

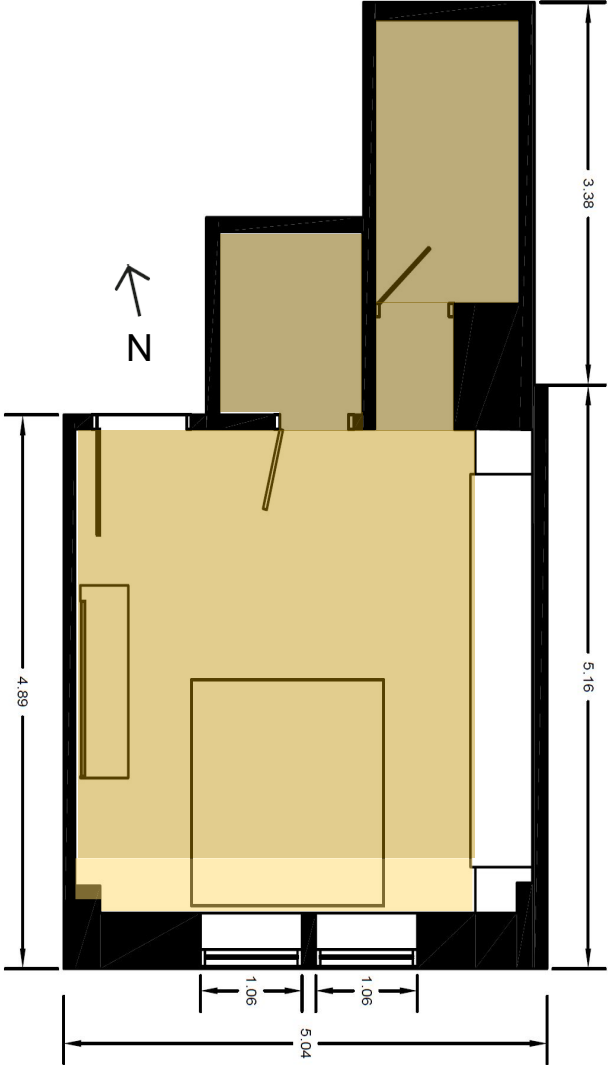
Daylighting Simulation

Philadelphia Apartment

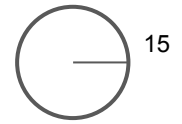
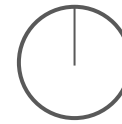
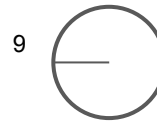
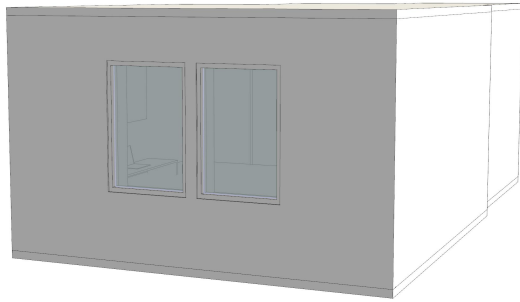
Intuitive Prediction

This lighting diagram comes from an intuitive analysis: spaces where you can read a book in proper daylight. The apartment is small, but the windows are small as well.

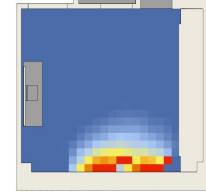
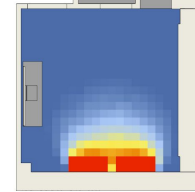
The only place that receives proper daylight seems to be right next to the windows. The workstation receives little light, but screen lighting compensates (and there is little glare during occupation hours).



