

# Color perception

« Absolute green is the most relaxing color possible: it has no meaning of joy, sorrow or passion ».

(W. Kandinsky)

« Blue develops a concentric movement and goes away from the man ».

(W. Kandinsky)

« Yellow irradiates, adopts an excentric movement and comes almost visibly closer to the observer ».

(W. Kandinsky)

« Red acts internally like a very lively color: it burns but rather in itself ».

(W. Kandinsky)

# Color perception

## ▶ Interaction between

- light source
- object
- eye
- brain

## ▶ Influence of context

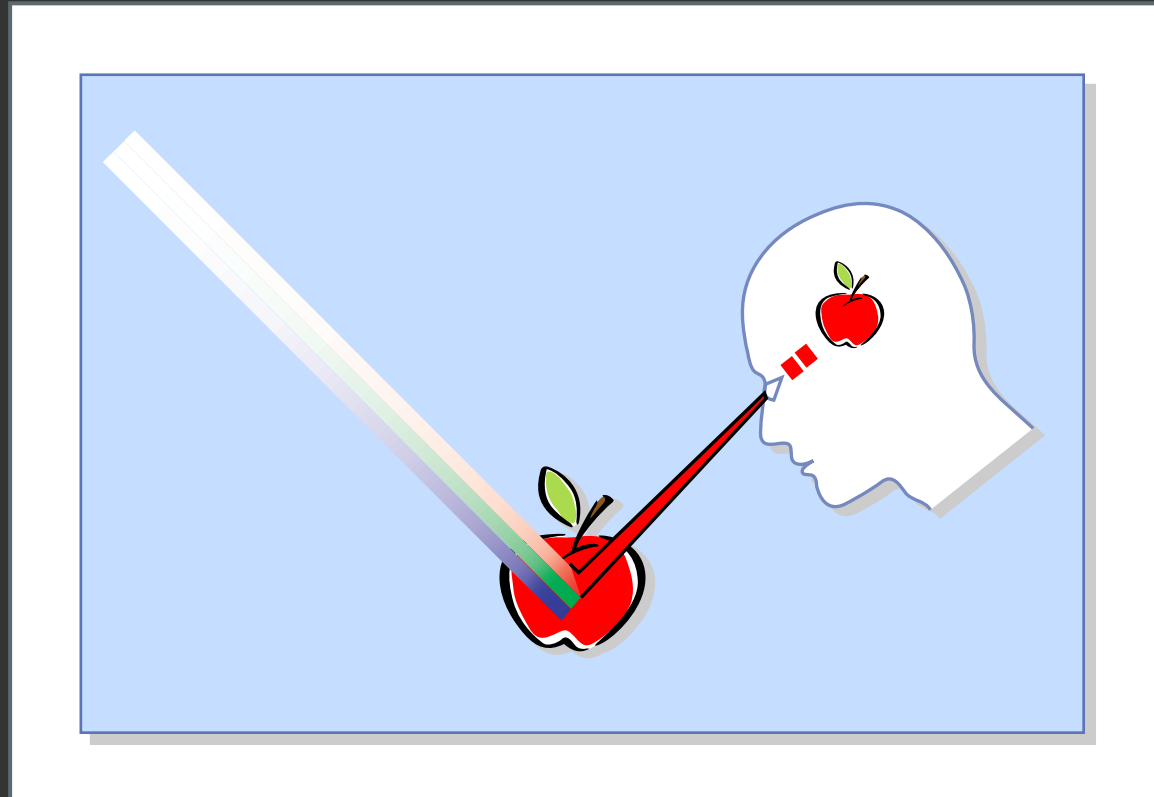
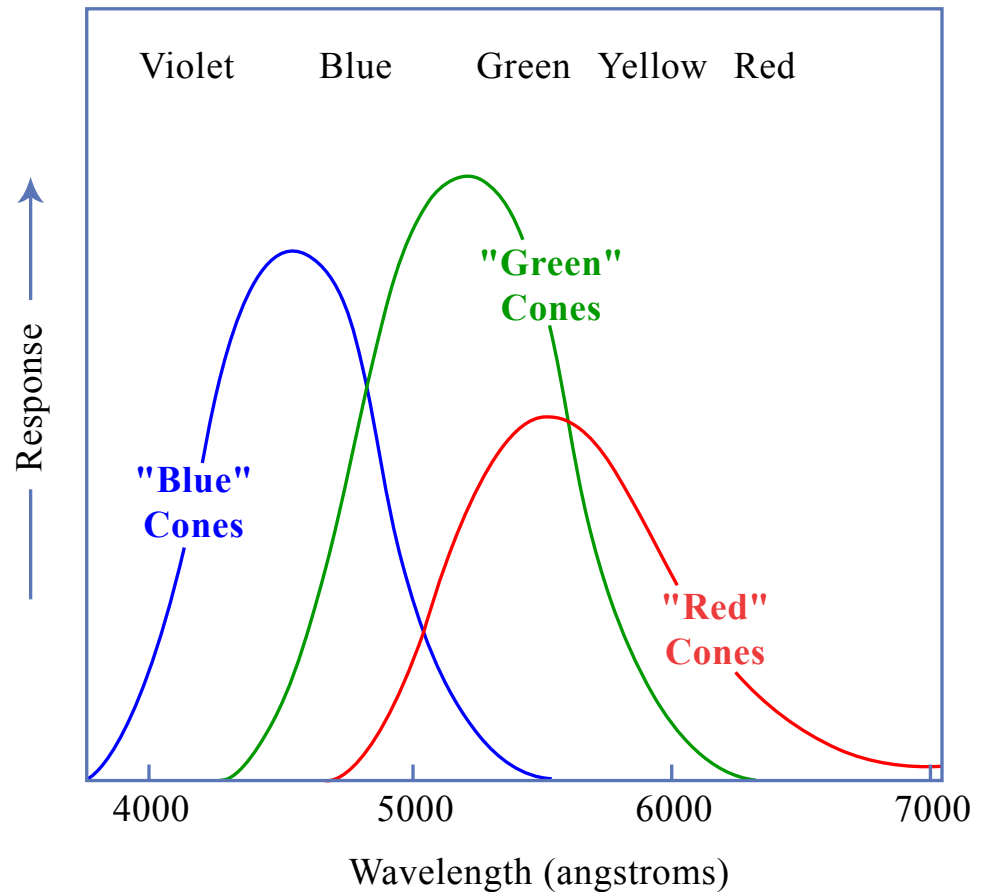


