



## *Color Changing UV Beads*

Learn how ultraviolet radiation from the sun can damage your skin and how you can protect yourself.

People of all races can burn, and having a tan is a sign that your skin has been damaged by ultraviolet (UV) radiation, which comes from sunlight and tanning booths. Exposure to UV radiation is the major risk factor for skin cancer.

### **Stay Safe in the Sun**

Protect yourself from UV radiation in the following ways:

- **Seek shade** during peak sun hours (10 am to 4 pm).
- **Cover up.** When outdoors, wear a long-sleeved shirt and pants, a hat to shade the ears, face, and eyes, and sunglasses to protect the skin around the eyes.
- **Use a sunscreen** with a sun protection factor (SPF) of 30 or higher — and reapply often. The higher the SPF, the better.
- **Check the UV index**, which predicts the next day's ultraviolet radiation levels on a 1–11+ scale, to help you plan sun-safe activities. To find out the UV Index for your area, visit the EPA SunWise UV Index website at [www.epa.gov/sunwise/uvindex.html](http://www.epa.gov/sunwise/uvindex.html).
- **Avoid tanning beds**, which can lead to skin cancer and premature aging of the skin.

### **UV Beads Experiments**

Test how the above actions can protect you from the damaging effects of UV radiation.

UV beads have a chemical substance embedded into the plastic that will change color when exposed to UV radiation (sunlight). The beads will remain white indoors as long as they are kept away from windows or doors where UV light can leak into the room.

**Shade Test** -- Take your beads outside and stand in the shade. Do they change colors? Now, move the beads into the sun and note what happens.

**Sun Screen Test** -- With all of the SPF (Sun Protection Factor) numbers available, we want to know what SPF lotion really works best at keeping out the sun's harmful UV rays? Start by collecting various strengths of sunscreen (SPF 4, 15 and 50, for example). Since the UV Color-Changing Beads are very sensitive to changes in UV energy, you can use the beads to determine the blocking potential of the sunscreen. Place the beads in a zipper-lock bag and apply a layer of sunscreen to the outside of the bag. Use a permanent marker to write the SPF number of the sunscreen you're testing on the outside of the bag. Be sure to set-up one bag without any sunscreen coating for comparison purposes. Expose the beads to direct sunlight for 5 minutes and look for any changes in color.

**The beads will always change color regardless of how good the sunscreen blocks UV - the beads are very sensitive!** The key is to rate the color of the beads on a scale of 1-5,

with 5 showing the most color or "burning" and 1 showing the least color. The bag without any sunscreen is an automatic "5". You can also test the difference between new and old sun screen. Sunscreen manufacturers suggest that you throw away old sun screen because it does not block out harmful UV light. Do your tests support this claim?

**Here's what others discovered...** SPF 4 did not do well at all while SPF 30 was the best blocker and received the best rating of 1.

**Cloudy Day** -- Test to see if the beads change color on a cloudy day. If they change color, then you can see why doctors warn people to wear sunscreen even on a cloudy day. Observe how well the beads change color when exposed to sun light at different times of the day. According to your data, what time of day does the sun give off its most intense UV light?

**Protective Clothing and Sunglasses** -- Test the ability of your sunglasses to block out ultraviolet light by covering a few beads with the lens of your sunglasses. If the beads do not change color, your sunglasses block out harmful ultraviolet light from your eyes. If not, you paid too much for that UV coating! You can also do the same thing by placing the beads under different fabrics and see what happens.

### **How do UV beads work?**

The UV beads contain different pigments that change color when exposed to ultraviolet light from any source including the sun. UV light is invisible to the naked eye. Therefore, UV beads help to detect when UV light is present. Each bead will change color about 50,000 times before the pigment will no longer respond to UV light.

When you expose bare skin to sunlight, your skin will either burn or tan (which doctors warn is still not healthy for your body). UV radiation wavelengths are short enough to break chemical bonds in your skin tissue and with over prolonged exposure, your skin may wrinkle or skin cancer may appear. These responses by your skin are a signal that the cells under your skin are being assaulted by UV radiation.



*Seek shade!  
Cover up!  
Wear sunscreen!*

