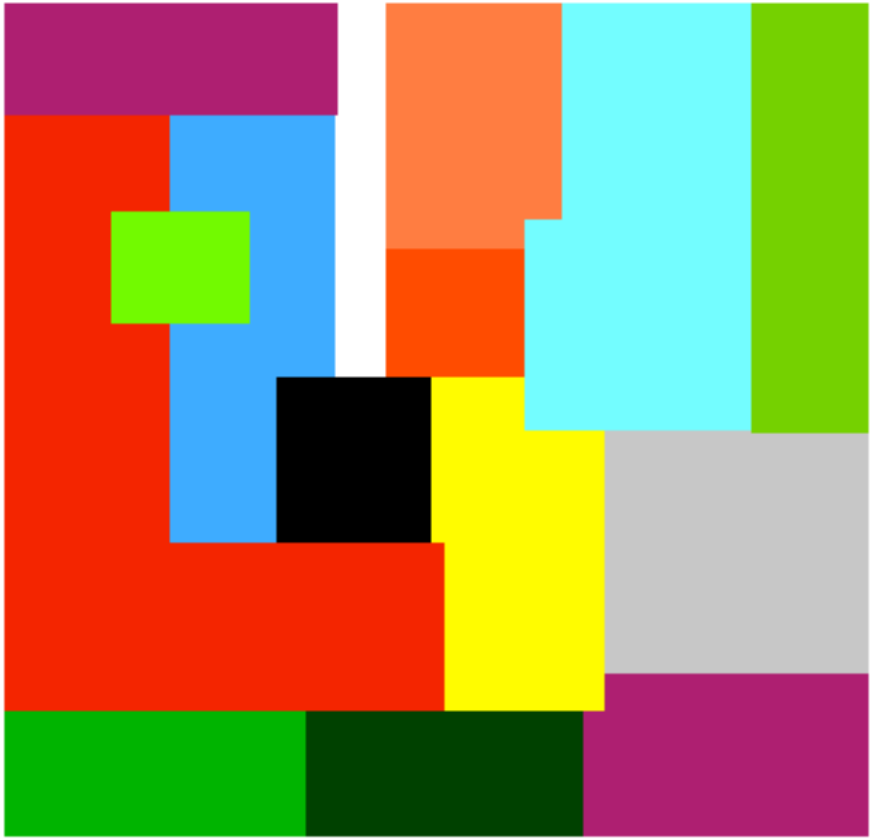
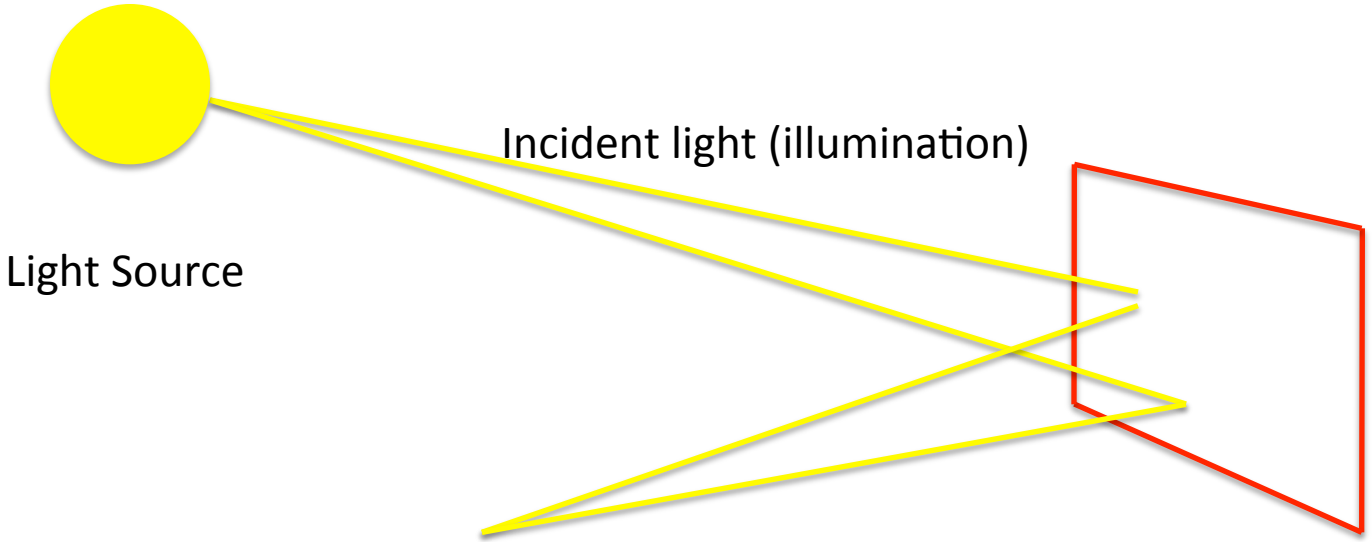