Figure by MIT OCW.

# Color perception

## ► Color differentiation

- cones sensitivity



THE EYE'S THREE COLOR RECEPTORS

Figure by MIT OCW.

# Color perception

## ▶ Color differentiation

- cones sensitivity
- colored perspective

# Color perception

- ▶ Color differentiation
- ▶ Luminous sensation

# Color perception

- ▶ Color differentiation
- ▶ Luminous sensation
- ▶ Color interpretation
  - intrinsic color of source
  - intrinsic color of object
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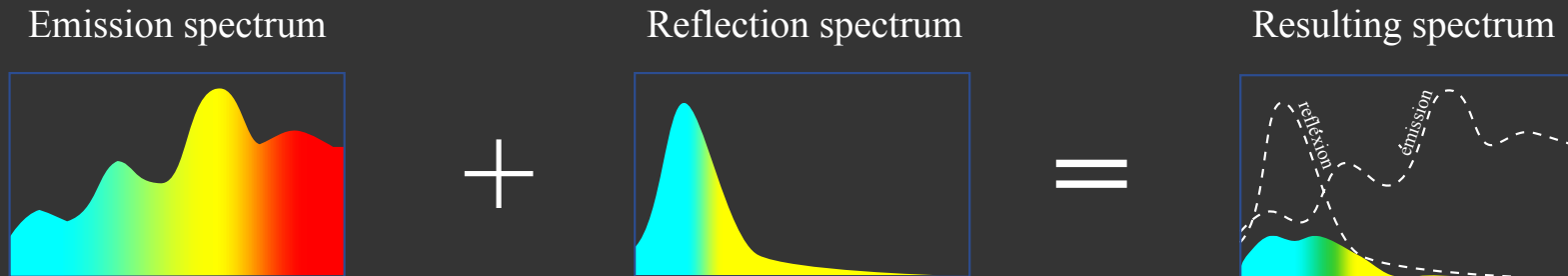
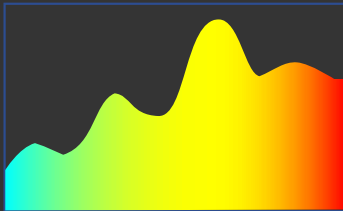


Figure by MIT OCW.

