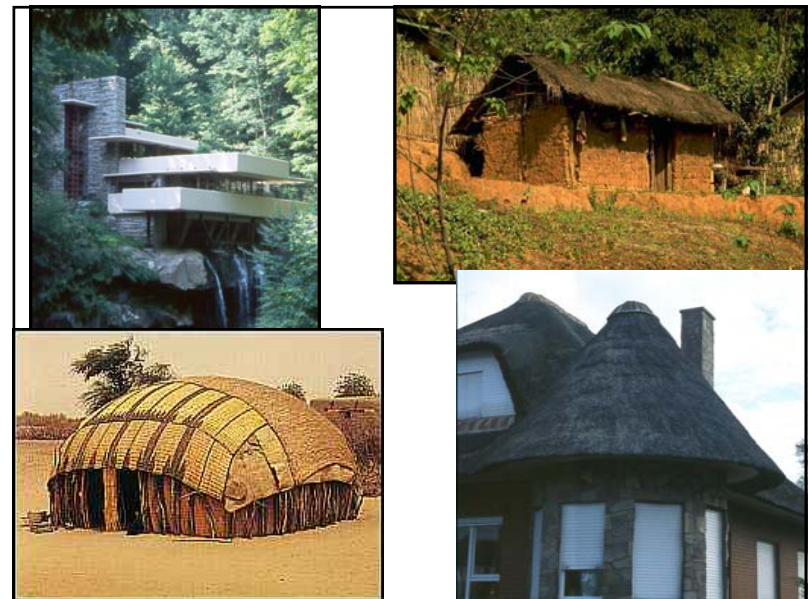
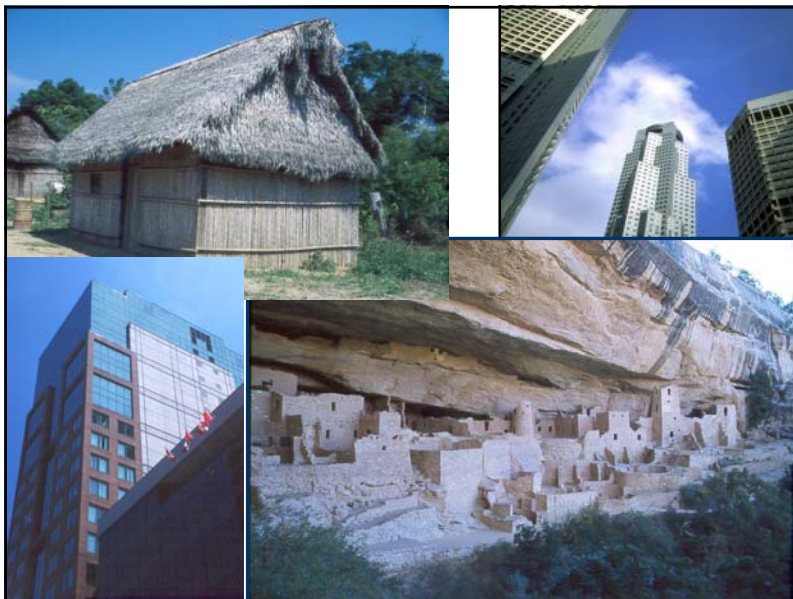
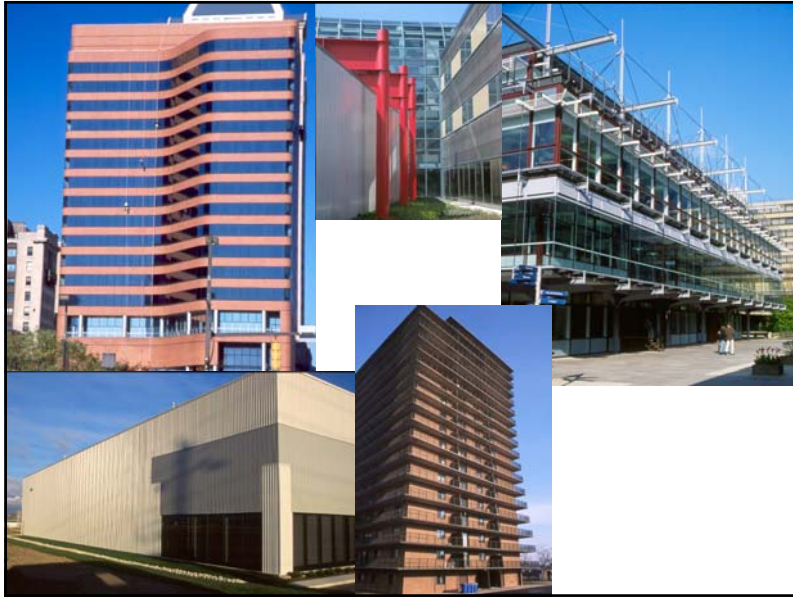


