FLASH SCREEN

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The Flash Screen was originally marketed by Mattel Toy Company. It consisted of a plastic sheet embedded with phosphorescent zinc sulfide (See Figure 1) and was accompanied by a small combination electronic flash/flashlight unit (See Figure 2). The flash screen was hung in a darkened room, an individual would stand in front of it, or place their hands in front of it, and would then flash the electronic flash unit "freezing" their shadow on the screen. Using the flashlight, one could also write on the flash screen using light. Other companies have also marketed phosphorescent screens with and without flashlights. A phosphorescent sheet of plastic, similar to the flash screen, and phosphorescent paper that can go through your computer printer are available from Flinn Scientific Inc.

The flash screen to be constructed consists of a board painted with a phosphorescent paint which glows in the dark after exposure to a bright light. In this experiment, the phosphorescent paint is prepared and painted onto a foam core poster board, or other suitable surface. Using a bright light, such as a photoflash, shadows of objects or persons can be observed "frozen" on the screen in a darkened room. Using a small narrow beam flashlight, one can write on the flash screen.

Figure 1. The Flash Screen

PROCEDURE

1. Materials needed:

Zinc sulfide, ZnS, phosphorescent powder (Flinn Scientific no. Z0015)
Latex paint base, white, for a flat wall finish (This is the latex base used for tinting or custom colors, available in paint stores)
foam core poster board, Masonite, a stretched canvas, or other suitable, smooth surface for painting. (Note: For best results, canvas or wood surfaces should be sealed with a base coat of paint before applying the phosphorescent paint.)
Paint brush (for latex paints)
100 mL measure
Container to store paint
Photoflash (electronic flash), strobe light, or other bright light source
Narrow beam flashlight

Figure 2. The Flash Screen electronic flash. The bottom is a narrow beam flashlight used to "write" on the Flash Screen.

2. Safety Precautions

Zinc sulfide is not toxic. In contact with acids, zinc sulfide will produce hydrogen sulfide, a toxic gas.

3. Removing Paint from Clothing, Furniture, or Rugs

Paint should be removed quickly from carpets, furniture, and clothing by washing with soap and water. Dried paint can be removed using waterless hand cleaner.

4. Experimental Procedure

Measure 100 mL of latex paint base into a clean container. Add 10 g of phosphorescent zinc sulfide. Stir well. You can test the paint by brushing a small amount on a piece of foam core poster board, exposing it to a bright light and then taking it into a darken room. If the paint does not glow sufficiently, increase the amount of zinc sulfide to 15 g.

Paint the foam core poster board or a prepared surface with the phosphorescent paint. Allow to dry completely, then repaint with a second coat of paint. 100 mL of paint will cover approximately 6 square feet (24 x 36 inches)

After the paint is dry, set up the flash screen in a dark room. Stand in front of the screen, hold your hand in front of the screen, or place an object in front of the screen. Flash the photoflash or strobe light. The shadow of the person or object in front of the screen will be "frozen" on the screen.

Store any unused paint in an airtight container.

The flash screen, if properly cared for, will last almost indefinitely.

5. Alternative Procedures

Measure 100 mL of latex paint base into a clean container. Add 29.6 mL (1 Fl Oz) of Glo-iT (A luminescent paint medium made by DecoArt. Available at craft stores.) Stir well. Paint as directed above.

Luminescent paint can be purchased at some hardware and/or paint stores, usually in 2 ounce bottles. It may have to be special ordered. This paint may be pale green in color. To make it whiter, dilute about 50% with latex paint base.

Luminous paint can be purchased in larger quantities (1 pint or 1 quart) from a theatrical supply company. It will usually have to be ordered. This paint is pale green in color. To make it whiter, dilute it about 50% with latex paint base.