

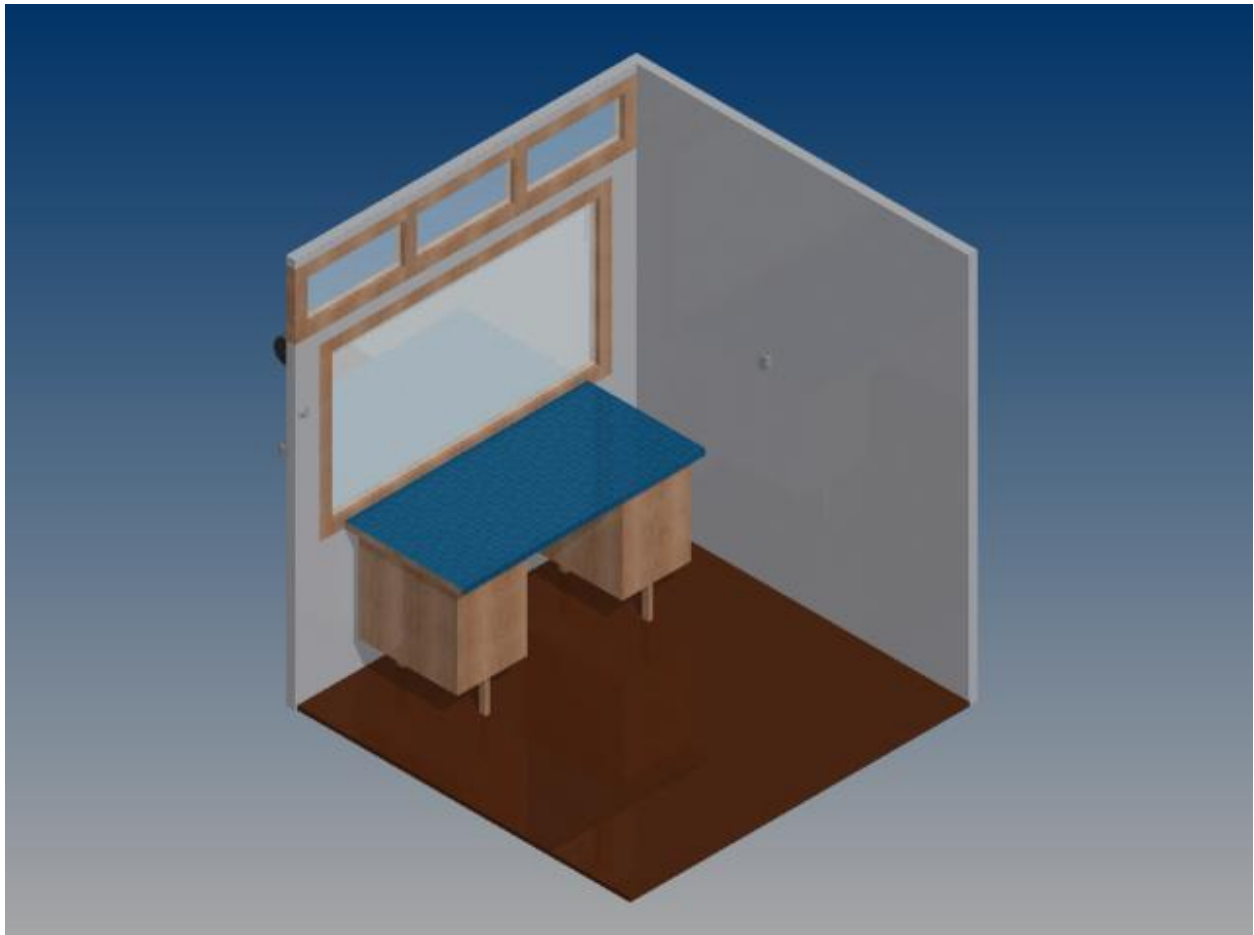
# The Robotic Room

687D

Every day, many people sit at a desk for hours at a time. While there, they often use man-made light, which requires electricity to be consumed. They also often use a heater or air conditioner to control the temperature in the room. We wanted to design a robotically-controlled room that would both allow natural light into the room and onto a desk, the only place where light is usually needed, and keep the temperature in the constant.

