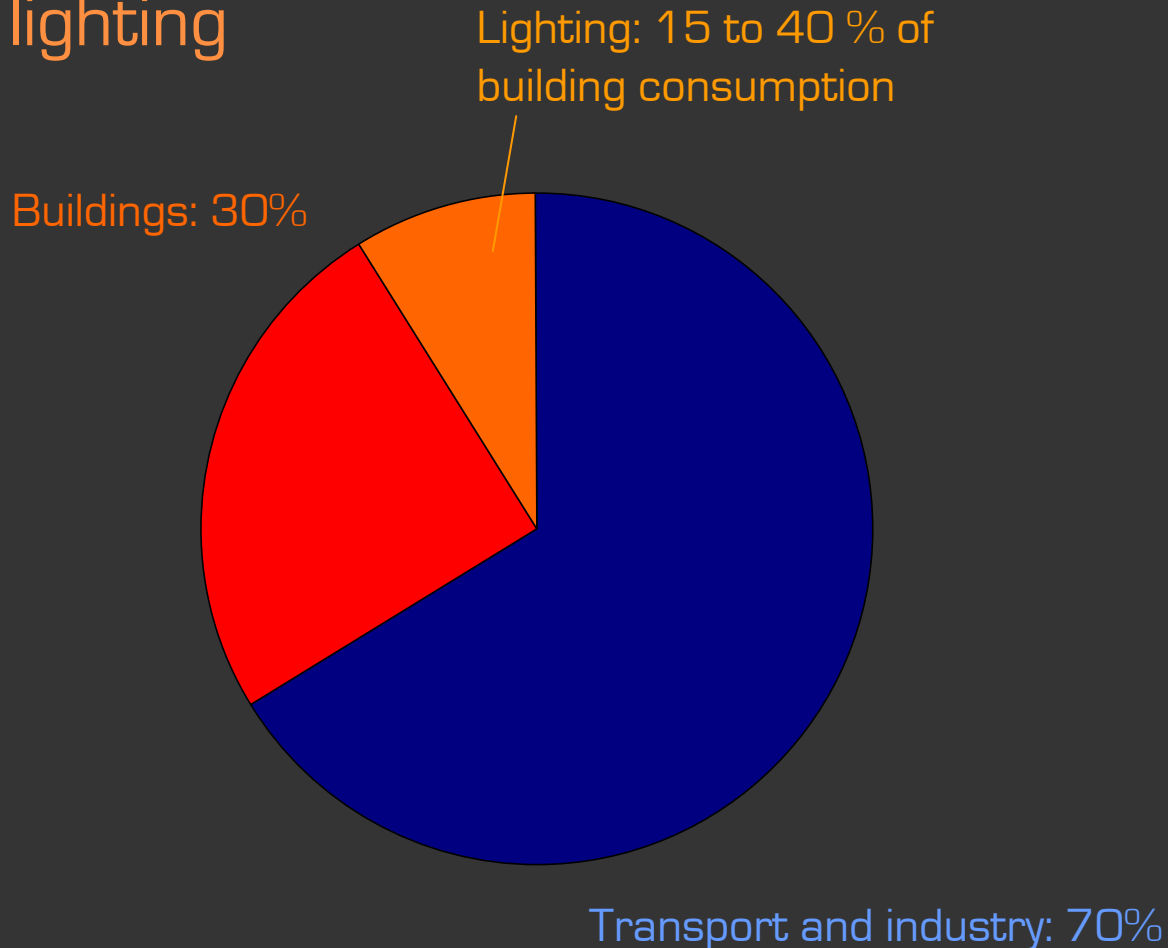


Daylighting for sustainability

► Energy savings

- electric lighting



Daylighting for sustainability

- ▶ Energy savings
 - electric lighting
 - solar gains management

Daylighting for sustainability

- ▶ Energy savings
- ▶ Visual comfort
 - visual performance
 - color rendering
 - aesthetical effects