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Emission spectrum



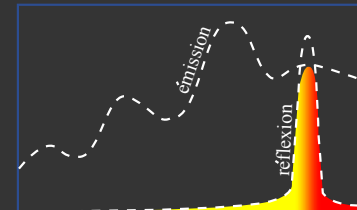
+

Reflection spectrum



=

Resulting spectrum

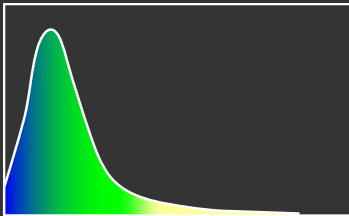




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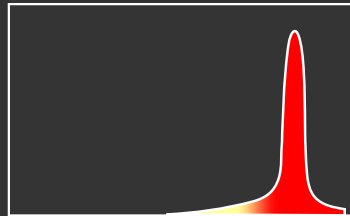
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Emission spectrum



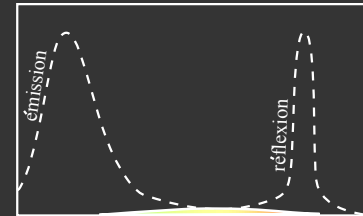
+

Reflection spectrum



=

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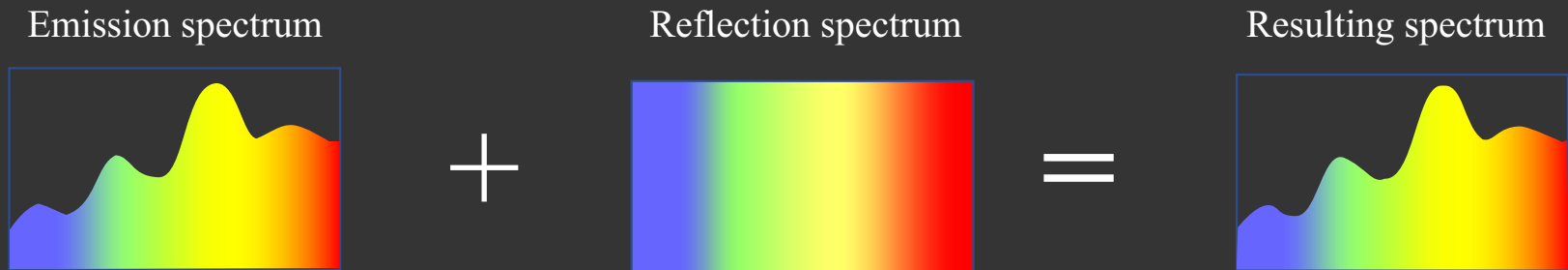


Figure by MIT OCW.

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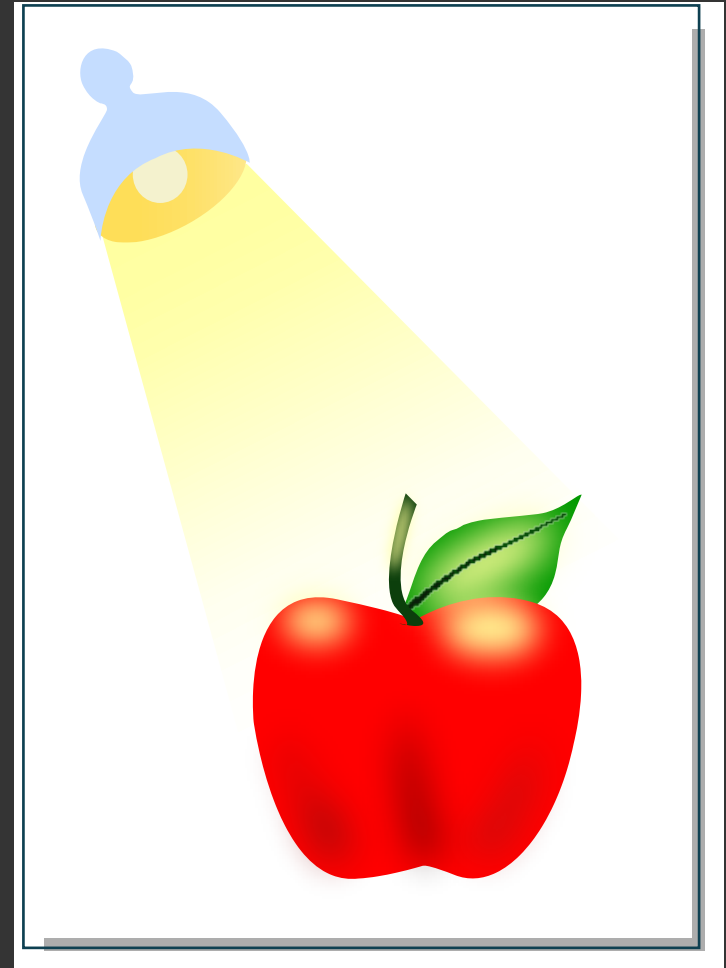


