

RAFT IDEAS

Topics: Electromagnetic Spectrum, Ultraviolet (UV) Radiation, UV Protection

Materials List

- ✓ UV sensitive beads
- ✓ Chenille stem or slit straw
- ✓ Sunglasses
- ✓ Optional: Stopwatch
- ✓ Optional: other materials to test (e.g., eyeglasses, transparent and opaque plastics, fabrics)

This activity can be used to teach:

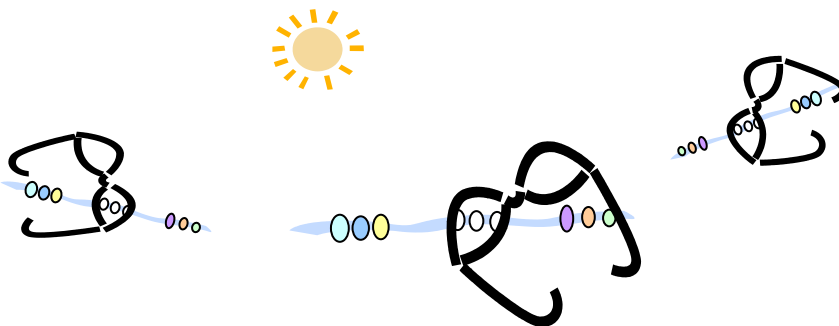
Next Generation Science Standards:

- Effect of light on an object (Grade 1, Physical Science 4-3, Grade 4, Physical Science 4-2)
- Properties of materials (Grade 2, Physical Science 1-2)
- Waves are reflected, absorbed, or transmitted (Middle School, Physical Science 4-2)
- Electromagnetic radiation absorbed by matter (High School, Physical Science 4-4)



Absorbing the Rays

Observing the Ultraviolet (UV) protection provide by sunglasses.



Using UV beads as detectors, the ability of sunglasses to protect the eyes from UV radiation from the Sun is tested.

Assembly

1. Thread three or more UV detecting beads on the chenille stem or slit straw and arrange the beads so that a sunglass lens placed over the stem will cover one or more, but not all of the beads. Suggested arrangement - place three beads near each end of the stem and three in the middle.

To Do and Notice

1. Hold the middle UV beads in the palm of the hand and cover with one lens of the sunglasses to be tested, they should be protected from sunlight from above by the lens and from below by the hand. The beads near the ends of the stem should extend beyond the sunglasses and the hand.
2. Move to an outdoor sunlit area.
3. Time or count out about 15 seconds and observe changes in the exposed beads.
4. Keeping the middle beads on the stem **covered**, move indoors (even reflected UV light can affect the beads).
5. Uncover the middle beads and observe if they have changed color.
6. Repeat above process with a variety of sunglasses to determine which ones are most effective at blocking ultraviolet radiation. (Optional include other materials for testing.)

The Science Behind the Activity

UV radiation from the Sun is harmful to the eyes in prolonged exposure; this is why sunglasses with UV protection are recommended when outdoors in sunlight for extended periods of time. Sunglasses with UV protection contain a material in the lens which filters out the UV radiation and protects the eyes.

Taking it Further

- Have students devise procedures in which all the materials are tested equally in terms of exposure time, sunlight exposure, and other variables.
- Can students devise a way to test sunblock using UV beads?
- For more information on the Electromagnetic Spectrum see RAFT Idea Sheets *Sunlight Beads* and *Spectrum Bracelet*

Web Resources (Visit www.raft.net/raft-idea?isid=271 for more resources!)

- Guide to choosing safe and effective sunglasses
http://www.glaucoma.org/living/a_guide_to_sung.html