Daylighting for sustainability

- ▶ Energy savings
- ▶ Visual comfort
- ▶ Connection to outside
 - view
 - biological needs

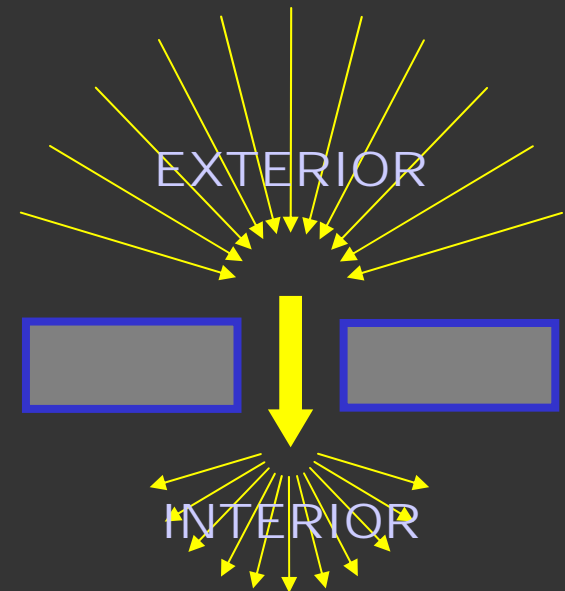
Daylighting for sustainability

- ▶ Energy savings
- ▶ Visual comfort
- ▶ Connection to outside
- ▶ Productivity

Daylight as a design factor

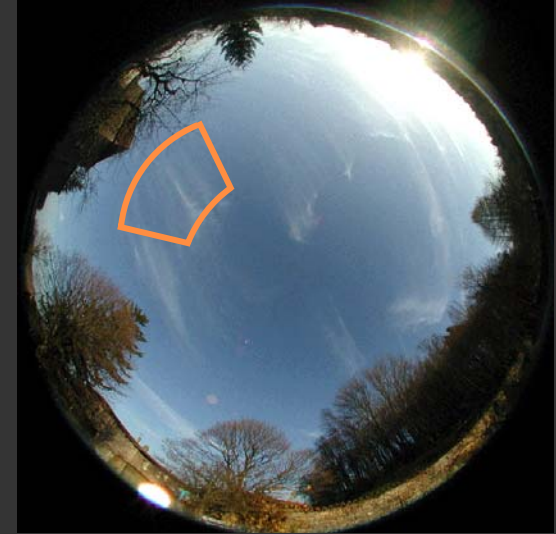