Figure by MIT OCW.

# Color perception

- ▶ Color differentiation
- ▶ Luminous sensation
- ▶ Color interpretation
- ▶ Color Rendering Index (CRI)
  - color rendering performance
  - average value over all colors
  - comparable only if same color  $T^\circ$

CRI < 25	→	poor	} rendering
25 < CRI < 65	→	medium	
65 < CRI < 90	→	good	
90 < CRI	→	excellent	

# Color symbolism

## ▶ Colors

red orange yellow green blue violet



## ▶ Qualification

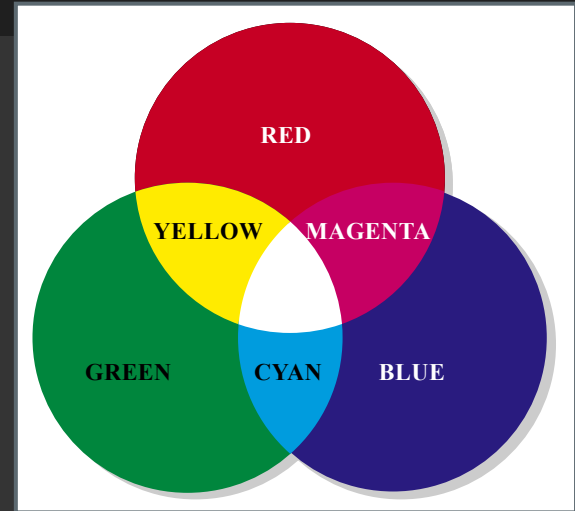
balancing	deep	radiant
exciting	elusive	welcoming

## ▶ Symbol of

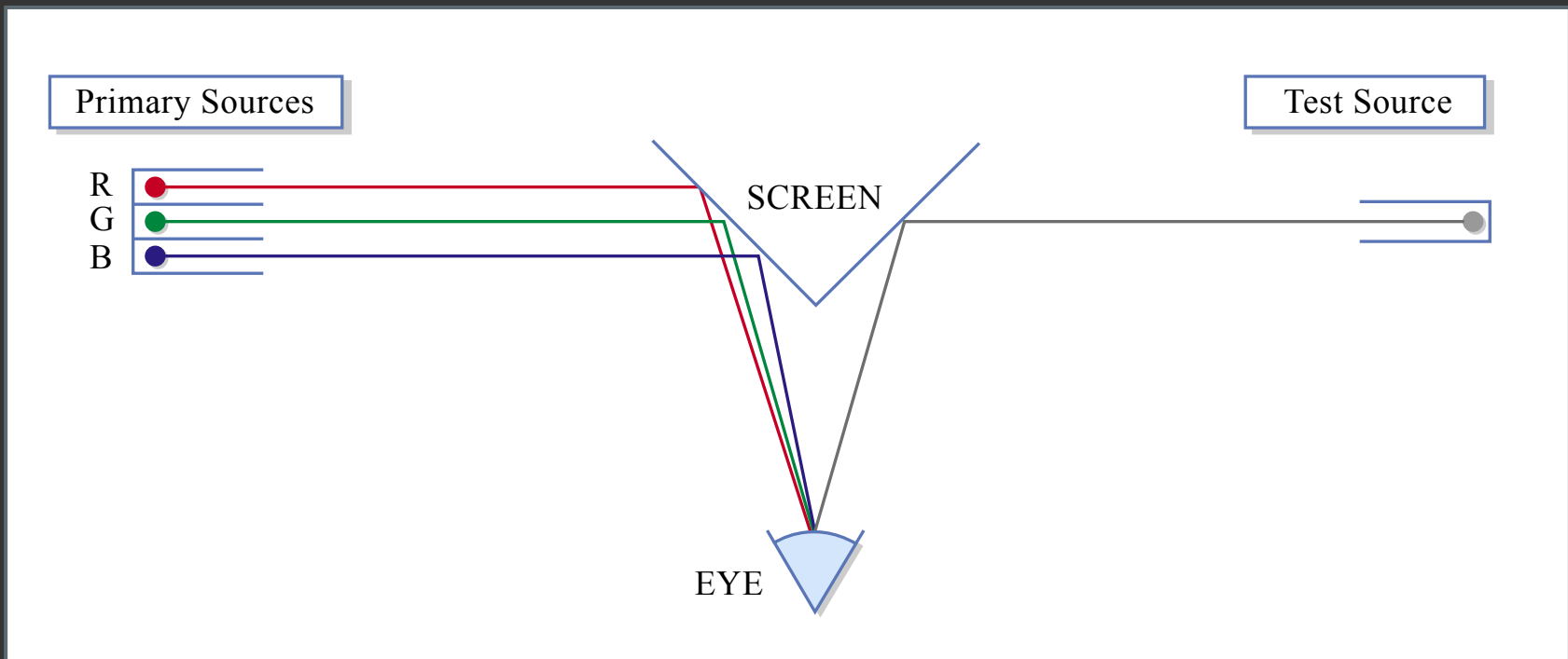
intimacy	fight	honesty
purity	spirituality	supremacy

