PANTHEON

137 AD: Rome, Italy

In Rome, Italy, the spring (April to May) and fall (September to October) have mild temperatures and sunny skies. The summer months have hot and humid temperatures, while the winter months are briskly cold but still fairly sunny. The oculus is the main source of light for the Pantheon, as well as the large opening at the entry doors. The oculus allows sunlight in as a focused beam, which creates a large circle of light within the space.

12:00 pm June  

12:00 pm December

Daylight Analysis

The above diagrams represent the amount of illuminance measured in footcandles for the Pantheon. The summer solstice and winter solstice are both shown, and provide the actual measurements dispersed over the floor plan. The diagrams show an abundance of daylight within the space, which can be attributed to the sheer size of the 700 square foot oculus at the top of the dome. However, the winter solstice does limit the amount of light due to the position of the sun in the sky.

Solar Geometry

The solar geometry shows the sun path diagram that represents the annual changes in the path of the sun through the sky. This diagram provides a unique summary of solar position that a designer can refer to when considering shading requirements and design options.
illuminating the past, present, and future with natural light

**PANTHEON**

Digital Renderings

Interior Renderings

The oculus, a round opening in the ceiling, at the top of the domed structure allows light in, and provides the main light source for the temple. Openings in buildings for religious purposes were often placed high in the structure to emphasize the ethereal quality of the heavens and direct the focus upward. The Pantheon as an architectural whole is not “illuminated” by the oculus, as there is no luminous effect in later structures like the Hagia Sophia. Instead, the light entering the interior from the oculus is focused as a beam of light, which is most effective in strong sunlight.

9:00 am March

9:00 am June

9:00 am December
HAGIA SOPHIA

537 AD: Istanbul, Turkey

In Istanbul, Turkey, the spring (April to May) and fall (September to October) have temperatures that are moderate and the skies are generally clear. The summer months have hot and humid temperatures, while the winter months can have harsh winds and snow. Daylight penetrates the Hagia Sophia through 40 windows that fill the dome, and as the windows are placed in the drums of the dome, the dome appears to float over the open space. The central space, in turn, is very well-lighted, with the side spaces becoming dark and obscure.

Daily Conditions - June 22nd

Solar Geometry
The solar geometry shows the sun path diagram that represents the annual changes in the path of the sun through the sky. This diagram provides a unique summary of solar position that a designer can refer to when considering shading requirements and design options.

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UNITY TEMPLE

1906 AD: Oak Park, Illinois

In Oak Park, Illinois, the spring (April to May) and fall (September to October) have mild temperatures and sunny skies. The summer months can be warm with humid temperatures, while the winter months have a fair amount of snow and wind. The Unity Temple captures much of the available daylight through clerestory windows and skylights, all of which are covered in patterned art glass that diffuses the available sunlight.

Daylight Analysis
The above diagrams represent the amount of illuminance measured in footcandles for the Unity Temple. The summer solstice and winter solstice are both shown, and provide the actual measurements dispersed over the floor plan. Comparing the data reveals that the winter sun at noon provides an average illuminance level around 10 footcandles in the center area of the temple, while the summer sun provides an average of around 40 footcandles in the same space.

Solar Geometry
The solar geometry shows the sun path diagram that represents the annual changes in the path of the sun through the sky. This diagram provides a unique summary of solar position that a designer can refer to when considering shading requirements and design options.

illuminating the past, present, and future with natural light
UNITY TEMPLE

Digital Renderings

The Unity Temple sought to employ the daylight as both a source of illumination and provide a heavenly experience within the temple. Clerestory windows and skylights covered with art glass provide the main sources of illumination, and all of these are well above ground level to give the impression of light coming from the heavens above. The lower portion of the temple is unbroken by windows or doors, except for the tall, thin vertical lancet windows that bring natural light into the darker areas for visibility. The various windows work together to provide abundant natural light within the temple.

Interior Renderings

9:00 am March

9:00 am June

9:00 am December

illuminating the past, present, and future with natural light