▶ Three aims when using natural light

- Collect
- Transport
- Distribute



Daylight as a design factor

- ▶ Three aims when using natural light
 - Collection



Daylight as a design factor

- ▶ Three aims when using natural light
 - Collection

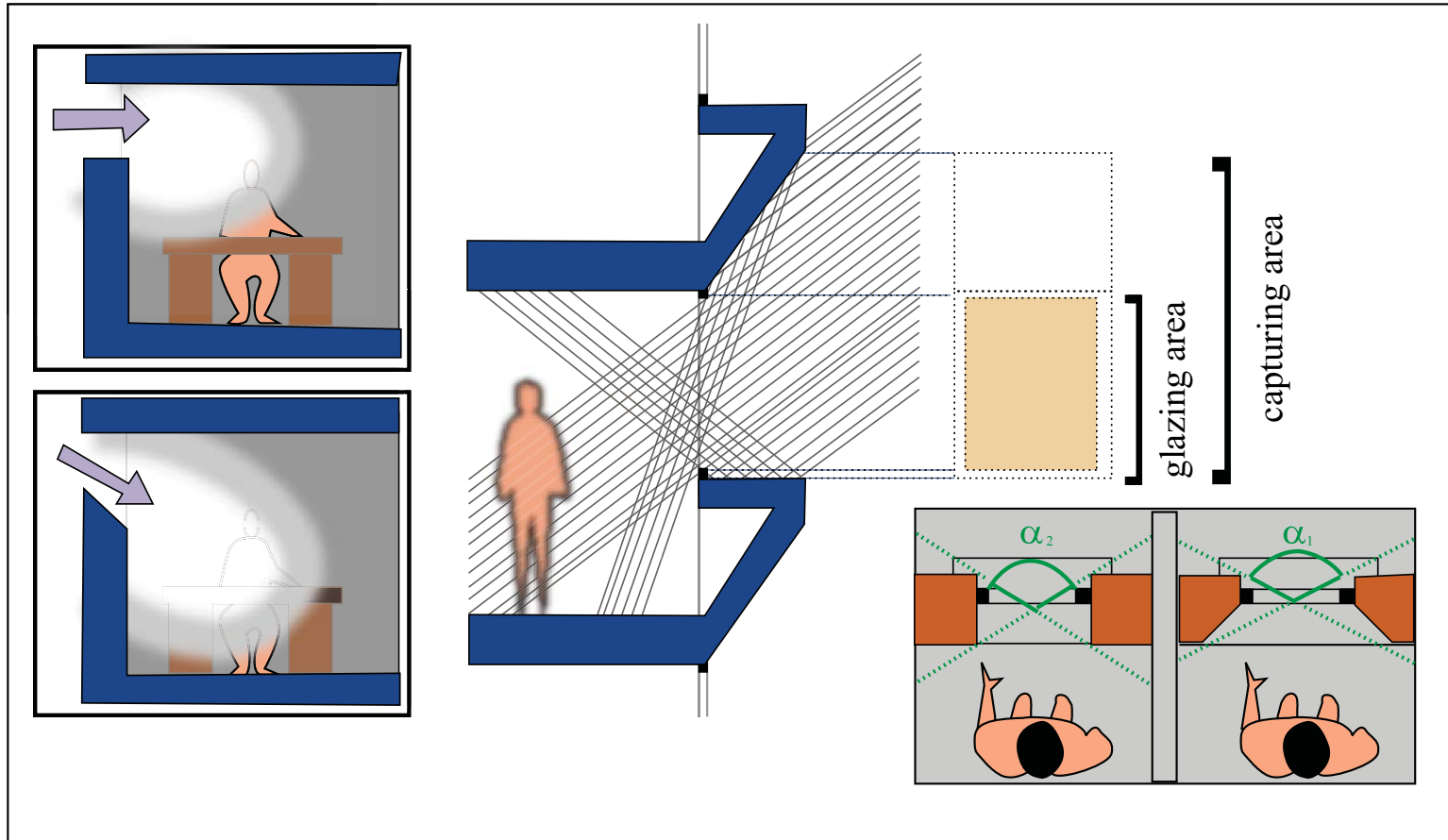


Figure by MIT OCW.