- Proper Daylight
- Not-so-proper Daylight
- Very poor Daylight



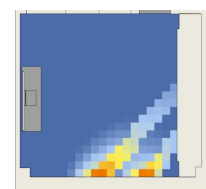
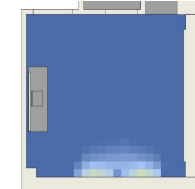
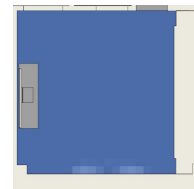
March 21



September
21



December
21

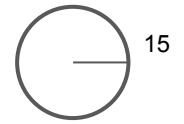
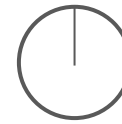
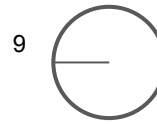
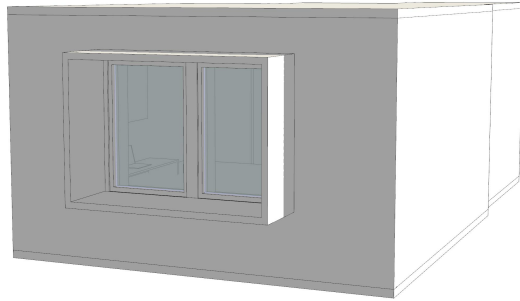


Grid-Based Analysis

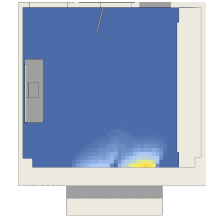
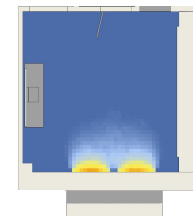
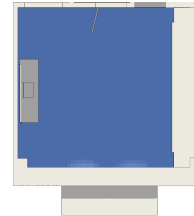
Current Glazing
No Shading

A grid-based analysis was done for the critical points of the year on the existing space.

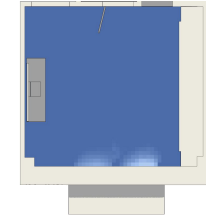
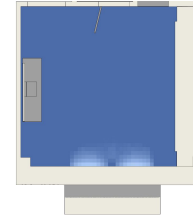
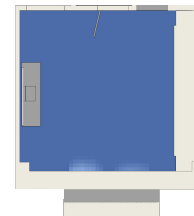
Most of the room surface seems to receive either too little or too much daylight throughout the year. Worst cases are December 21 morning (too little daylight) and March 21 noon (too much daylight).



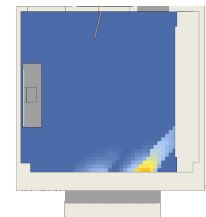
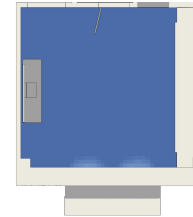
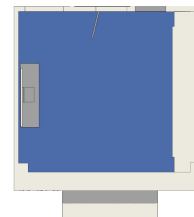
March 21



September 21



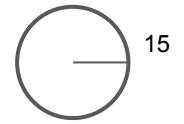
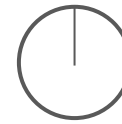
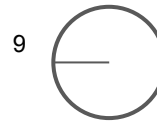
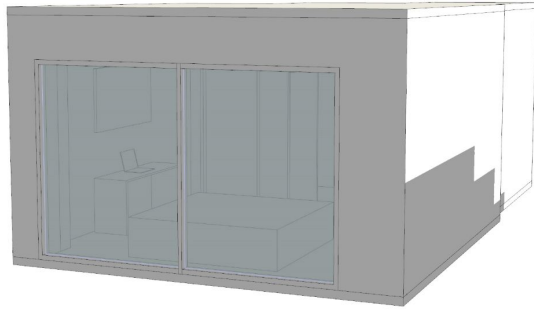
December 21



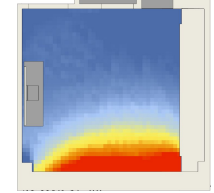
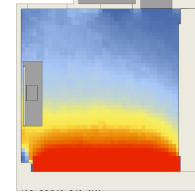
Grid-Based Analysis