Edwin Land's "Mondrian" pattern. This is a physical display, like a poster made of colored papers.



$$\text{Reflectance} = \frac{\text{Reflected light}}{\text{Incident Light (amount)}}$$

$$\text{Reflectance} = \frac{\text{Reflected light}}{\text{Incident Light (amount)}}$$

Reflected light is what gets to your eye.

Reflected light = Incident Light x Reflectance (a proportion, less than 1)

This means that the reflected light, measured as luminance, depends on TWO things, amount of incident light and reflectance of the illuminated surface.

SPECTRAL Reflectance is Reflectance measured wavelength by wavelength. To compute spectral reflectance, you measure the amount of incident light at a given wavelength, then measure how much light at that wavelength is reflected. Then you make the ratio.

For a given colored area of a surface, the reflectance will be different for different wavelengths, but will be the SAME for any illumination.

Under most "normal" conditions, we seem to be able to see the colors of a surface, regardless of the illumination conditions. This amounts to "seeing the spectral reflectance" and is called "color constancy."

Remember that in Gilchrist's work, we used the term "lightness" to designate the perceptual experience that corresponded to physical reflectance.

The usual puzzle is this: When we have ONE thing (the amount of light reflected to the eye), how do we see two things [surface properties and illumination properties]?

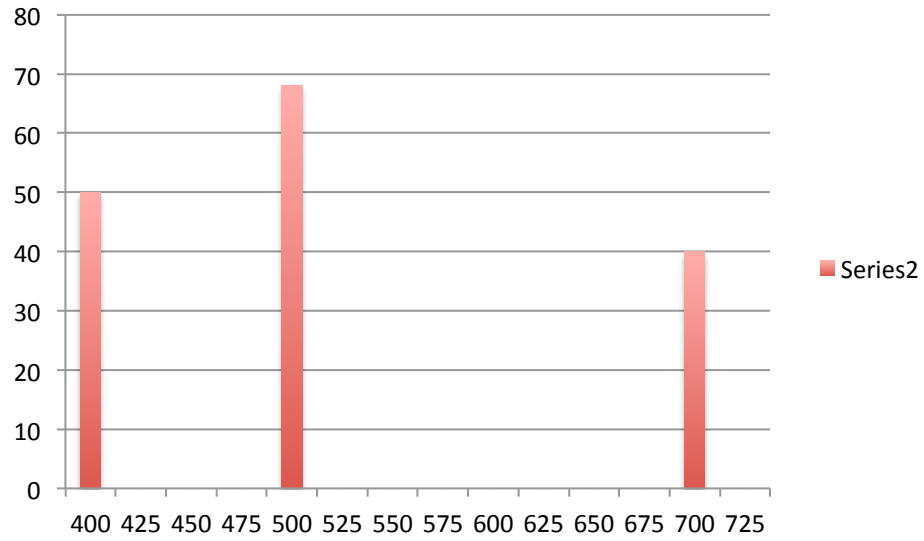
The answer is always going to be in PATTERNS (somehow).

The theme of pattern in color vision begins with simple contrast, then more interestingly we proceed to Land's "red and white" demos.