Daylight as a design factor

- ▶ Three aims when using natural light
 - Collection

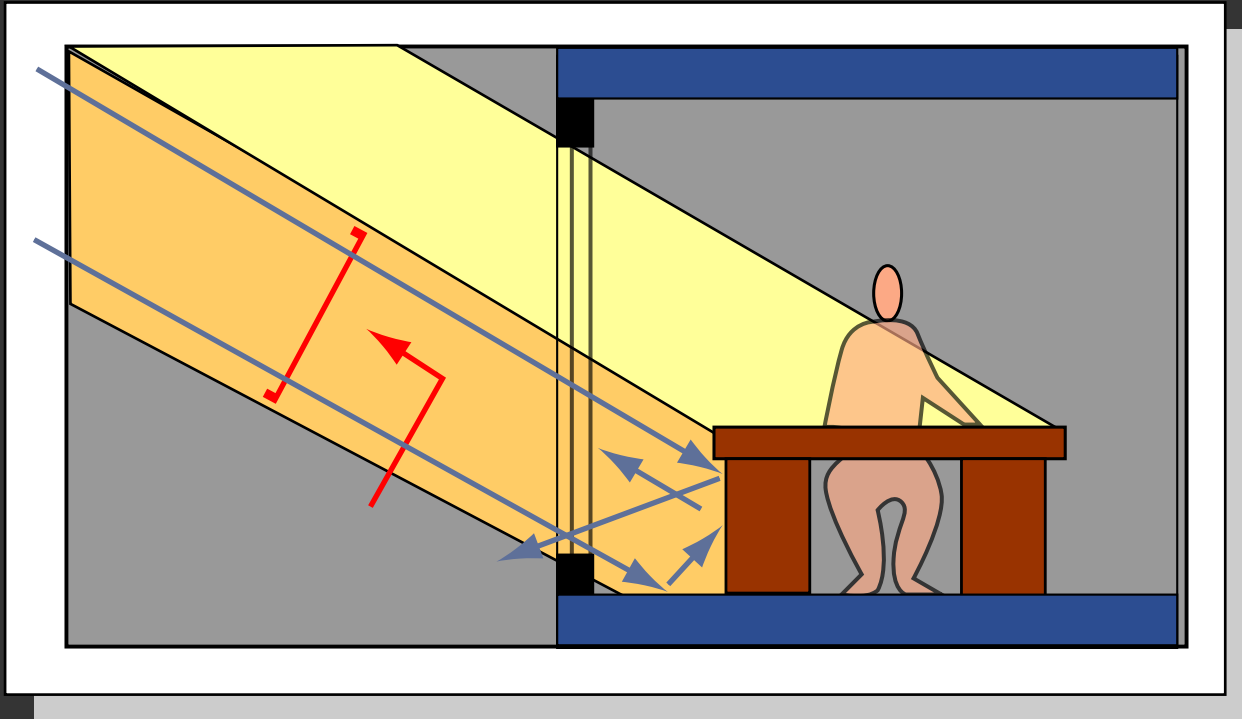


Figure by MIT OCW.

Daylight as a design factor

▶ Three aims when using natural light

- Collection
- Transport

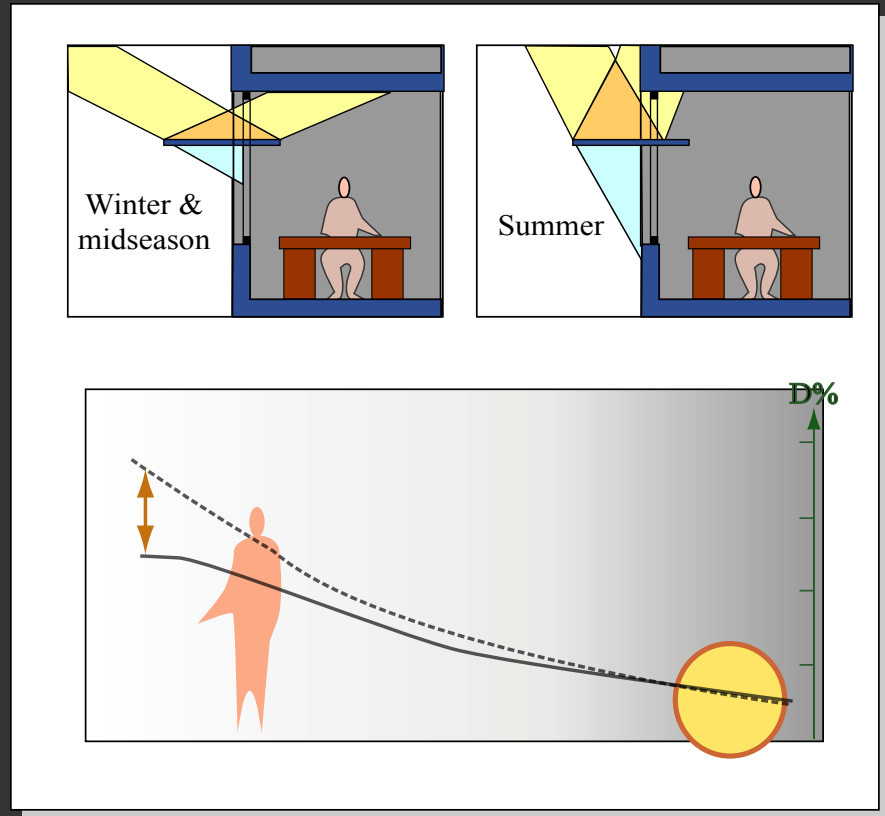


Figure by MIT OCW.

