

Lighting Ergonomics

The right lighting for you!

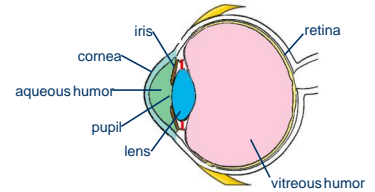


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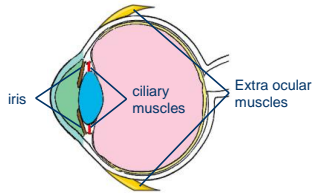
Workplace Health

Vision

- Light enters eye & passes through:



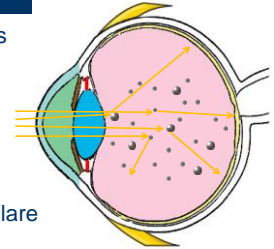
Eye Muscles



- *Ciliary muscles* control lens shape
- *Iris* controls amount of light
- *Extra ocular muscles* control eye movement

Age-Related Changes

- Humors fill with debris
 - "Floaties"
 - Scatters light in eye
- Lens becomes more opaque
- Need more light
- More susceptible to glare

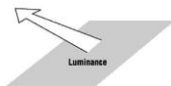


Illumination & Luminance

- Illumination = Light falling on a surface



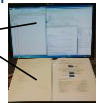
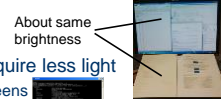
- Luminance = light reflected or emitted from the surface



Images courtesy of CCOHS

Recommended Illumination Levels

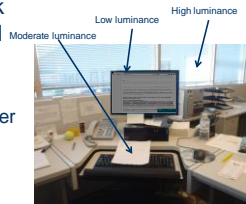
- Depends on age and the task
 - Traditional office tasks (paper-based): 500-750 lx
 - Computer workstations (mixture of computer and paper): 300-500 lx
 - Match light levels
 - Some scenarios may require less light
 - E.g. negative polarity screens
- Can be achieved with supplemental task lighting
 - Must bear in mind **luminance ratios**...



Luminance Ratios

- Ratio of amount of light coming from main task area to secondary and other areas, for example:

- Computer screen : paper documents
- Computer screen : window behind



Luminance Ratios

- Want balance of light
- High luminance ratios cause pupils to dilate and constrict continuously
 - Eye fatigue, discomfort, headaches
- Can also wash out details
 - Too much light
 - Dispersion of light in eyes



Glare

- **Discomfort glare**-causes discomfort only
- **Disability glare**-causes reduction in visual performance
- **Blinding glare**-makes it difficult to see
 - E.g. bright headlights



Glare Sources: Direct

- Direct-shining directly into the eye
 - Windows
 - Bright light fixture
 - Poorly adjusted task lamp

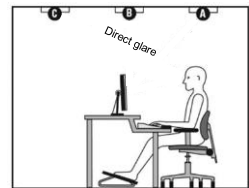


Image adapted from CCOHS

Glare Sources: Indirect

- Indirect
 - Reflected from a surface
 - Desk
 - Wall
 - Floor
 - Computer screen

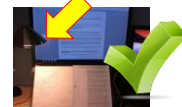
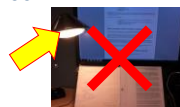


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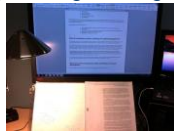
Glare Control

- Avoid direct view of light bulbs in design
- Adjust task lighting not to shine into eyes or onto screen



Glare Control

- Avoid task light being too bright
- Create balanced brightness



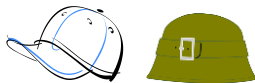
Glare Control

- Partitions
- Window blinds
- Matte finishes
- Windows to side



Glare Control

- Dual monitors: same screen brightness
 - Preferably white screen with black characters
 - Not as good for detail, though
- Peaked or brimmed hat



Personal Control

- Adjust the monitor contrast and brightness to comfortable levels
- Eliminate / control glare
 - Minimize upward screen tilt
 - Screen perpendicular to window
- Practice the **20/20/20 Rule**:
 - every **20 minutes**
 - stare at an object **20 feet away**
 - for **20 seconds**
- Get your eyes checked at least every 2 years



For More Information

Visit our Ergonomics Page on the POD

<http://pod/empwell/ohsc/injprev/pages/Default.aspx>