We will not go into those examples as part of the course you will be tested on, but if you are interested in some fascinating color effects, see the color related website of Wendy Carlos.

www.wendycarlos.com/colorvis/color.html

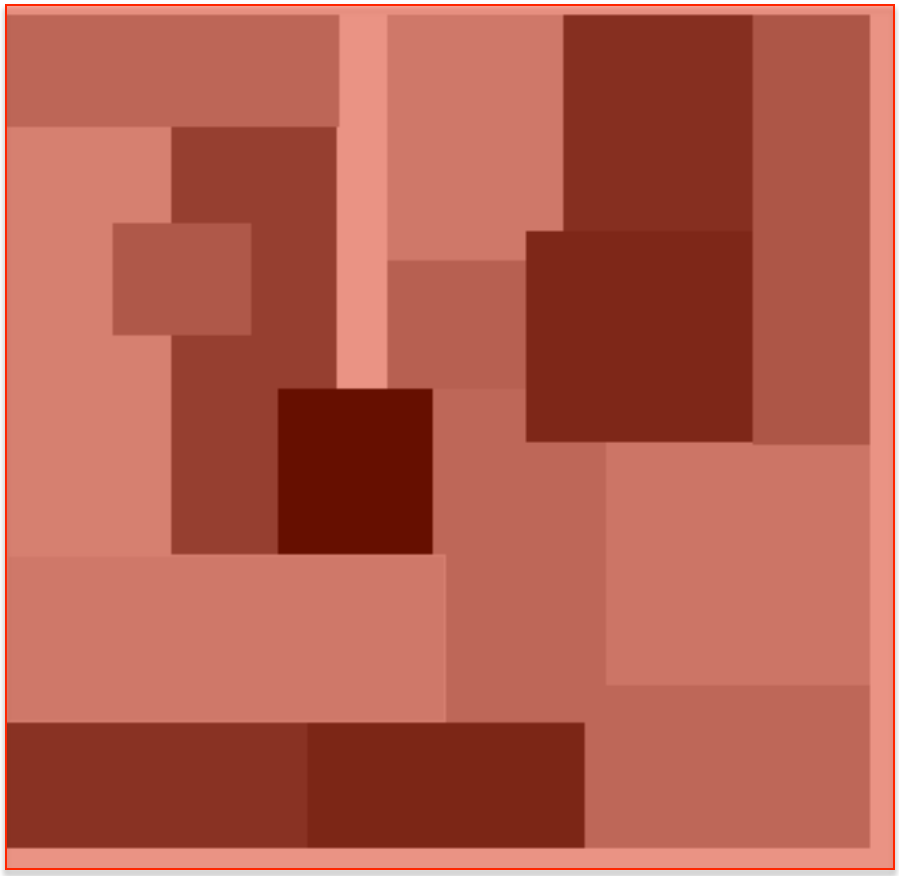
Remember this slide?