ARCH 673 – Building Science

Buildings, Climate & Site



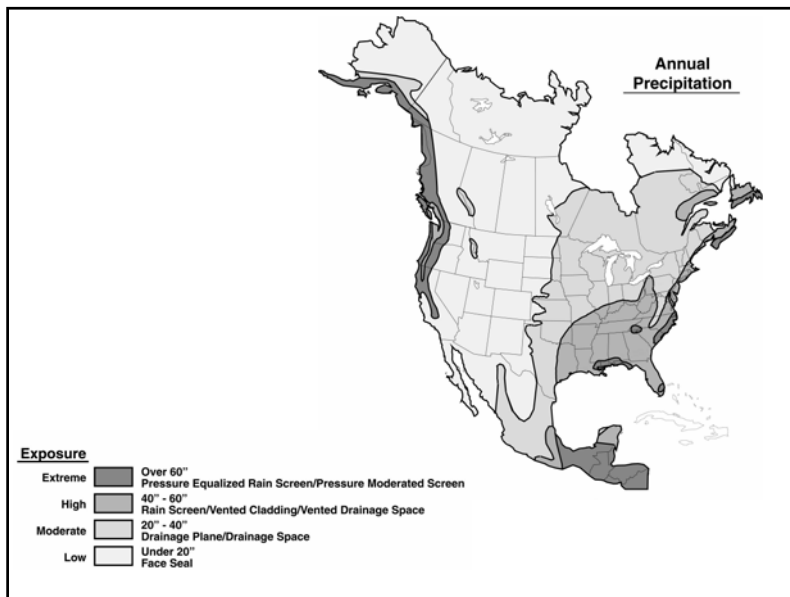
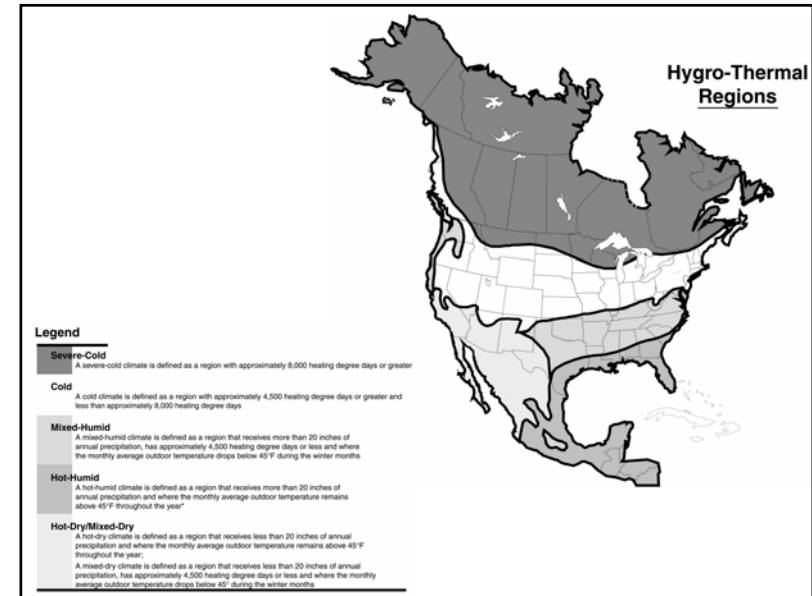
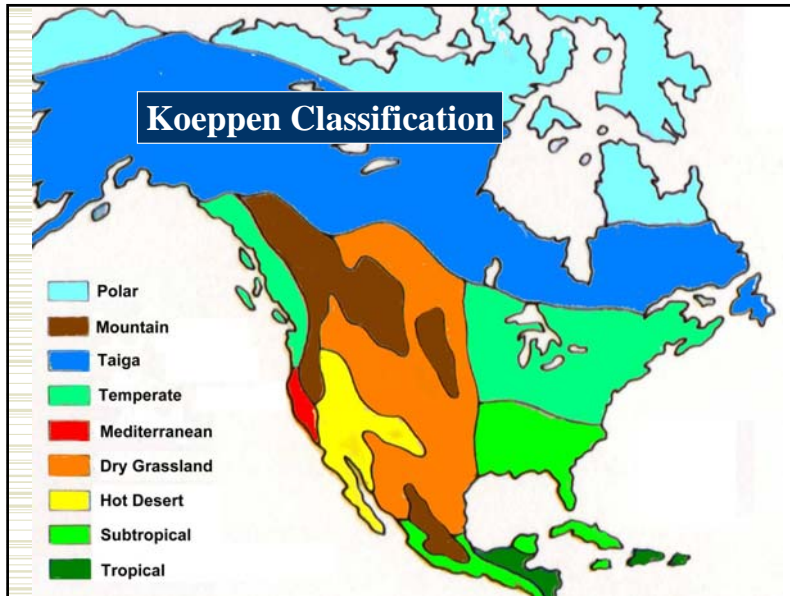


