# Lesson 2: Exploration of Ultraviolet Light Produced by the Sun

## Objective:

Students will be able to understand that the sun creates ultraviolet light and that although we cannot see this light, it can cause damage to cells. However, chemicals, such as sunblock, and other materials can protect your skin and prevent the ultraviolet light from damaging skin cells.

## NGSS:

Science and Engineering Practices—Obtaining, Evaluating, and Communicating Information

PS4.B – Electromagnetic Radiation

PS3.D – Energy in Chemical Processes and Everyday Life

## Essential Questions:

* How does energy from the sun reach the Earth?
* How can radiation from the sun be blocked?

## Materials:

* UV meter
* Plastic wrap
* Sunblock of various SPF levels
* Sunglasses
* Material that has differing SPF levels
* Clothing such as t-shirts, jeans, cotton shorts, hats, etc.

## Directions:

1. Lead a class discussion on ultraviolet light. Where is a source that impacts us on Earth on a daily basis? [The sun.] What happens if we get exposed to too much ultraviolet light from the sun? [Sunburn.] How can we prevent damage from ultraviolet light from the sun? [Chemicals and clothing.]
2. Tell students that we are going to measure the amount of ultraviolet light from the sun that we are receiving. Discuss what a UV index reading means. [A measurement that predicts the ultraviolet radiation level on a 1–11+ scale and tells you how intense the UV rays from the sun are at that time and location.]
3. Take an initial reading of the UV index. [*Note*. Be sure to do this on a sunny day or with few clouds in the sky.] Be sure to follow directions. Have students record this measurement as the UV index for the day. Be sure to voice the number for all students to hear if there is only one meter, or have a student designated to voice the number if there are enough meters for the students to conduct the experiment in small groups.
4. Next, begin obstructing the UV meter with the different materials gathered for the experiment. For instance, place sunglasses over the sensor and record the measurement from the meter. If in groups, you can vary the materials given to each group for comparison at the end.
5. To measure the sunblock, stretch a piece of plastic wrap over the meter. This becomes the baseline measurement for the UV index.
6. Next, smear a thin layer of sunblock on the plastic wrap. Record the measurement from the light meter.
7. Be sure to start with a new piece of plastic wrap to test a new sunblock.
8. Have students discuss the results of the experiment. Which material worked best at blocking the ultraviolet light? Which materials did not work well? What SPF levels worked best? What surprised you about this experiment?
9. Overall, what advice would you give to another person about prevention of a sunburn? What should they wear? What sunblock should be used?

## Extension Activities:

1. Have students look up the UV index and determine how long it would take them to get a sunburn without use of any materials or sunblock, with the use of different materials, and with different levels of sunblock.
2. Research how the UV index is calculated and how the Earth’s stratospheric conditions impact the UV levels.
3. Research how UV rays impact skin cells.