

Writing with Light

The energy in light can make some materials glow on their own.

WHAT TO DO

Turn on one of the keychain flashlights (red, green, blue, UV or white) by squeezing it. Hold it near the large white board (don't touch the board) and move it around to see what happens.

WHAT'S HAPPENING?

The board has been painted with "glow-in-the-dark" paint, which contains a special phosphorescent pigment. When light waves of certain wavelengths (colors) shine on this pigment, electrons are excited into higher energy levels. These high energy electrons are very unstable, however, and they eventually drop back into their normal or ground level, but in doing so they emit a new photon of light. The wavelength or color of this glow depends only on the difference between the energy levels, a property of the pigment, and not on the color of the flashlight used. The paint on our board always glows green. Not all of the excited electrons drop back at the same time, so the phosphorescent glow can last for several seconds or minutes depending on the type of pigment. Only flashlight colors with short wavelengths (high energy) can excite the electrons, no matter how bright the flashlight shines. UV or ultraviolet light has the shortest wavelength and works best, followed by blue, green, then red, while "white" light is a mix of all wavelengths.