Daylight as a design factor

- ▶ Three aims when using natural light
 - Collection
 - Transport
 - Distribution

Daylight as a design factor

- ▶ Main parameters in daylight availability
 - Climate and weather

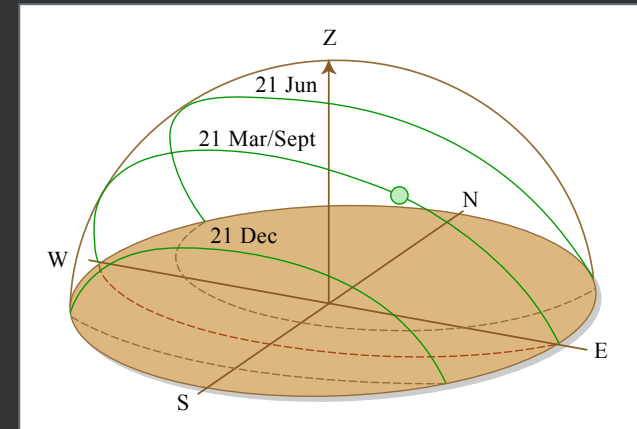
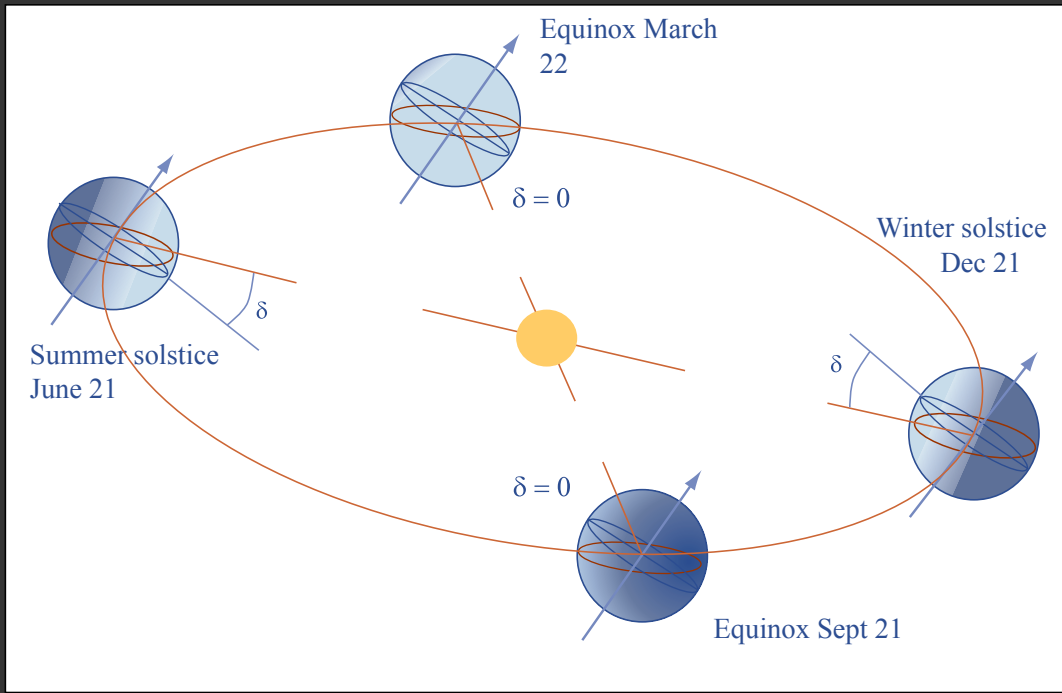


Courtesy of Bernard Paule. Used with permission.

