



Teacher Tools

Lesson 3 Sun Smarts



Video Entry Topic: Sun Protection

OVERVIEW

Sun protection: Humans need natural sunlight. While some exposure to sunlight can be enjoyable and healthy, too much can be dangerous. Ultraviolet (UV) rays from the sun can pass through glass and therefore reach you and all the materials around you while you are inside a building or car.

Explain the danger and the science behind it.

Explain and/or demonstrate possible option(s) for protection and explain the science, technology, engineering and/or mathematics involved.

Length of Lesson: 2-3 class periods

Subject Area(s): Science, Health, Technology, Visual Arts, Language Arts

OBJECTIVES

Students will:

- Research ultraviolet (UV) radiation;
- Determine the impact of UV rays on the human body and nonliving materials;
- Determine the impact of harmful UV rays to society, the economy, and lives; and
- Research and present ways to protect yourself and possessions from harmful UV radiation.

MATERIALS

- Access to the Internet
- For final project, materials will vary. May include art materials, access to multimedia presentation software, Internet and e-mail, video equipment, etc.

PROCEDURE

1. Ask students what they know about the sun. Ask for examples of when they thought the sun was helpful and when they thought it was harmful.
2. Have students work in small groups of 3-4 and complete a chart that will show examples of each situation.
3. Give each group of students a piece of dark colored construction paper and a small object (a toy block, a ruler, a key, etc.). Place the object on the paper and put them in direct sunlight for an hour or two. Have students write down their observations and relate it to their sun examples.
4. Have each group present their ideas to the class along with an explanation of what was harmful and/or helpful about the sun.
5. Let each group of students select one harmful example and research it with the following guiding questions.
 - What is the danger to human cells and/or specific organs from overexposure to UV radiation?
 - What is the impact of UV rays on nonliving materials (furniture, fabric, art work, etc.)?
 - What is the impact on society (economic impact of illness, material deterioration, etc.) from overexposure to UV radiation?
 - How can you protect yourself and your possessions from overexposure to UV radiation?
6. Research the topic and possible solutions using such Internet sites as:
 - [Environmental Protection Agency](http://tiny.cc/9Ca5b) – Sunwise Program (see <http://tiny.cc/9Ca5b>)
 - [NASA](http://tiny.cc/6A7Gt) – Ultraviolet Waves (see <http://tiny.cc/6A7Gt>)
 - [Tufts University](http://tiny.cc/Jcx2W) – Ultraviolet Radiation (see <http://tiny.cc/Jcx2W>)
 - [3M](http://tiny.cc/6Yxlr) – Window Films (see <http://tiny.cc/6Yxlr>)
 - [Centers for Disease Control and Prevention](http://tiny.cc/1qIZ5) – Basic Information about Skin Cancer (see <http://tiny.cc/1qIZ5>)
 - [HowStuffWorks.com](http://tiny.cc/jh676) – How to Tint Home Windows (see <http://tiny.cc/jh676>)
 - [HowStuffWorks.com](http://tiny.cc/gMibd) – How UV Radiation Works (see <http://tiny.cc/gMibd>)
7. Once students have completed their research, allow one to two full class periods for students to organize presentations on a harmful effect of overexposure to UV rays and how they believe they can protect themselves and/or their possessions from it. Stress to students that they must present the impact to society and be prepared to defend and discuss their findings and solutions with solid scientific evidence.

EXTENSIONS

- Have students choose a partner with the same topic, and introduce the following writing prompt:
The Better Business Bureau is recruiting two middle school students to be interns for the jobs of their choice. Based on your topic research, write a letter to the chairman stating which job (structural engineer, cancer researcher, etc.) you would select and why both of you would be the best candidates for the job.
- Have students create a Sun Safety Task Force in the school that would inform the school about ways to protect students and school materials from overexposure to UV rays.

SUPER EXTENSION!

Have your students create individual videos that showcase what they know about the sun and ultraviolet radiation and enter them in the 2010 Discovery Education 3M Young Scientist Challenge for a chance to win a \$50,000 U.S. savings bond. To learn more about the [2010 Challenge](#), visit www.youngscientistchallenge.com.

EVALUATION

You can evaluate your students on their presentations using the following three-point rubric:

- **Three points:** Presentation well researched; information clearly and logically organized; presentation interesting and lively; discussion session well organized
- **Two points:** Presentation adequately researched; information sufficiently organized; presentation could use improvement; discussion session disorganized
- **One point:** Presentation insufficiently researched; information inadequately organized; presentation poorly prepared; discussion session disorganized

You can ask your students to contribute to the assessment rubric by determining a minimum number of facts to be presented in a report and setting up criteria for an interesting and lively presentation.

STANDARDS CORRELATION

This lesson plan may be used to address the National Science Education Standards listed below.

These standards are drawn from Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education: 2nd Edition and have been provided courtesy of the [Mid-continent Research for Education and Learning](#) in Aurora, Colorado.

Subject: Science as Inquiry

Standard: Abilities necessary to do scientific inquiry

Benchmark: Think critically and logically to make the relationships between evidence and explanations.

Subject: Science as Inquiry

Standard: Understandings about scientific inquiry

Benchmark: Different kinds of questions suggest different kinds of scientific investigations.

Subject: Science and Technology

Standard: Abilities of Technological Design

Benchmarks:

- Design a solution product
- Implement a proposed solution

Grade level: 6-8

Subject area: Health

Standard: Knows essential concepts about the prevention and control of disease.

Benchmark: Understands how lifestyle, pathogens, family history, and other risk factors are related to the cause or prevention of disease and other health problems.

Grade level: 6-8

Subject area: Life science

Standard: Knows the general structure and functions of cells in organisms.

Benchmarks:

- Knows the levels of organization in living systems—including cells, tissues, organs, organ systems, whole organisms, and ecosystems—and the complementary nature of structure and function at each level.
- Knows that multicellular organisms have a variety of specialized cells, tissues, organs, and organ systems that perform specialized functions (e.g., digestion, respiration, reproduction, circulation, excretion, movement, control and coordination, protection from disease).