

### Teaching Tip

Give the children the opportunity to explain their ideas by asking them to draw and write down their explanations.

## PROCEDURES

### Part 1

1. Provide each student with a few of the Ultra-violet light Detection Beads. Explain that they have a detection tool in their hand that will turn color when a special kind of energy is present.

### Teaching Tip

Individual beads may be hard for some students to hold. String the beads and secure them with a knot if necessary.

2. Have the students move around the room, looking at the color of their beads, placed under different sources of light (e.g. lamps, overhead projector, a grow-light for plants) Note that fluorescent lighting will not change the beads' color. As the students move towards the window they should notice that their beads will begin to change color. Take them outside if possible; it need not be a bright sunny day.

3. Class discussion: Prompt students with the following questions to help them develop an explanation for the changes they are seeing in the UV beads.

- What do you notice about the beads? (They should say a change in color)
- What color were they before? What color are they now?
- Are all the beads changing color? If not why not? If so, why do you think?

### Teaching Tip

It is important for the students' to explore their ideas. Allow the students time to explore their beads and develop their own mini-investigations.

Some students may think that it is the Sun's light that is changing the color of the bead. Other may think that it is the Sun's heat. Encourage the students to think of different ways of testing their ideas.

### Part 2

1. Find an area in full sunlight.
2. Arrange the students into groups of 3-4 and distribute materials.
3. Have each group of students put three UV beads in each film canister (You will not be using the lids unless you want to prevent the beads from escaping during the walk to the outdoors. Remove lids once outside. Different coverings will be tested in this experiment
4. Instruct students to test the following nine scenarios (if it is difficult to do all 9 tests at the one time, break the experiment into a couple of separate sessions):
  - Canister 1. (control) Set it on a desk or the ground with nothing over it.
  - Canister 2. Lay a white piece of cloth over it.
  - Canister 3. Lay a black piece of cloth over it.
  - Canister 4. Put sunglasses over this canister.
  - Canister 5. Put a baseball cap over this canister.
  - Canister 6. Fill this canister with water. String the beads on a paper clip so that they will sink.
  - Canister 7. Cover this canister with plastic wrap.
  - Canister 8. Cover this canister with plastic wrap and then apply a coat of sunscreen (spf 5 or 8) to the plastic with a paintbrush or sponge.
  - Canister 9. Repeat the instructions for the previous canister using an spf 30 sunscreen.



5. Tell students to let their canister sit for five minutes in the sunlight- either outdoors or in a sunny window.

6. While waiting for the results to appear, conduct a whole group discussion to have the students predict what might happen in each of the canisters. Prompt with questions if necessary, such as:

- What do you think will happen to your beads? Why?
- Will the same thing happen to everyone else's beads?
- What colors do you predict they will become? What makes you say that?

7. After five minutes, have students check the canisters one at a time and record the results on Worksheet 1. Before checking they will need to move the canister to the shade and look quickly. The response time of the beads is very rapid. If the beads are not examined in the shade immediately and if the students look too slowly, the results will not be valid.

#### Teaching Tip

Ensure that all students have observed the beads in their group. Only one student need fill out the worksheet, however. Others may also do so if you prefer.

