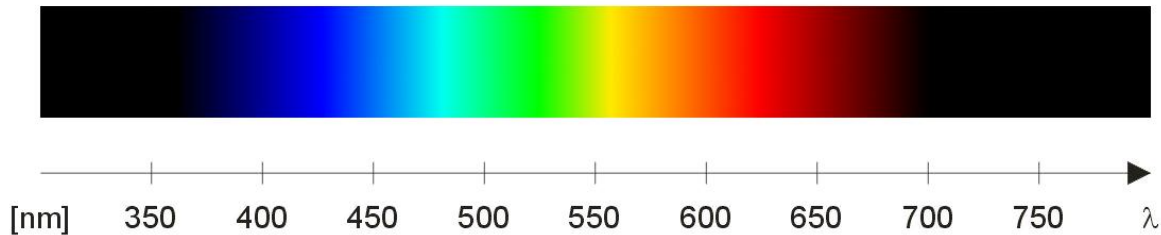
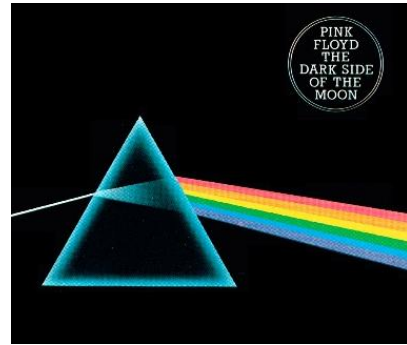


Mysteries of Photography: What is Colour and why is the Grass Green?

Do you have the Pink Floyd album “Dark Side of the Moon”? The album cover says it all, doesn’t it?

Not quite. It is highly stylised and simplified. The spectrum actually looks like this:



What our eyes can see is shown in the middle but on the left (shorter wavelengths) it extends into what to us to be black a very long way through near and far UV right up through X Rays to gamma radiation.

On the black on the right, we start with infrared (IR) through microwaves through to very long wavelength radio waves. However, it is all basically the same thing. It is just that we only know what we can see which is a tiny fraction of it.

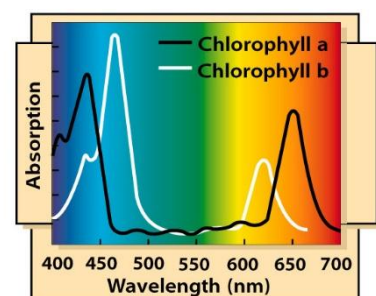
So you can see colour is a continuum that merges on both ends into blackness. However if you mix a bit of red with a bit of blue you come up with a sort of purple so you can see how the idea of a colour wheel came into being.

So colour is just the mix of wavelengths of the photons coming into our eyes (or camera lenses). Remember this is seldom monochromatic (i.e. light from a narrow band within the spectrum). It can be a mix of colours coming from anywhere in the spectrum and in any proportions. This is where colour mixing comes in and also whether we are talking about light that is being emitted or reflected.

With emitted light, if we mix all the colours together in equal proportions (or just mix red, green and blue), the light will appear to be white since it is simulating all three of the colour receptors in our eyes equally.

With reflected light, if we mix pigments together that will adsorb (and not reflect) any part of the visible spectrum, of course it now appears black. It is just like when we are first given a watercolour set and started mixing colours and found to our dismay that, if we mixed too many different colours together we always wound up with a murky brown (but never black – the pigments weren’t ever dense enough).

So why then is the grass green? Plants use light for energy to convert carbon dioxide and water glucose. To do this, they have pigments that adsorb at the red and blue ends of the visible spectrum but not the green in the middle. The green is



reflected off the leaves rather than being adsorbed so what we see is the green. Effectively all plants use the same pigments so they are all mostly green. Variegated plants with white patches have mutations where the chloroplasts that contain the chlorophyll have failed to replicate when the plant cell has, resulting in a region in the plant that is unable to fix carbon dioxide and power itself.

Gardening tips for free this month as well. Who would have thought?

David Woodcock