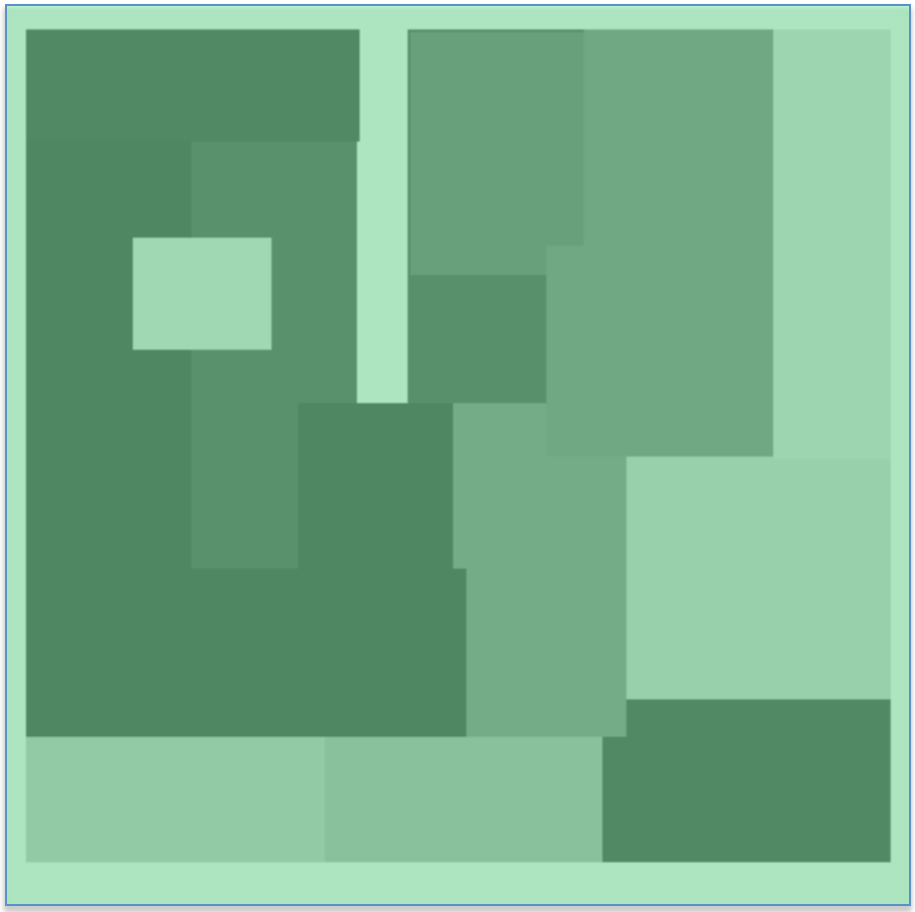
What color is a light beam that consists of only these 3 wavelengths?

We do not have ALL of the wavelengths, but we do have the primary colors.

Land illuminated his Mondrian display with 3 different projectors, with filters that project light at 670 nm, 540 nm, and 450 nm.

