make it visually easier to analyse the data).
- b) Identify the median age range for women and men being newly diagnosed with melanoma. Based on the median explain one reason why the median age is lower for one gender and higher for another.
- c) Identify the modal age range for both women and men.
- ii) On the right-hand side of the VCR Data explorer, the **Variation in melanoma incidence for all persons in the period 2019–2021** displays the data by SEIFA socio economics and the relative likelihood of being diagnosed.
- a) In the period 2019–2021 people living outside of major cities of Victoria were 44% more likely to be diagnosed with melanoma. Identify and explain three factors that can contribute to people living outside of major cities being more likely to be diagnosed.
- b) Identify the region e.g. North Eastern Melbourne, that your school is classified in – use the regions identified in the VCR data explorer. State the statistics that reflect the region your school is in. Why are people in the region you go to school in more or less likely to be diagnosed with melanoma?

Question 4

From the VCR Data explorer, select the 'Survival' tab. Examine the **five-year relative survival for all malignant tumours by period graph**.

- i) Identify the type of graph the data is represented by.
- ii) Explain the overall trend observed.

TASK 3

Conduct primary research



Question 1

You are now required to conduct your own research to develop and formulate conclusions. Using the table on the last page, you will need to administer a survey to determine how many sun protection measures people use to protect themselves from UV on a typical day (school or weekend).

Interview 25 people (these can be other students, adults or friends outside of school) to help you complete the table 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). Do not identify the person by name.

Note: For age range in your survey, use the same age ranges used in the VCR data explorer from Task 2 (e.g. 0–4 , 5–9 ... 30–34, 35–39 ...)

Question 2

- i) Using the information collected from question 1 (data in the table on the last page), is this an example of **numerical or categorical** data? Can it be further categorised as **nominal/ordinal** or **discrete/continuous data**?
- ii) Explain why it is an example of either **qualitative or quantitative data**.

Question 3

When collecting data, the size of the data collected can be either a population or a sample. Based on the survey you have conducted, is the size of the data reflective of a population or a sample? Why have you categorised it this way?

Question 4

- i) Display the data you collected in a frequency table, and then as a dot plot.
- ii) Explain whether this data can be represented as a stem and leaf plot.
- iii) Display the frequency table as a percentage bar chart.
- iv) Write a summary on the data you collected and graphs (or displays) you have produced. What have you discovered? What has surprised you based on the data you have collected?

Sun protection measure	Frequency (f)
Slip	
Slop	
Slap	
Seek	
Slide	
Total	$\sum f =$

TASK 4

Present your findings



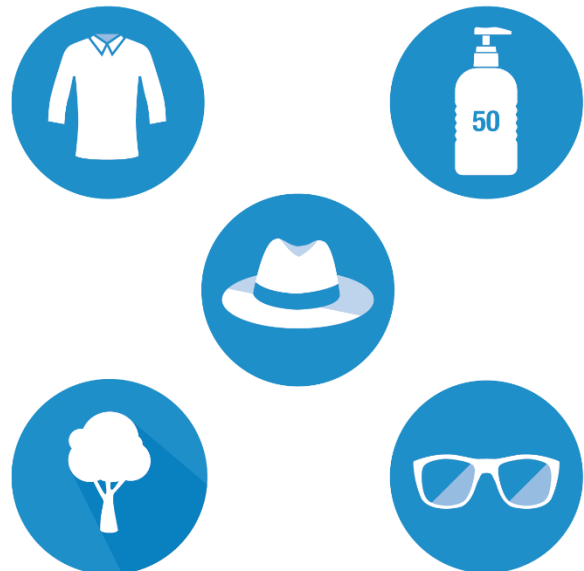
Part 1

Prepare a report answering the questions from Tasks 1–3.

Include all the primary and secondary information you have collected and use it in your report.

Part 2

With a partner (or in a group) prepare a presentation presenting the evidence you have collected to emphasise the importance for secondary schools – especially yours – to consider UV radiation and the harms associated with exposure to UV.



TASK 3 Primary research

Question 4 – Evidence collection table

	Slip (clothing)	Slop (sunscreen)	Slap (hat)	Seek (shade)	Slide (sunglasses)
1					
2					
3					
4					
5					
6					
7					
8					
9					
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11					
12					
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Total					