Current Glazing
80cm Box Shading

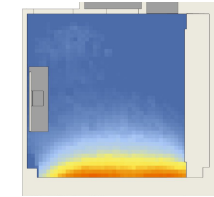
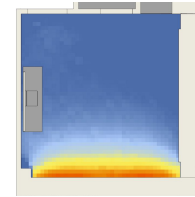
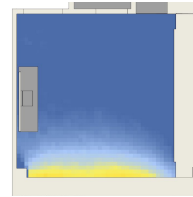
A 80cm shading was added to the exterior wall to both cover the windows and serve as a light shelf (bottom surface) to bounce light inwards. The result is mainly poor daylight.



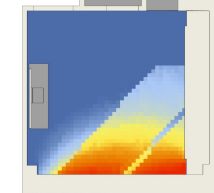
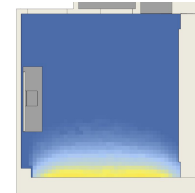
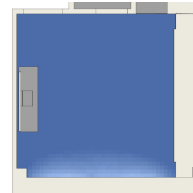
March 21



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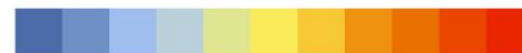


December
21



Legend:
Lux

300

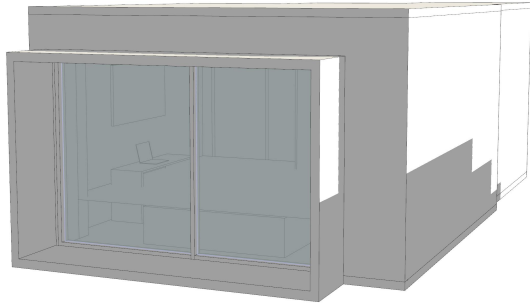


2000

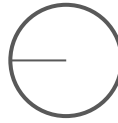
Grid-Based Analysis

Full Glazing
No Shading

To increase incoming daylight, glazed surface area was maximized.. This lets much more light in, but still needs some protection.



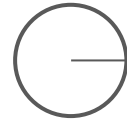
9



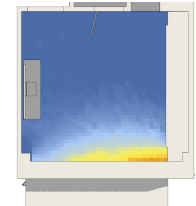
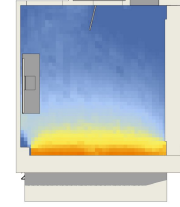
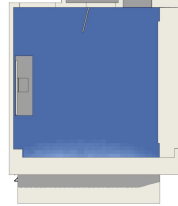
12



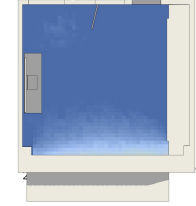
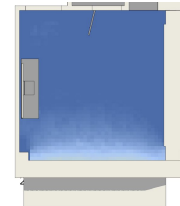
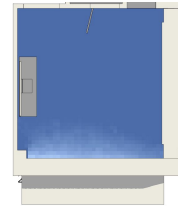
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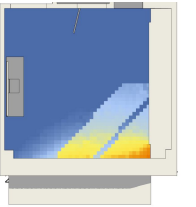
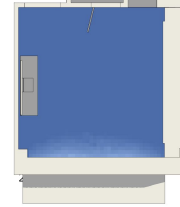
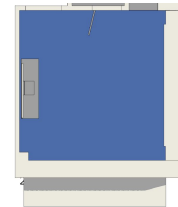
March 21



September
21



December
21



Legend:
Lux

300

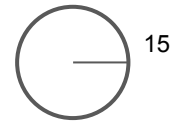
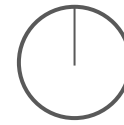
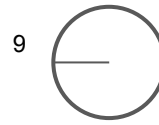
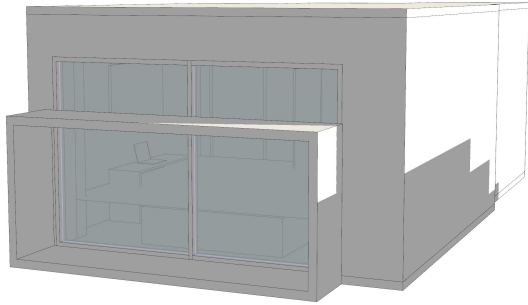