Why such differences? Art?

- ♦ Usually create buildings to provide an interior environment
- ♦ Must be aware of exterior environment
- ♦ Building:
 - Shape,
 - Size,
 - Orientation,
 - Glazing use
 all interact with building use and climate

Climate Parameters

- ♦ Temperature
- ♦ Humidity
- ♦ Sun
- ♦ Rain
- ♦ Wind



Climate Zone

- ♦ Vernacular experience indicates the type of building appropriate
 - Vernacular cant help us much with large buildings
- ♦ Primary Determinants for Buildings

Climate Zone

Climate Zones:

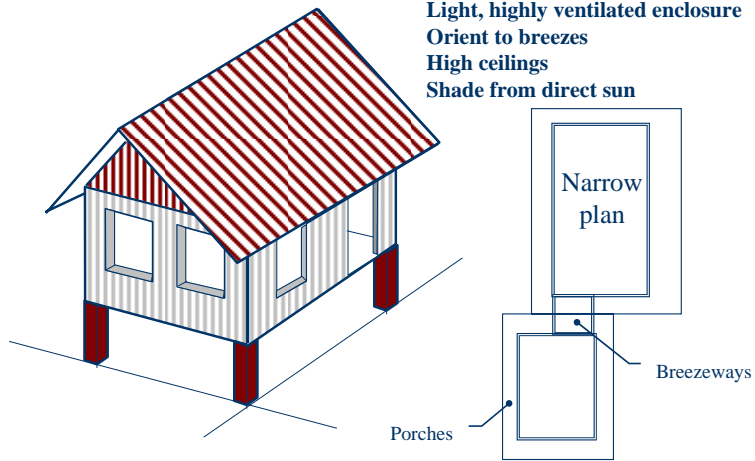
- Hot-Humid
 - Hot-Arid
 - Mixed
 - Cold-Humid
 - Cold-Dry
- ♦ Different strategies are used for each

