

Anatomy and Physiology Lab: Does SPF Matter?

Question: Do sunscreens with different SPF values block different amounts of UV light?

Background:

Sunlight contain three different types of ultra-violet light: UV-A, UV-B, and UV-C. While UV-C light is absorbed by the Earth's atmosphere, UV-A and UV-B light reaches us and can damage our skin. Overexposure to these UV rays can cause darkening or burning of the skin, and even skin cancer.

The active sunblocking ingredients in sunscreen are designed to absorb the energy from those light rays on the surface of the skin, therefore preventing damage to the deeper layers.

Sunscreen products are rated based on their "SPF" (skin protection factor). This is a measure of how much additional protection the sunscreen provides. For example, a sunscreen with an SPF of 15 would increase your natural UV protection by a factor of 15. If you could normally stay in the sun on a given day for 10 minutes without getting burned, SPF 15 sunscreen would allow you to stay in the sun for 150 minutes.

Collect These:

- Blank transparency sheet
- Permanent Marker
 - Scissors
- Sunscreens with various SPF values
 - UV light source
 - UV light sensor

Do This:

1. Cut the blank transparency sheet into 3" squares.
2. On each transparent square, use the permanent marker to draw a 2" circle.
3. Leave one transparent circle blank. Coat the other five with a different SPF value sunscreen. The goal is to apply the same amount of sunscreen to each transparent circle.
4. Allow the sunscreen to dry thoroughly.
5. Use your UV sensory to measure the amount of light energy coming from your UV source. Record this value in your data table.
6. Place the first transparent circle over the UV sensor, and measure the amount of light coming from the UV source. Record this value.
7. Repeat steps 5 & 6 for the other five sunscreens.

Your lab notebook should contain these:

1. A completed copy of your data table.
2. A graph comparing the effectiveness of the different sunscreens.
3. Answers to the summary questions.

Data Table: Comparison of Light Absorbed by Sunscreens

SPF	Initial UV sensor reading	UV sensor reading with sunscreen	Difference	% of light blocked by sunscreen
<i>None</i>				

Summary Questions:

1. What is the purpose of the blank circle transparency?
2. Which SPF blocked the most UV light? Which blocked the least? Were these results what you expected?
3. If I can usually stay in the sun for 30 minutes without burning, how long should each of the sunscreens tested allow me to stay in the sun without burning?
4. What changes occur in the skin when a person tans? What is the importance of these changes?
5. What factors will contribute to a person's natural protection from UV light rays?