2000

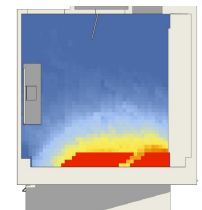
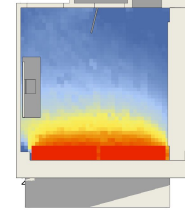
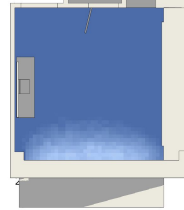
Grid-Based Analysis

Full Glazing
80cm Box Shading

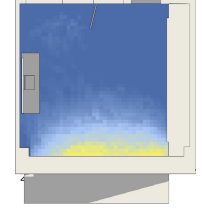
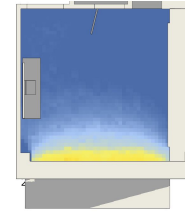
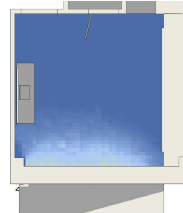
A similar box type shading was added to both provide shading and a surface to bounce light inwards. Glare was greatly reduced, but there is still uneven dispersion.



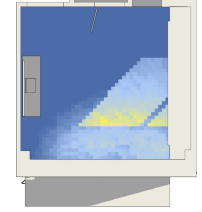
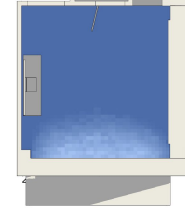
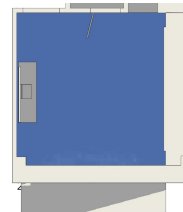
March 21



September 21



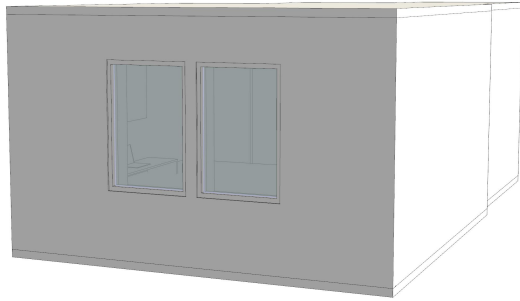
December 21



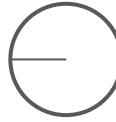
Grid-Based Analysis

Full Glazing
80cm Box Shading (improved shelf)

This version included an improved shelf for more even distribution of daylight.



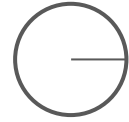
9



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March 21



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21

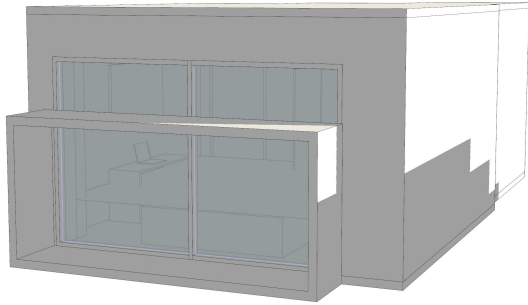


December
21

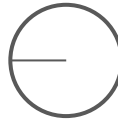
Glare Analysis

Current Glazing
No Shading

Error - Evalglare.exe



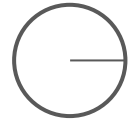
9



12



15



March 21



September
21



December
21

Glare Analysis

Full Glazing
80cm Box Shading (improved shelf)

Error - Evalglare.exe

Annual Analysis

Current Glazing
No Shading

Full Glazing
80cm Box Shading (improved shelf)