# Colorimetry

## ▶ RGB chromatic system



Figures by MIT OCW.



# Colorimetry

- ▶ RGB chromatic system
- ▶ XYZ chromatic system (CIE)

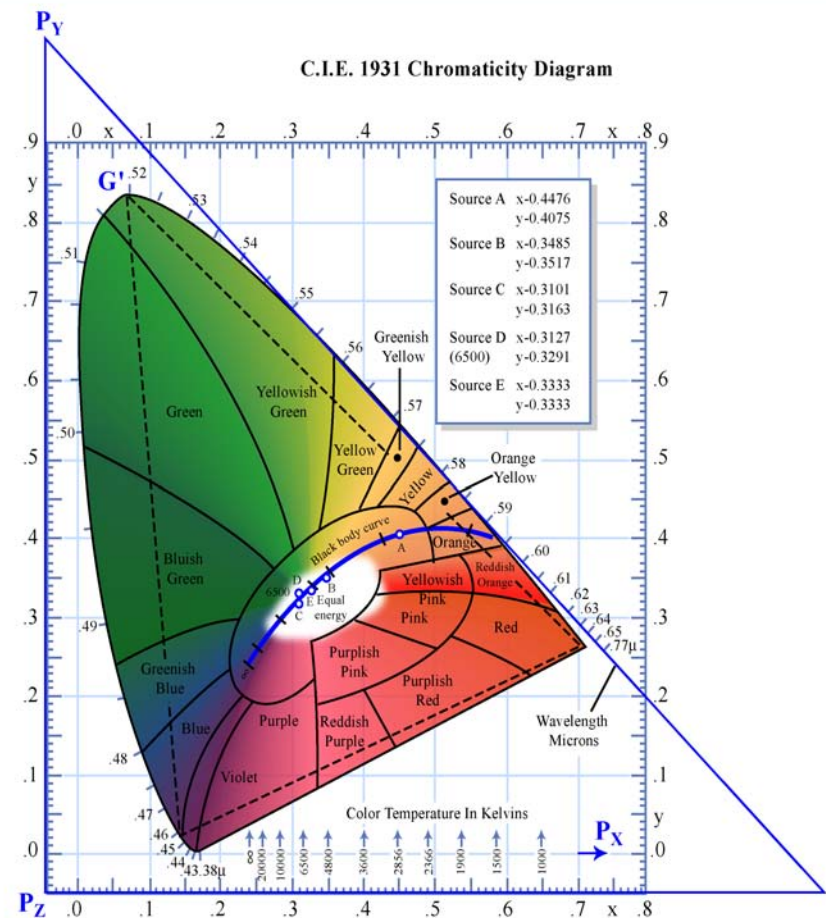


Figure by MIT OCW.

# Color Perception

## ▶ Reading relevant to lecture topics:

- "IESNA Lighting Handbook" (9th Ed.): pp. 4-1 to 4-6
- ...