Daylight as a design factor

► Main parameters in daylight availability

- Climate and weather
- Sun course (latitude, time/date)



Daylight as a design factor

- ▶ Main parameters in daylight availability
 - Climate and weather
 - Sun course (latitude, time/date)
 - Sun and sky access
 - orientation, mask, design of opening

Daylight as a design factor

- ▶ What do we want to do?
 - maximize daylighting, but avoid glare
 - maximize solar gains in winter
 - protection from solar gains in the summer and fall

Daylight as a design factor

▶ How do we do it?

- siting and orientation
 - Seinäjoki Library by A. Alto

Daylight as a design factor

▶ How do we do it?

- siting and orientation
- sizing and positioning
 - openings and room depth

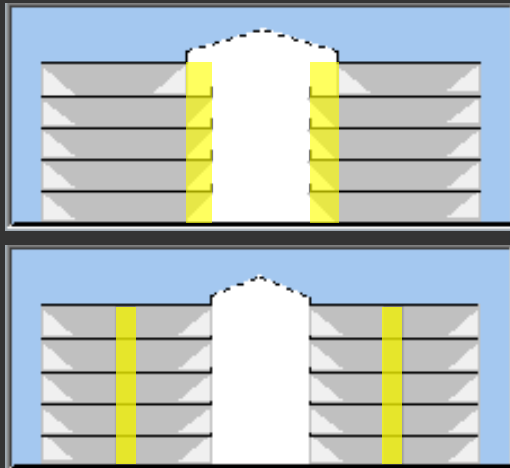
Sahara West Library and Museum by Meyer et al.

N.-D. du Haut by Le Corbusier - Exeter Library by Kahn

Daylight as a design factor

▶ How do we do it?

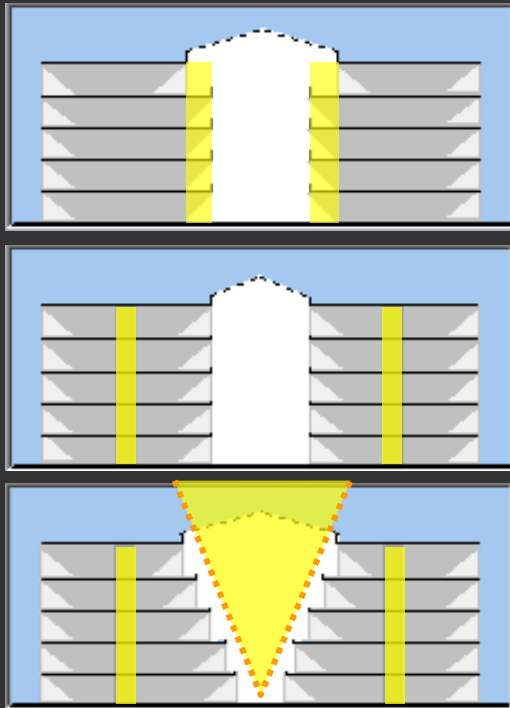
- siting and orientation
- sizing and positioning
 - Atrium
 - Bürohaus PRISMA by Auer+Weber



Daylight as a design factor

► How do we do it?

