**Overexposed!**

**How do the UV beads work?**

The UV Beads contain different pigments that change color when exposed to ultraviolet light from any source, including the sun. The beads are all white in visible light. In UV light, depending on the pigment added to each bead, you will see different colors. Each bead will change color about 50,000 times before the pigment will no longer respond to UV light.

The term "light" is often used as a generic word to describe many different forms of light such as incandescent light, fluorescent light, or sunlight, for instance. However, not all light is made up of the same energy. Using Energy Beads, you will be able to uncover an invisible form of light energy called ultraviolet light. None of the energy in the ultraviolet region of the light spectrum is visible to the naked eye. Just as there are many different colors of wavelengths in the visible spectrum (red, yellow, green, blue...), so are there many wavelengths of ultraviolet light.

First, there is long wave ultraviolet light (300 to 400 nanometers), which most of us recognize as "black light" - the light that is often used to make decorations glow in discos and theatrical productions. Long wave UV passes easily through plastic and glass.

Short wave ultraviolet light (100 to 300 nm) is used to kill bacteria, hasten chemical reactions (as a catalyst), and is also valuable in the identification of certain fluorescent minerals. Unlike long wave UV, the short wave UV cannot pass through ordinary glass or most plastics. The shortest wavelengths cannot even travel very far through the air before being absorbed by oxygen molecules as they are converted into ozone.

UV Beads are the perfect tool for understanding how solar radiation can be harmful and to recognize preventative measures that can be taken to reduce the risks associated with exposure to sunlight. 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 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.

Here are some good experiments to try with the UV Beads:

**Sunscreen 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 30, 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 zip-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. The bag with no sunscreen coating will serve as the control in your experiment. 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 well 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 sunscreen. Sunscreen manufacturers suggest that you throw away old sunscreen because it does not block out harmful UV light. Do your tests support this claim?