Some Reflections on Color

BY JOSH COBB

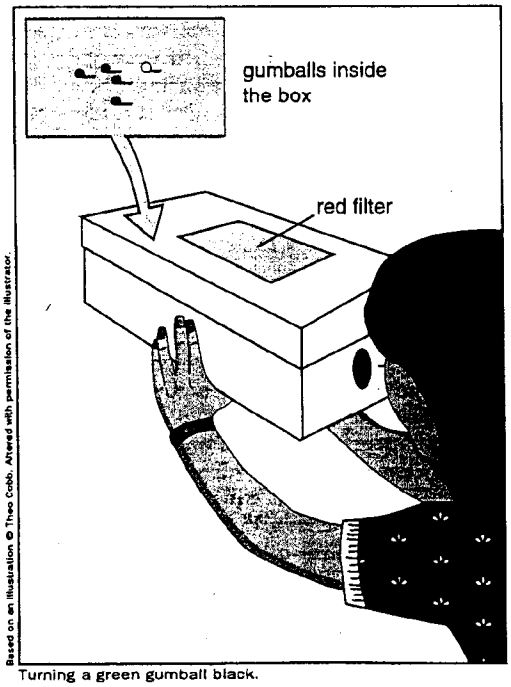
Did you ever wonder what makes a green object look green? The human eye is capable of seeing thousands of shades of colors within the visible spectrum. Take a look in the lipstick section of a drugstore or a jumbo box of crayons and you will wonder how they can come up with names for all of the colors. The perceived color of an object depends upon three things: the colors in the light that's illuminating the object, the colors that the object reflects, and the colors that your eyes are sensitive to.

The human eye is more sensitive to green light than it is to red or blue light. That is, green light appears brighter than blue light when the same amount of green and blue light fall upon the eye's retina. You can change the "color" of an object by changing any of the three factors. Here's a fun experiment to fool your eyes and illustrate color perception.

Make a green gumball black

For this experiment you will need a shoebox, a ruler, cellophane of different colors, several gumballs of different colors, and tape and scissors. Cut a hole in the top of the shoebox about three inches by six inches, and cover it with a piece of red cellophane. If you fold the cellophane a couple of times it will make a stronger color filter and produce more dramatic effects. Cut a one-inch hole in the end of the shoe box and then put the gumballs or other colored objects inside it. Now, put the top on the box and go under a bright light or outside on a sunny day. Look through the hole in the side of the shoe box and try to figure out the colors of the gumballs.

A red object appears red because it reflects only the red light back to your eyes. If you have only red light incident upon it, it will reflect most of that light. A white object reflects all of the colors in the visible spectrum. If you have both a red object and a white object in the box, they will both reflect about the same amount of red light back to your eyes and you won't be able to tell the difference between the two. Similarly, a green object reflects only green light. The other colors are absorbed into the object. Since only red light is incident upon a green object in the shoebox, very little of that light is reflected and it appears black. The same thing happens with a black or a blue object.



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Turning a green gumball black.

Fun with furniture

Here's another fun experiment that can teach kids about light absorption and also explains why glass coffee tables have green edges. For this one, you will need a glass coffee table, a flashlight, and colored cellophane. Shine the flashlight through one edge of the table toward the opposite edge. Look at the light through the opposite edge of the table. The light should appear green, just as the edges of the table do. Now put different colors of cellophane over the flashlight and try it again. Some colors will appear very bright and some will barely be visable at all.

Coffee tables are made of a material called "green" glass. It is an inexpensive window glass that absorbs light in the red and blue end of the spectrum. When light passes through several feet of the material, the glass absorbs most of the red and blue energy and transmits the green. Optical quality glass and crystals absorb almost no light in the visible spectrum. Large pieces of these types of materials are almost completely colorless and give meaning to the expression "crystal clear."

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