

Color

Type of Project: Demonstration OR Hands-on Exhibit
Target Museum: MSI OR SciTech
Target Audience: Anyone age 8+ OR Children 7-15

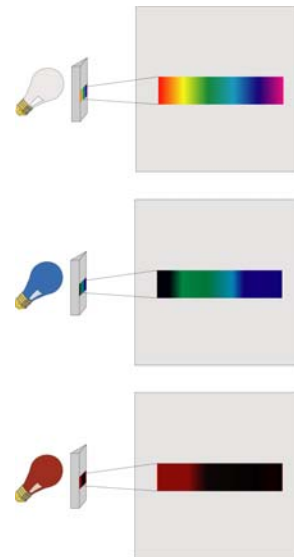
The basic idea is to show several characteristics of colored light and pigmented materials and attempt to give the audience a basic understanding of the human perception of color. This concept could be developed as either a demonstration or a stand-alone exhibit. These two modes would entail somewhat different subject matter, so each is presented below independently.

Interactive Light Demo

The demo would consist of several sub-components, building up from the basic idea that colors are just different frequencies (types) of light, leading to an explanation of how human color perception shapes our view of the world. Eg. Brown is a construction of our mind - there's no frequency of light that is brown. It exists only as a pigment which reflects a combination of R+G+B.

Light Intro (Prism; see figure, right)

Here, we start with a basic incandescent lightbulb and shine it on a white background. Place a prism in front of the light, show that white light splits into different colors. Tie in to regular rainbows. Next, replace the white light with a green/red/blue light, show that it doesn't produce a full rainbow. Explain that white light is a combination of all colors.



Colored Glasses

Hand out colored glasses to the audience (R/G/B filters). Have them look at the different lights. At every stage, have them look at things, pointing out how the glasses only let one color of light through. Eg. With a green-light illuminated white sheet, red glasses give nothing. Explain how human color perception works, seeing only red, green and blue.

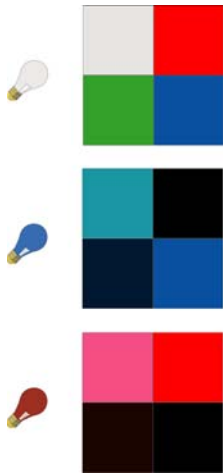
Light Mixing

Go back to a white background, shine different combinations of colored light on it, finally producing white light with R+G+B. Show that colors add constructively. Go to human color perception, explaining why R+G+B looks white to us even though many other colors aren't present. Explain that this is how color screens (TV, computer, phone, etc) work, show a small screen under a big magnifying glass. Show a fluorescent bulb and how it distorts colors.



Photo Decomposition

In this portion of the demonstration, a digital photo is taken of the visitors and decomposed into its constituent colors – one red picture, one green, and one blue, to drive home the idea that any color we perceive is a combination of three constituents. If possible, it would be great to provide a printout to the audience as a souvenir.



(Quick Note: The following pigment sections may be dropped from the demo.)

Pigment Intro (see figure, left)

Here, papers of various colors, chosen to match the colored lights, are displayed and illuminated. With the white light, they look their own color, but with other colored lights, they change in appearance. Explain that things are pigmented and that pigments reflect only certain colors, absorbing all the others.

Rainbow Pigment

Retrieve the prism from the light intro, shine the full rainbow (from the white light) onto different colored papers. Show how they only reflect certain parts of the rainbow.

Pigment Mixing

Get some paint, mix it up. Show, red+blue=, etc. Show that pigments are added destructively (as opposed to light), and show that now we can make brown!

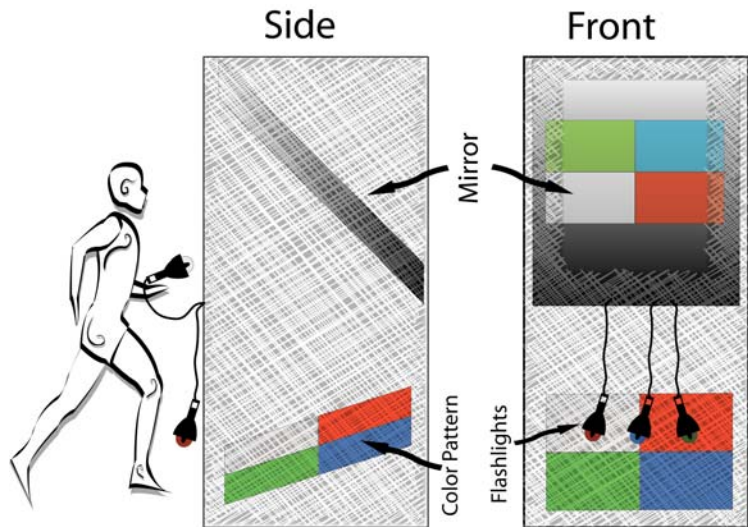
Light Exhibit

As an exhibit, development would be slightly different. (eg. Pigment mixing wouldn't be a viable option.)

In a dark box, there would be a colorful display which the users could illuminate with various colored light flashlights attached to the box (see diagram).

The box would be similar to arcade games which use a mirror to simulate extra depth, should be able to provide a deep dark environment for the colored lights to be shone into.

Colored glasses or large filters would also be available to cover portions of the display, and various color patterns could be tested. Eg. solid colors as pictured, photos of people or scenery, etc.



Evaluation/Development Plan

- 1) Background – interest in and knowledge of light & color
- 2) Selection of exhibit/demo, mockup & initial usability testing (on-site)
- 3) Development of final design

Connection to MSI/SciTech

The connection for MSI would be via the human perception of light being tied into the Body Human exhibit. Depending on feedback and interest levels, this may have to be emphasized and brought out more in the demo plan.

SciTech has nothing obviously related to this topic, so the exhibit may not be ideally matched to the SciTech setting.