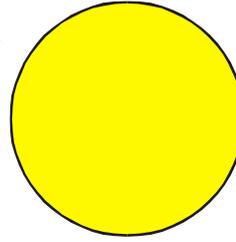


PRIMARY EXPLORATION: The Invisible Energy in Light

Background: Solar beads are white when there is no ultraviolet radiation. The beads contain special pigments that change color when they absorb ultraviolet (UV) radiation. They are not affected by visible light and do not react to indoor light or when shielded from UV radiation.



Concepts: Energy from the sun comes to the earth as radiant energy or radiation (in rays).

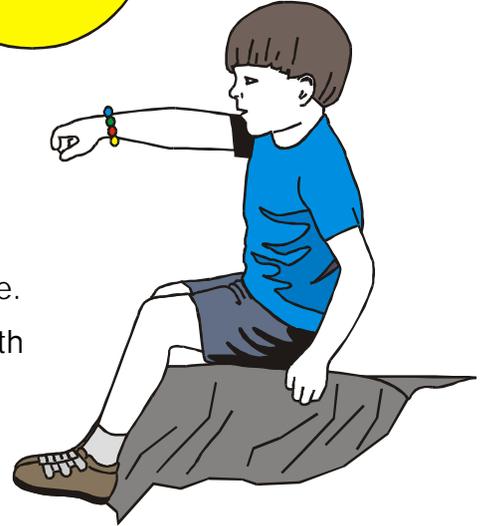
Some radiant energy we can see - it is visible light.

Some radiant energy we can't see - it is invisible light.

Ultraviolet light is invisible. It is the light that causes sunburns - it changes into heat when it touches someone.

We can't see ultraviolet light, but we can tell it's there with solar beads.

Ultraviolet light can be stopped by some materials.



Materials: 5 solar beads* for each student
2 clear ziplock bags with five beads in each
1 piece of string for each student
1 large bowl of water
Clear spray sunscreen, fabric, white and black paper, umbrella

- Procedure:**
1. Have the students string the beads into bracelets in a room with no sunlight.
 2. Have the students hold the bracelets close to an indoor light source and observe the beads.
 3. Take the students outside into the sun and have them observe the beads.
 4. Move into a shaded area and observe the color and intensity of the beads.
 5. Have the students hold the bracelets under an umbrella, the white and black paper, and a piece of fabric. Observe any changes in the beads.
 6. Place the ziplock bags with the beads into the sun. Observe the beads. Spray one bag with sunscreen. Observe the bags. Note any difference.
 7. Place the bowl of water in the sun. Place the beads from one of the bags in the water. Observe the beads.

Data: Have the students keep science journals of their explorations and observations.

- Questions:**
1. How can you tell there is energy in the light from the sun?
 2. Is all light the same?
 3. Where do you find ultraviolet light?
 4. What materials can stop ultraviolet light?
 5. What things can you do to keep from getting sunburned?
 6. If you put on sunscreen and stayed in the water all day at the pool, do you think you could still get a sunburn?

* A package of 250 UV detecting beads from Educational Innovations is \$6.95 (www.teachersource.com or 1-888-912-7474).