Hot-Humid Climate

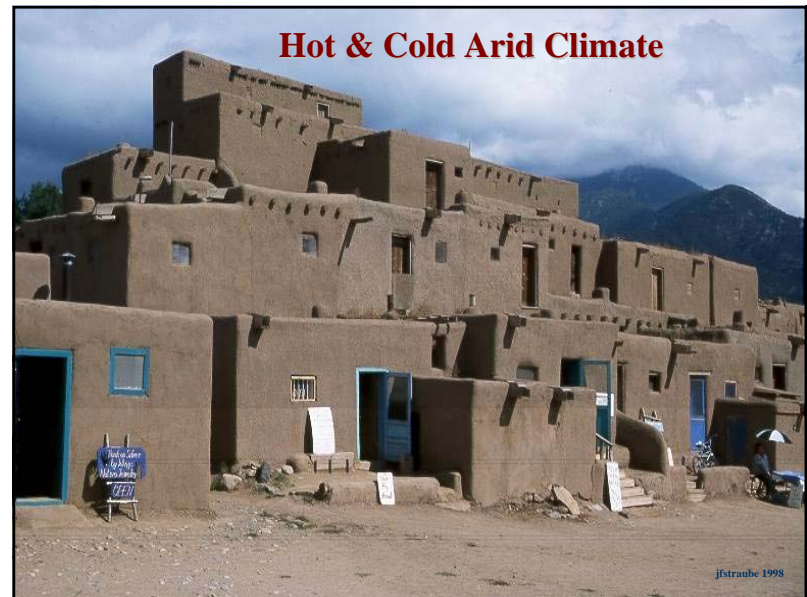


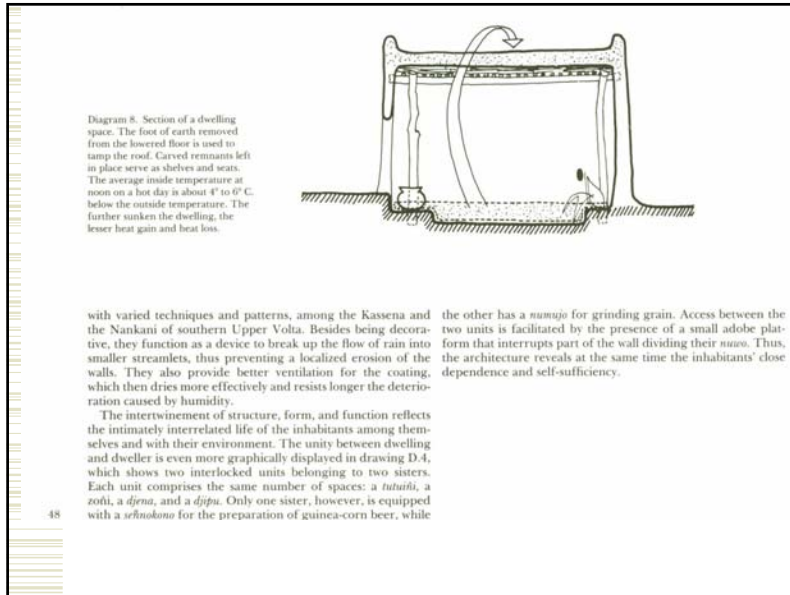
Hot-Humid

Light, highly ventilated enclosure
Orient to breezes
High ceilings
Shade from direct sun



