

Experiments with UV beads

(Portugal)

Background

UV Beads contain pigments that change colour when exposed to UV light. The beads are white in ordinary, visible light but in UV light, you'll see different colours depending on the pigment added to each bead.

When you expose bare skin to sunlight, your skin will either burn or tan. UV radiation wavelengths are short enough to break chemical bonds in your skin tissue and, with prolonged exposure, your skin may wrinkle or skin cancer may occur. These responses by your skin are a signal that the cells in your skin have been damaged by UV radiation for a long time.

Wearing a hat, sunglasses, using sunscreen, and being aware of the UV Index report from your local weather forecaster can help reduce your skin exposure to UV radiation.

You will need:

- ✓ UV beads
- ✓ UV lamp and UV index chart (can be found online),
- ✓ Plastic bags/plastic test tubes
- ✓ sunglasses
- ✓ sunscreen,
- ✓ glass
- ✓ polaroids.



Follow these steps:

1. Place an equal amount of UV beads in 4 plastic bags or plastic test tubes.
2. Place an equal amount of sunscreen of varying strength (SPF 10, SPF 30, SPF 50) on each bag and allow it to dry. Leave one bag with no sunscreen on it as the control.
3. Shine the UV lamp on each bag for the same amount of time (few seconds) or if no UV lamp is available, place in the sunlight outside for a few minutes.
4. Observe any colour change and compare to the UV index.
5. Repeat for different sunglasses.
6. Repeat in a beaker of water and shine the UV lamp through the water or through a glass block.

(All of the above can be done in natural sunlight if a UV lamp is unavailable.)

So what happened?

When the beads are exposed to UV light, a chemical reaction occurs that changes the colour of the bead. The greater the colour change the higher the UV index.

The higher the SPF the less the beads change colour. The sunglasses should reduce the amount of UV radiation so the beads should not change colour or only change very slightly.

Glass blocks out UVB radiation but not UVA. Most UV lamps are UVA which has a lower frequency and is not absorbed by the glass. Half a metre of water will block out 40% of UVB but not UVA.

What next?

- Repeat using two pieces of polaroid and rotate one on top of the other by 90°.
- When the one of the polaroids are rotated by 90° no UV radiation should get through and the beads remain unchanged in colour.