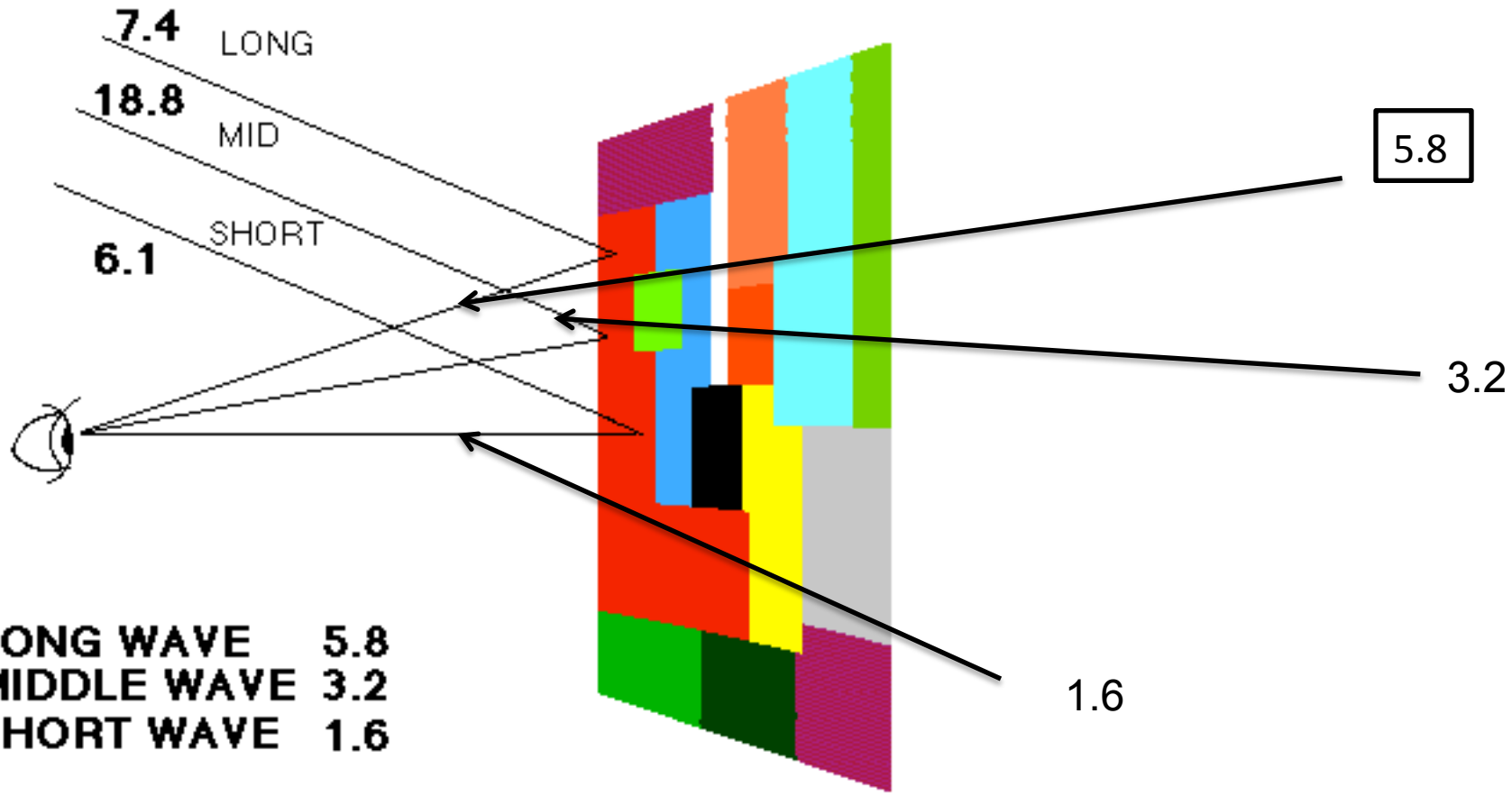


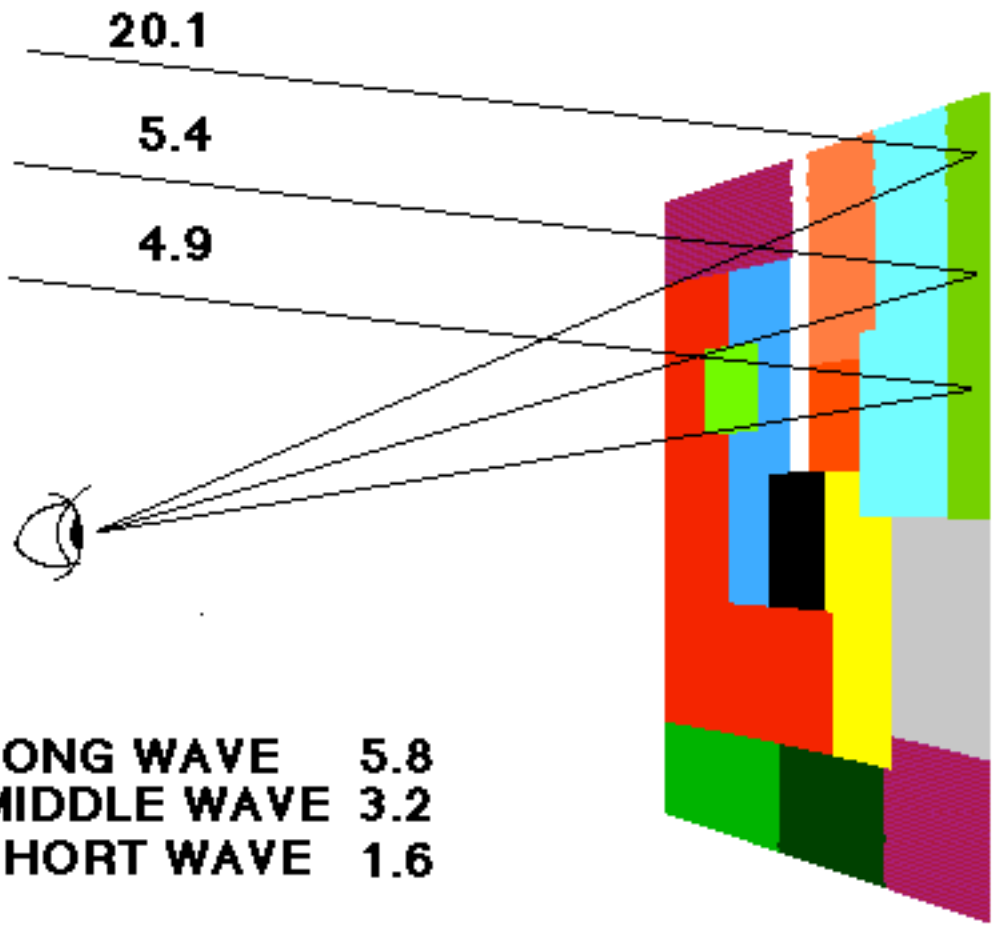
Illumination at 670 nm [long wavelength illumination]