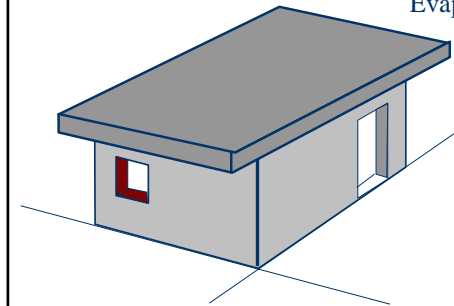
Hot & Cold Arid Climate





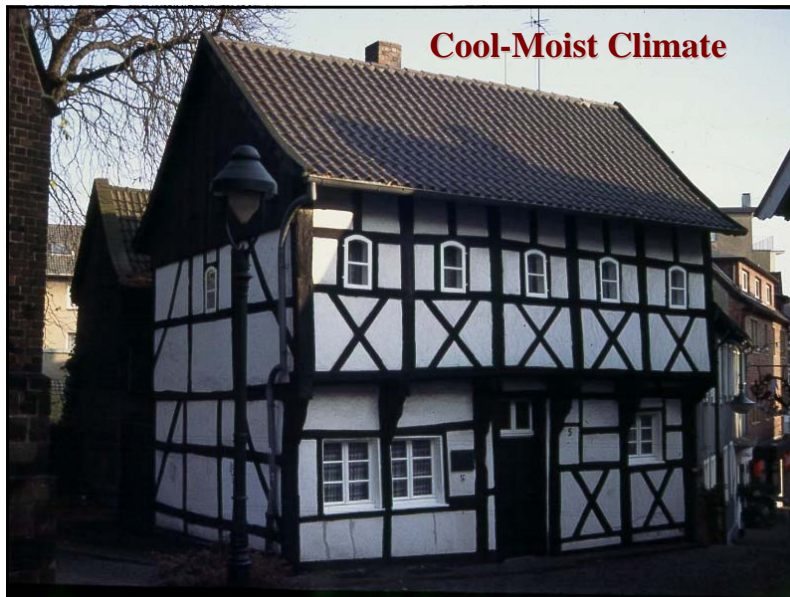
Arid Climate (Hot and Cold)

High mass - moderate temperature
Few or shaded windows
Overhangs for solar shade
Evaporative cooling / solar chimney



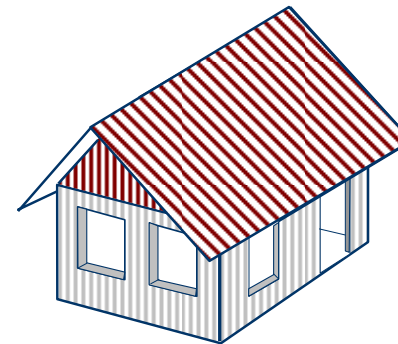
Towns: Narrow
Streets

Stocky
Plan



Cool-Moist

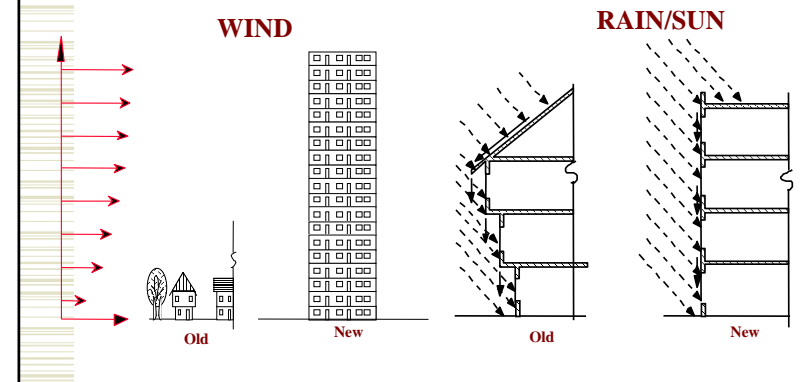
Collect sun in winter
Shade sun in summer
Shelter from rain
Shelter from winter wind