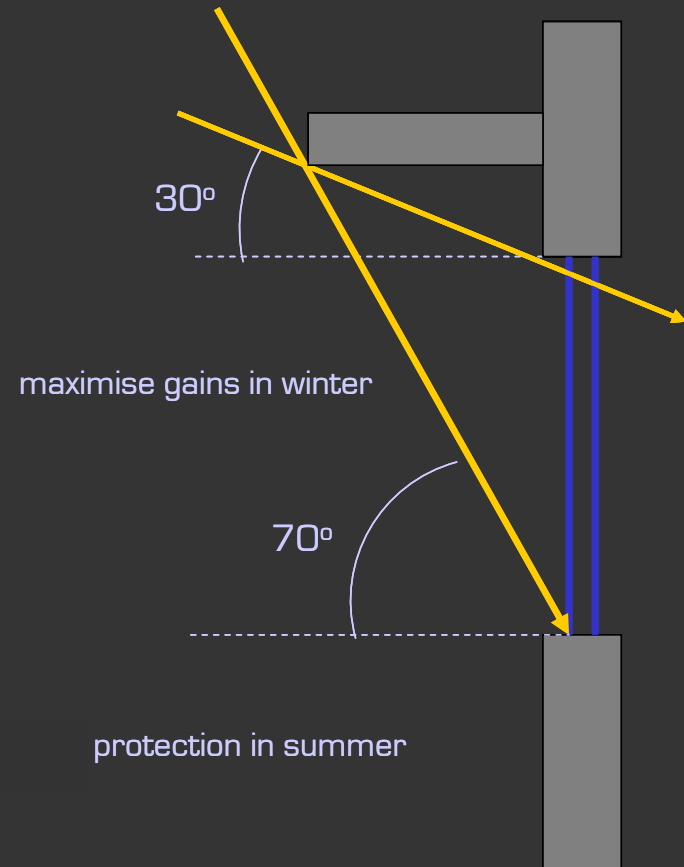
- siting and orientation
- sizing and positioning
 - Atrium
 - Genzyme HQ by Behnisch & Behnisch



Daylight as a design factor

► How do we do it?

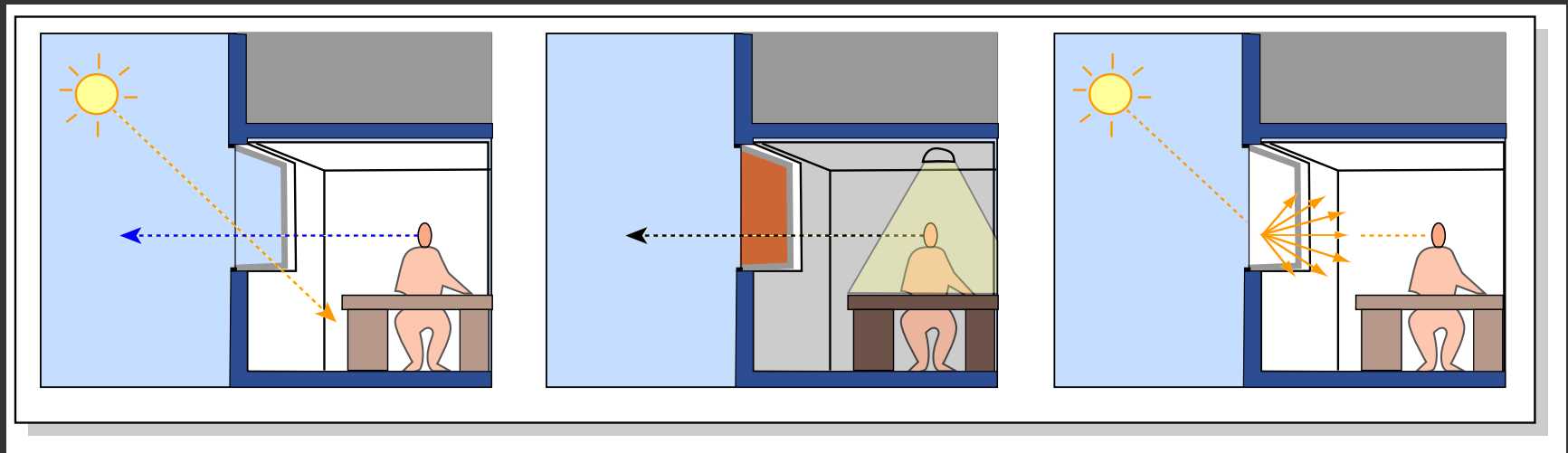
- siting and orientation
- sizing and positioning
- solar protections
 - fixed
 - mobile
 - orientation



Daylight as a design factor

► How do we do it?

- siting and orientation
- sizing and positioning
- solar protections
- glazing selection



Daylight as a design factor

▶ How do we do it?

