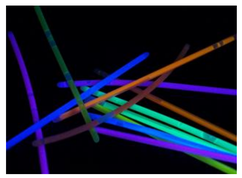
Do You See What I See? The Use of Light in Forensic Science

Jackie Smith, Science, William A. Hough High School

Overview

This curriculum unit teaches students about light and its applications in the field of forensic science. The unit begins with a study of the dual theory of light and the electromagnetic spectrum. It covers the interactions and reactions of light with matter. The unit then looks at how the properties of light can be used to locate and analyze latent evidence at a crime scene. It covers the use of alternative light sources to detect blood, saliva, sweat, accelerants, ink alterations, hairs, fibers, fingerprints, footprints and more. This unit is an interesting way to explore light and its applications to practical science.

(a) **Incandescence** – tungsten filament light bulb 	(b) **Chemiluminescence** – chemical reaction takes place inside glow sticks 
(c) **Fluorescence** – Luminol fluoresces in the presence of blood and UV light 	(d) **Phosphorescence** – *Panellus Stipticus* and other organisms phosphoresce naturally 

In

Light Interactions and Reactions

Incandescence is the light produced when heat causes an object to emit energy as visible light. Chemiluminescence results when a substance undergoes a chemical reaction with a reagant such as blood with Luminol to emit light. Fluorescence occurs when energy is added to a substance which excites an electron which moves to a higher energy level. When the electron drops back to its orginal state, it emits a photon of light. Phosphorescence is similar but the excited electron is retained for much longer so when it drops down, it emits a longer wavelength of light which is visible for a longer period of time.

Applications

Use the infrared and ultraviolet lights with goggles to examine the materials below to observe which will fluoresce at a crime scene.

Blood	Sweat
Urine	Gasoline
Saliva	Cooking Oil

Acknowledgements

Thanks to our fearless leader, Dr. Tom Schmedeke at UNCC, Scott Gartlan and Robin Mara at CTI for their support and encouragement over the years, the Bechtler Museum of Modern Art for hosting Teachers as Scholars, my awesome fellow Fellows for all of their comraderie and great ideas and my wonderful students who year after year let me try out some crazy ideas on them in the pursuit of developing better curricula.