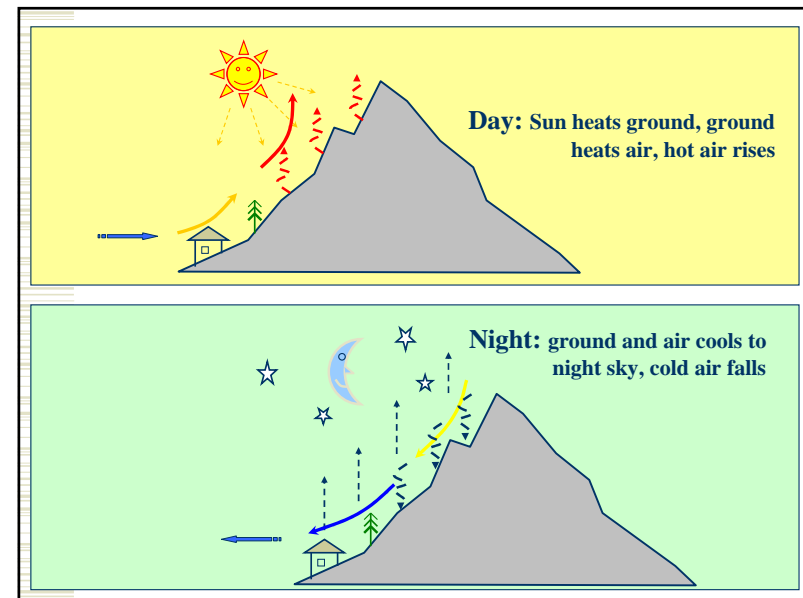
Site/Microclimate

- ♦ Can be modified
- ♦ Great savings & improved comfort possible
- ♦ SUN - heating or shade, solar chimney
- ♦ WIND - cooling or ventilation
- ♦ TOPOGRAPHY - hill top versus valley
- ♦ PLANTING - sun, rain, wind protection
- ♦ Ponds, reflective snow, etc
- ♦ Orientation