- siting and orientation
- sizing and positioning
- solar protections
- glazing selection
- framing

Daylight as a design factor

▶ How do we do it?

- siting and orientation
- sizing and positioning
- solar protections (fixed / mobile)
- glazing selection
- framing
- indoor surface colors

Daylight as a design factor

► How do we do it?

- siting and orientation
- sizing and positioning
- solar protections (fixed / mobile)
- glazing selection
- framing
- indoor surface colors
- advanced systems / materials

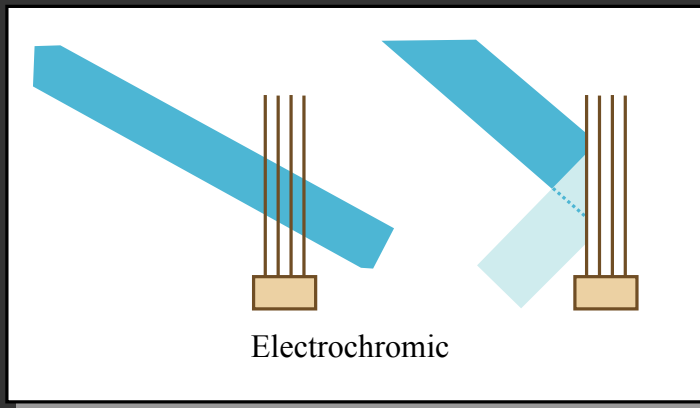


Figure by MIT OCW.

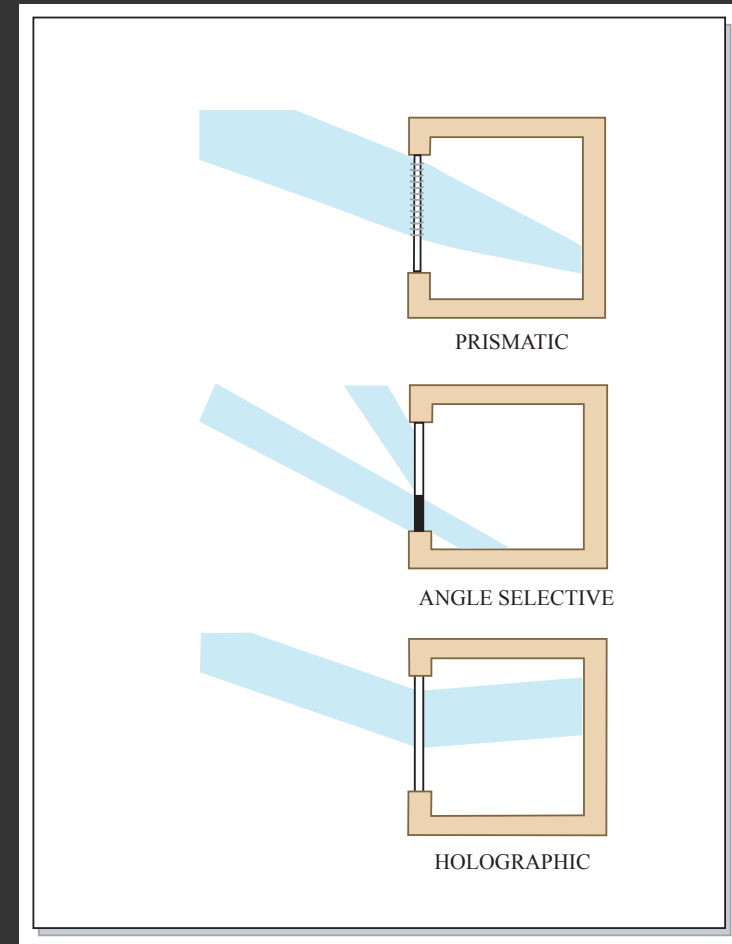


Figure by MIT OCW.

Designing with Natural Light

► Readings relevant to lecture topics:

- "Heating Cooling Lighting" by Lechner: Chaps 9 + 13
- "Introduction to Architectural Science" by Szokolay: § 2.3 - 2.4