

# Colour vision

## Colour

Colour: a private experience...

**Definition:**

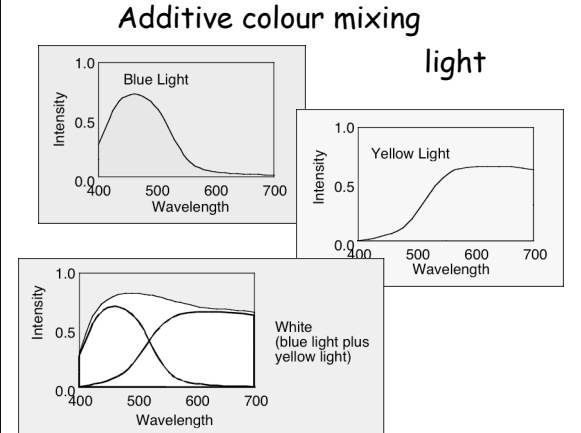
- Additive mixture: light
- Subtractive mixture: ink or paint

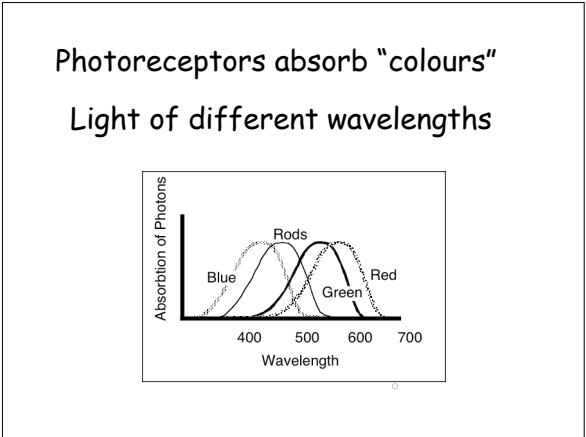
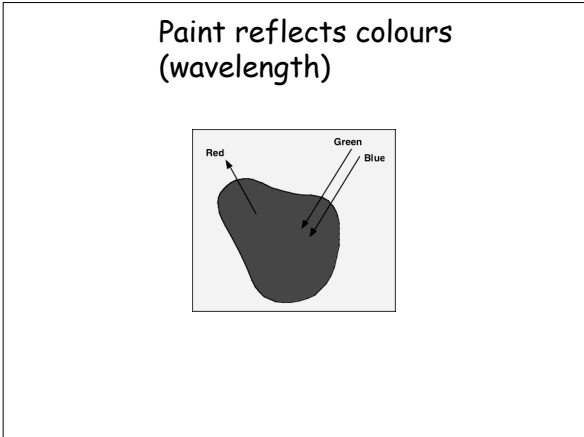
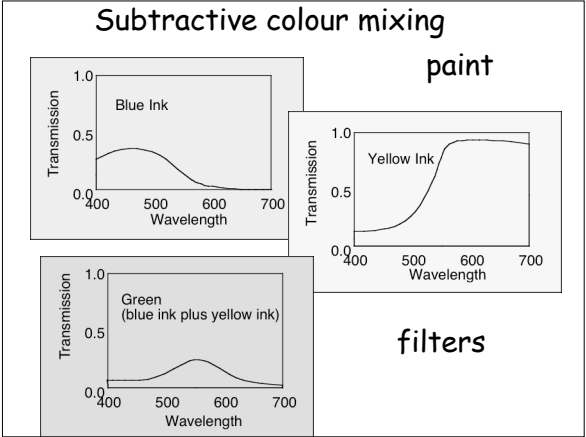
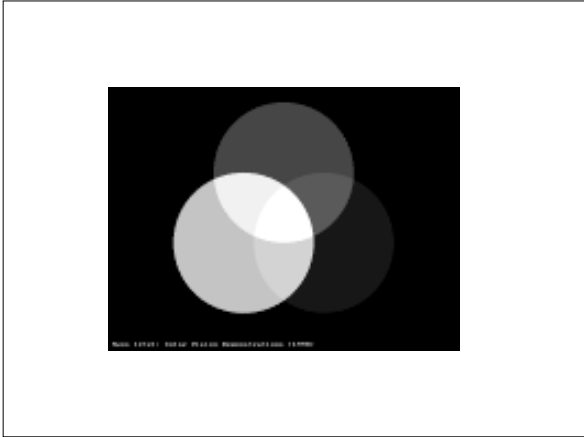
**Photoreceptors:**

- Rods: monochromatic
- Cones: trichromatic
  - trichromatic theory: Young and Helmholtz
  - vs
  - principle of univariance

**Physiology**

- Ganglion cells and LGN
  - Concentric single opponent cells
  - Concentric non-opponent cells
- Striate cortex (Hering)
  - Purely opponent cells
  - Double opponent cells
- Psychophysical evidences for physiology
  - Negative afterimages
  - Colour constancy





## Colour deficiencies

### Monochromatism

One receptors wavelength selectivity

### Dichromatism

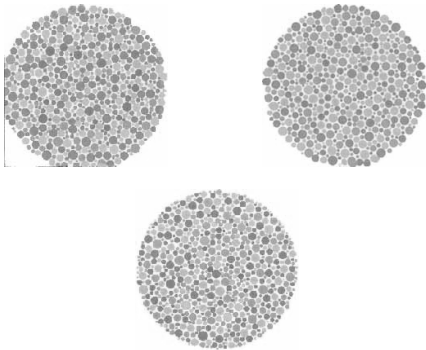
Two receptors wavelength selectivity

Tritanope

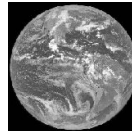
Protanope

Deuteranope

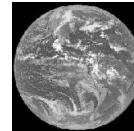
## Ishihara Test



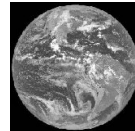
**The world.**



**How the world looks to a person with a red/green color deficit (deuteranopia).**

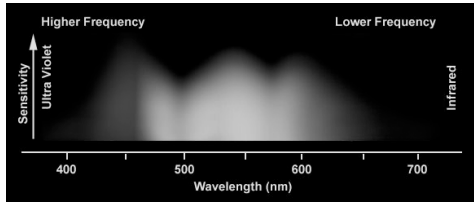


**How the world looks to a person with a blue/yellow color deficit (tritanopia).**

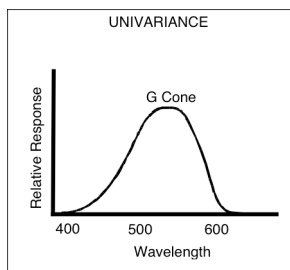


<http://www.vischeck.com/showme.shtml>

## Cones sensitivity



		NORMAL FATHER	
		X	Y
CHILDREN →		GIRLS	BOYS
CARRIER MOTHER	X'	Carrier X'X	Color Blind X'Y
	X	XX	XY



## Principle of univariance