Gradients



Overhangs - Surface - Drainage - Shelter

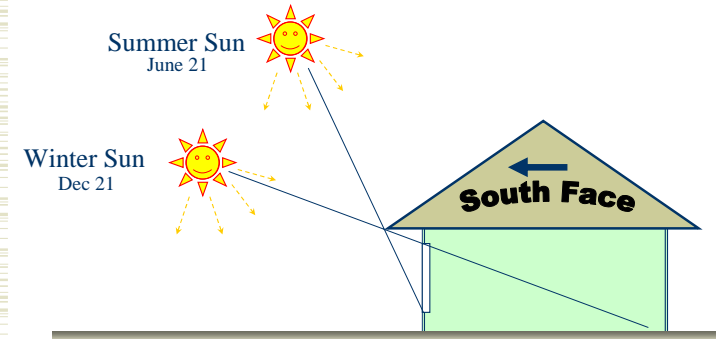


City planning has a large impact on the micro-climate

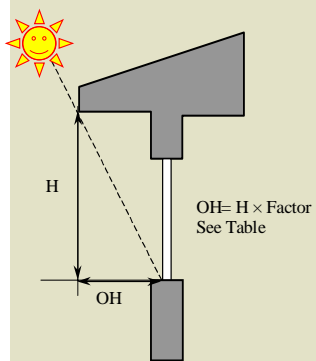


Solar Control - Shading

At high noon

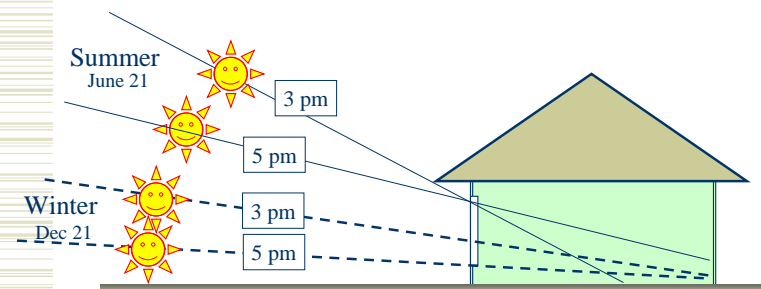


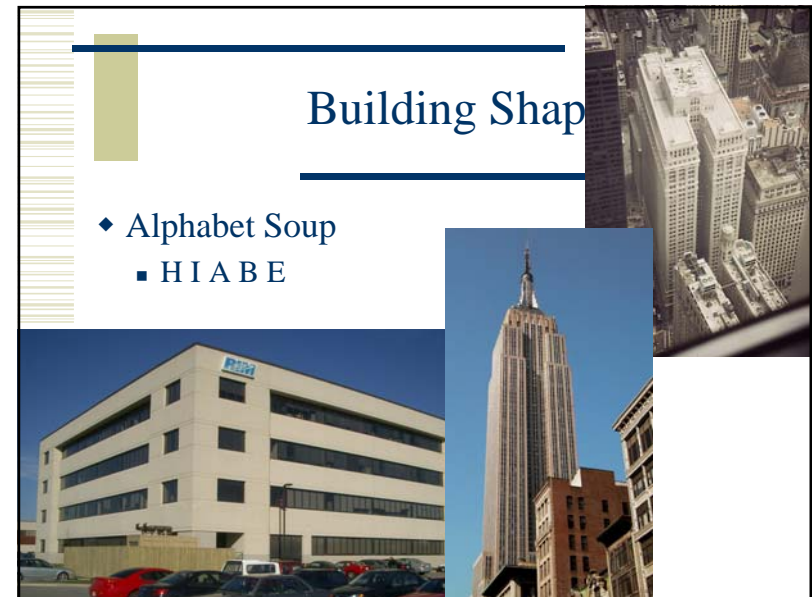
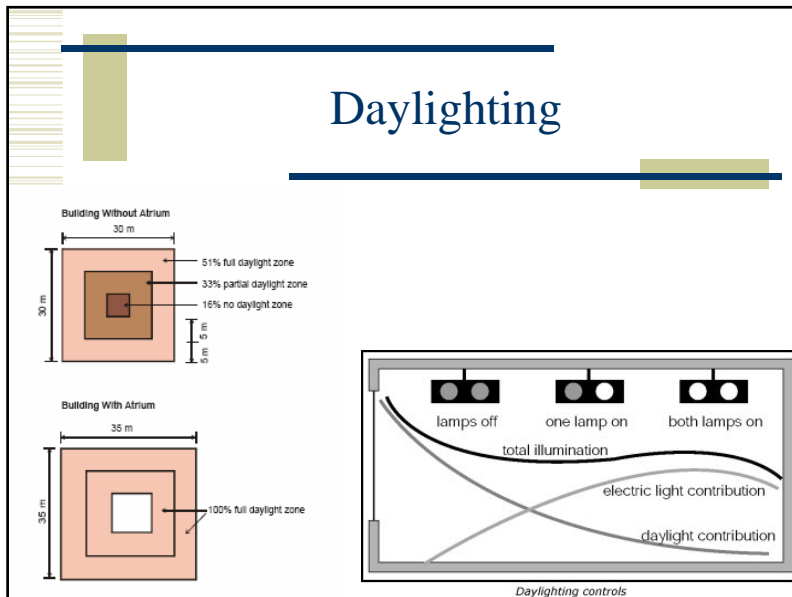
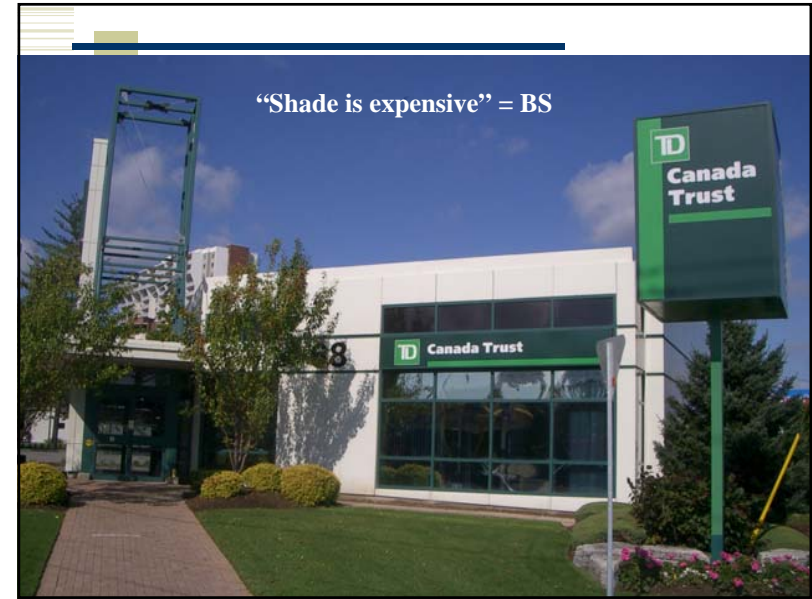
South Shading



Degrees Latitude	June 21 Only	May 10 to Aug 1
28	0.09	0.18
32	0.16	0.25
36	0.22	0.33
40	0.29	0.40
44	0.37	0.50
48	0.45	0.59

East-West Shading





Website

- ♦ Review some photos of different geography
- ♦ University of Waterloo

Building

Engineering

Group

www.civil.uwaterloo.ca/beg

