

Name:

Date:

Class:

Protective Fashion! Student Worksheet

Pre-Activity

Introduction: When you head to the beach, it's natural to focus on looking stylish and staying cool. But have you ever considered how your beachwear can also shield you from the sun's harmful ultraviolet (UV) rays?

In this activity, you'll take on the role of a textile engineer, creating beachwear that combines style with sun protection. Your task is to design clothing that not only looks great but also keeps the wearer cool and safeguards them from UV radiation.

Pre-Activity Instructions: After listening to the teacher's introduction and watching the video "[Sun and Skin](#)," answer the following questions.

1. What is UV radiation?
2. Why is UV radiation harmful to human skin?
3. Besides wearing sunscreen, how can people take preventive measures against skin cancer at the beach?
4. What problem are we going to try to solve?

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Activity Procedure

Control Experiment

1. In your group's box, draw a large person-shape on the photoluminescent paper with a dark marker. Try to fill as much of the paper as possible.
2. Label this page "Control."
3. While the UV flashlight is still off, measure 6 inches from the end of the flashlight to the photoluminescent paper.
4. Use your UV flashlight and shine the light on the paper for 2 minutes. (Use your phone as a timer.)
5. When the 2 minutes is over, observe how much UV light ends up on the person-shape.
6. Each group member should record their observations in the table below.
7. Describe any other changes to the paper related to color, reflection, etc. in the table below.

Color Change Observations	Other Observations

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Fabric Experiments

Instructions: Do the following for each fabric type.

1. In your group's box, draw a large person-shape (like the person-shape drawn in the control experiment) on the photoluminescent paper with a dark marker.
2. Label this page with the fabric type.
3. Cut the fabric to the dimensions and shape of your large person-shape.
4. Weigh the mass of the fabric on the scale (in grams) and record it in the data table.
5. Place the fabric on top of your person-shape.
6. While the UV flashlight is still off, measure 6 inches from the end of the flashlight to the photoluminescent paper.
7. Use your UV flashlight and shine the light on the paper for 2 minutes. (Use your phone as a timer.)
8. When the 2 minutes is over, observe how much UV light ends up on the person-shape.
9. Remove the fabric from the person-shape and observe the penetration of UV light from a flashlight on the person-shape.
10. Record your observations in the data table.
11. Describe any other changes to the paper related to color, reflection, etc. in the data table.

Data Table

Fabric Type	Mass of Fabric (g)	Observed color changes	Other observed changes
Cotton			
White satin/silk			
Denim			
Corduroy			

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Design

Instructions: Based on the data collected, design three beach outfits that only cover the top layer of the person-shape on your photoluminescent paper. These outfits may be designed to your liking, but you must be mindful of protection and comfort. Sketch your three designs below. Make sure to label the fabrics/materials you would like to use in each design.

Design #1

Design #2

Design #3

Name:

Date:

Class:

Test

Instructions: Do the following for each of your beach outfit designs.

1. In your group's box, draw a large person-shape (like the person-shape drawn in the control experiment) on the photoluminescent paper with a dark marker.
2. Label this page with the design number.
3. Cut the fabric to the dimensions and shape of each design sketch.
4. Weigh the mass of the fabric on the scale (in grams) and record it in the data table.
5. Place the fabric on top of your person-shape.
6. While the UV flashlight is still off, measure 6 inches from the end of the flashlight to the photoluminescent paper.
7. Use your UV flashlight and shine the light on the paper for 2 minutes. (Use your phone as a timer.)
8. When the 2 minutes is over, observe how much UV light ends up on the person-shape.
9. Remove the fabric from the person-shape and observe the penetration of UV light from a flashlight on the person-shape.
10. Record your observations in the data table.
11. Describe any other changes to the paper related to color, reflection, etc. in the data table.

Data Table

Design	Mass of Fabric (g)	Observed color changes	Other observed changes
Design #1			
Design #2			
Design #3			

Name:

Date:

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Improvements

Based on the data you collected above, answer the following questions:

1. Which of your designs would be the coolest to wear to the beach? Why?
2. Which of your designs would have the best protection from UV radiation? Why?
3. Which of your designs would be the coolest AND have the best UV radiation protection? Why?
4. What improvements would you make to your design? Why?

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Reflection

Answer the following questions:

1. How did the different fabrics you tested compare in terms of their ability to block UV radiation? What surprised you about the results?
2. What challenges did you face when trying to balance style, comfort, and UV protection in your beachwear designs? How did you overcome them?
3. If you had to choose one fabric to use for all beachwear based on your experiments, which would it be, and why?
4. How did your understanding of UV radiation influence your design choices? Do you think these choices would change if you were designing for a different environment (e.g., hiking in the mountains)?
5. After completing this activity, what advice would you give to someone choosing beachwear to protect themselves from UV radiation?