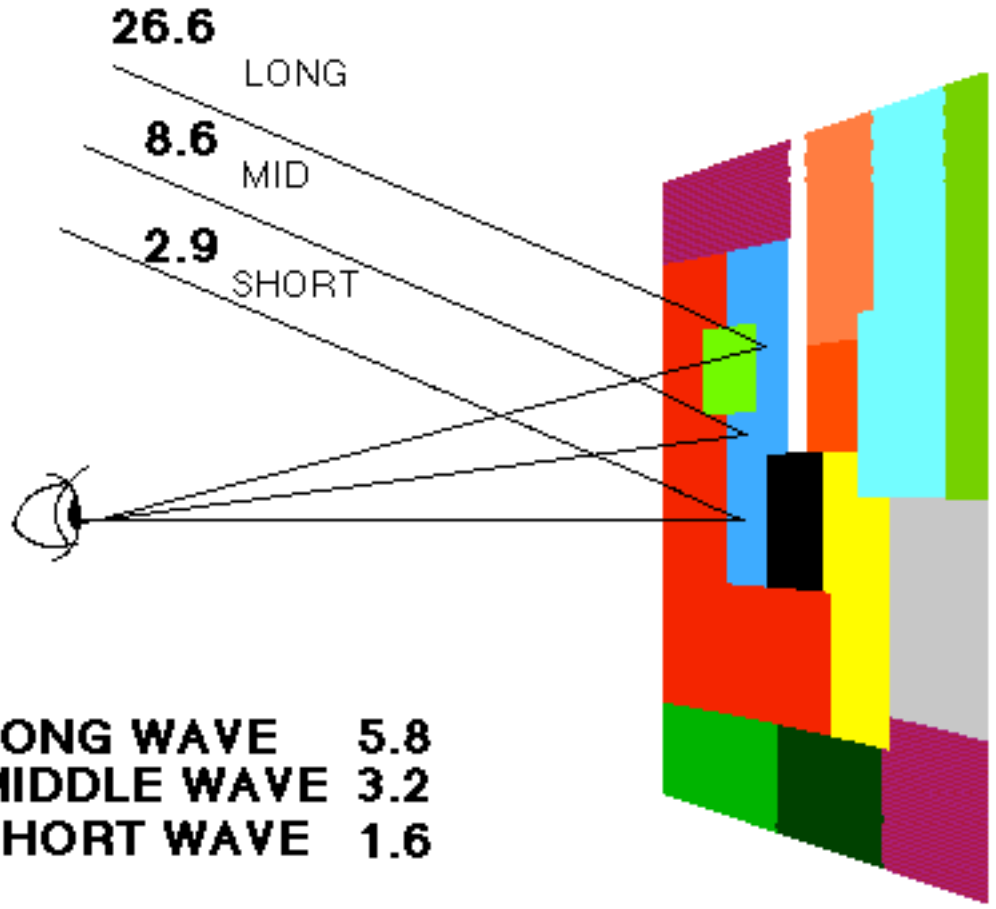


Illumination at 540 nm [medium wavelength illumination]

Illumination at 450 nm [short wavelength illumination]


7.4
LONG
18.8
MID
SHORT
6.1
5.8
3.2
1.6
LONG WAVE 5.8
MIDDLE WAVE 3.2
SHORT WAVE 1.6


20.1
5.4
4.9
LONG WAVE 5.8
MIDDLE WAVE 3.2
SHORT WAVE 1.6



LONG WAVE 5.8
MIDDLE WAVE 3.2
SHORT WAVE 1.6