Soaking up the Sun: An Inves	tigation of Sunscreens and the Ultraviolet Spectrum
Geology	Mr. Traeger

Name: ___

Period: ____

Date:

Purpose

The purpose of this lab investigation is to determine how different SPF value sunscreens perform. Other factors such as time of day, time of year, sun angle, and atmospheric conditions will be considered to determine whether or not it is necessary to wear sunscreen. Students will gain an intimate understanding of the UV Index and risks to their health.

Materials

- Vernier Lab Experiment 21 •
- Sun trackers
- Sun photometers
- Calculator •
 - String

- Meter stick
- Writing device

- UV Sensing Beads
- •

Part 1: Investigating Sunscreen Effectiveness

1. Follow the instructions on the Vernier Experiment 21 handout. READ THEM CAREFULLY for best results! 2. Take UV data and record it in the chart below. I will take UVA data and report it to the class.

Brand and SPF Value	Active Ingredients in Sunscreen	UVA Intensity (mW/m²) (Traeger)			UVB Intensity (mW/m²)		
		Trial 1	Trial 2	Avg.	Trial 1	Trial 2	Avg.
SPF 0 (Control)	None						
Banana Boat Dark Tanning Oil SPF 4							
Banana Boat Sunscreen SPF 8							
Banana Boat Sunblock SPF 15							
Banana Boat Ultra Sunblock SPF 30							
Banana Boat Ultra Sunblock SPF 50							
Target Brand SPF 30 (Don q plot this on your graph.)							

Graph your UV-A data below in a line graph. Put Brand/SPF # on x-axis and Average Intensity (mW/m²) on the y-3. axis.

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4. Graph your UV-B data below in a line graph. Put Brand/SPF # on x-axis and Average Intensity (mW/m²) on the y-axis.

- 5. Study your graphs. Is there any logical relationship between the intensity of light and SPF number? In other words, does SPF 30 have double the protection of SPF 15? Does SPF 8 have double the protection of SPF 4? See if you can find any mathematical relationship between SPF number and actual protection.
- 6. What is SPF? If you use a sunscreen with SPF 30, how much longer will you theoretically be able to stay in the sun without burning? How about SPF 8? You are comparing these numbers to 0 SPF or no sunscreen applied.
- 7. Study the active ingredients in each sunscreen. Describe how ingredients might determine effectiveness of each sunscreen.
- 8. What is the wavelength range of UV-A radiation and what kinds of damage can it cause to your skin? Does each sunscreen protect your skin equally well in terms of UV-A radiation? Why or why not?
- 9. What is the wavelength range of UV-B radiation and what kinds of damage can it cause to your skin? Does each sunscreen protect your skin equally well in terms of UV-B radiation? Why or why not?
- 10. What is the stratospheric ozone layer? What has happened to our need to wear sunscreen as the ozone layer has been depleted by Chlorofluorocarbons emitted by humans?
- 11. What is the wavelength range of UV-C radiation? Why is it that we do not receive any UV-C radiation at Earth surface?
- 12. What is the ultraviolet index? What four (4) factors does it depend on?
- 13. What time of day do you need to be most concerned about wearing sunscreen? Least concerned?
- 14. What time of year do you need to be most concerned about wearing sunscreen? Least concerned?