



In addition to the rays of light that we can see, sunlight also has ultraviolet or UV rays. These UV rays harm our skin. If we stay in the sun too long without sunscreen or protective clothing, the UV rays will cause sunburn, or even worse, may lead to skin cancer. In this activity, you will use a special plastic card that has been painted with a chemical that changes color when it is in UV light. The more UV rays there are, the darker the painted portion on the card will turn.

## Materials

- \* PULS card (or other UV indicator card)
- \* Letter-size envelope
- \* Zip-closing bag (snack size)
- \* Watch with second hand
- \* Clear spray-on sunscreen (SPF 30 or greater)
- \* Paper towel

**NOTE:** This activity should be done outside. Windows often have special coatings that filter out UV rays.

**ADAPTATION** A magnifying glass may be helpful to read small print.

**SAFETY!** Be sure to follow Milli's Safety Tips and do this activity with an adult!  
**DO NOT LOOK AT THE SUN! PERMANENT EYE DAMAGE WILL RESULT!**



For more information about the PULS cards used in this activity, contact the ACS Office of Community Activities at [ncw@acs.org](mailto:ncw@acs.org).

## Procedure

1. Before going outside, place the PULS card inside an envelope to keep it out of the sunlight.
2. Find a sunny spot where the card can be placed in the sunlight. Be careful to avoid shadows from buildings or trees.
3. Using terms like "partly cloudy", "raining", or "sunny" describe the weather in the "What Did You Observe?" section.
4. Remove the PULS card from the envelope and place it in a zip-closing bag.
5. Hold the bag with the card (face up) in the sun for 20 seconds.
6. Look closely at the color-changing portion of the card and compare it with the "Level of Sun Exposure" section. Pick the block color from the scale that most closely matches the color-changing portion of the card. Read the word below the color block (minimum, low, moderate, high or critical), and record it in the "What Did You Observe?" section.
7. Take the card out of the plastic and place it back into the envelope so that it is out of the sunlight for at least 3 minutes.
8. While you are waiting, spray the outside of the zip-closing bag with sunscreen. Be careful to make an even coating. If the sunscreen does not spray on clear, you will need to spray it on and wipe away the excess with a paper towel.
9. Write the SPF rating for the sunscreen in the "What Did You Observe?" section.
10. After three minutes have passed, open the zip-closing bag, and place the PULS card inside.
11. Repeat steps 5 and 6 recording your results in the "What Did You Observe?" section.
12. Throw the plastic bag in the trash, but keep the card and the sunscreen for future use. Thoroughly clean your work area and wash your hands.

## Where's the Chemistry

Sunscreens protect our skin from harmful UV rays. We can have some idea of how well they will work based on the SPF number indicated on the bottle. The higher the SPF, or Sun Protection Factor, the stronger the sunscreen. The American Academy of Dermatology recommends that everyone use sunscreen with SPF 15 or higher whenever working or playing outside.





### What Did You Observe?

Describe the weather. (partly cloudy, sunny, raining?)

SPF of sunscreen \_\_\_\_\_

	Reading on PULS Card
PULS Card in bag	
PULS Card in bag with sunscreen	

### Try this...

Try the activity again on a different day when the weather is different, or try a sunscreen with a different SPF number.



The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at [www.acs.org/kids](http://www.acs.org/kids).

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## Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

### Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

**Never** eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

**Never** experiment on your own!

**For more detailed information on safety go to [www.acs.org/education](http://www.acs.org/education) and click on "Safety Guidelines".**