After looking through the Autodesk Sustainability Workshop, we brainstormed and decided that our room would have the following features:

1. Good Lighting Throughout
2. Intensified Lighting Near the Desk
3. Glare-free Windows
4. Unobstructed View
5. Automatic Light Switch
6. Temperature Control



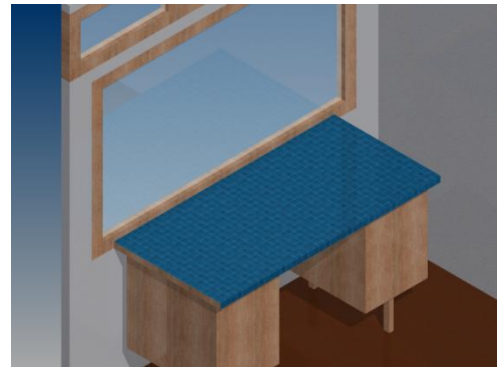
### **Good Lighting Throughout**

While looking through the Autodesk Sustainability Workshop, we found a Solar Decathlon House that had wide windows located near the roof. These windows were used to spread light throughout the room. We decided to use these windows in our room in order to accomplish the same task.



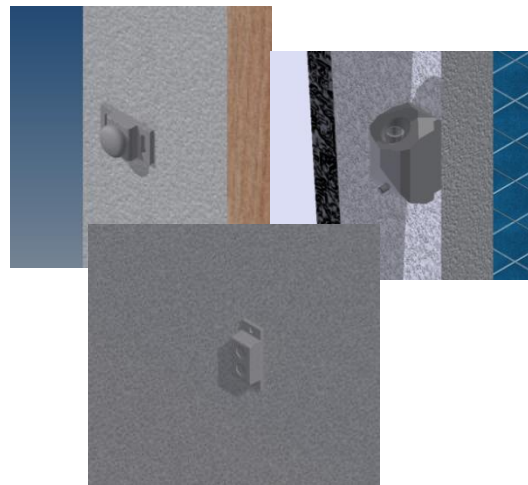
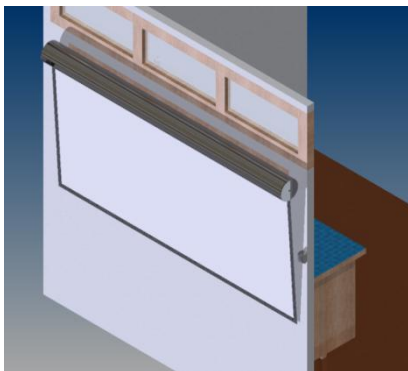
### **Intensified Lighting Near the Desk**

After some thinking, we decided the best way to allow natural light onto a desk was to place the desk next to a large window, and that is exactly what we did. This window also allows anyone sitting at the desk to have a nice, open view of the outside environment.



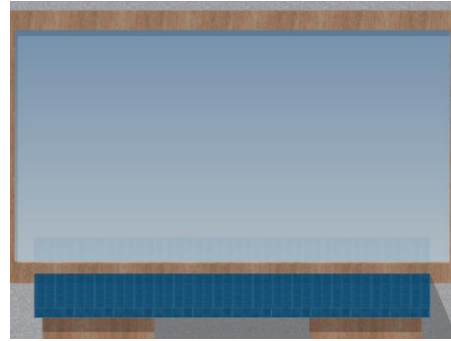
### **Glare-free Windows**

In order to prevent anyone sitting at the desk from being irritated by glare, we added a sun blocker outside the window. Sensors located around the room track the location of the sun and the location of any person inside, and they then send the data to a processor which decides how far the blocker needs to extend to prevent sunlight from traveling straight into any eyes in the room. There is also a manual override switch that allows people to manually control the location of the sun blocker.



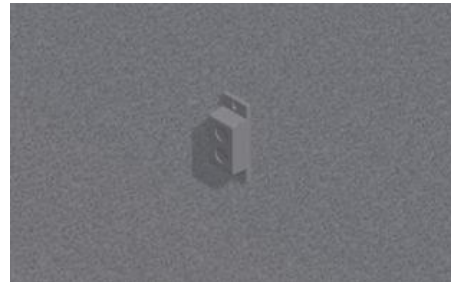
### **Unobstructed View**

The processor was designed to keep the sun blocker low enough to block the sun but high enough so that anyone's view is not blocked. The manual adjustor can also be used to lift the sun blocker out of view.



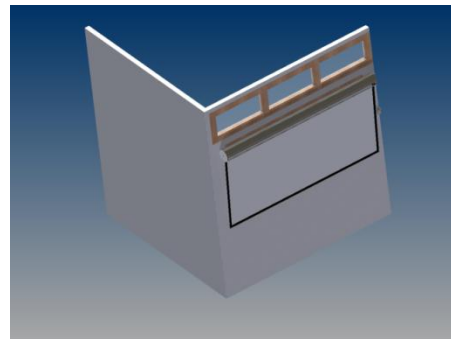
### **Automatic Light Switch**

Our room is equipped with an automatic light switch that automatically turns the light on and off. The light uses sensors to determine when man-made light is necessary. There is also a manual override switch that allows users to turn the light on and off whenever they choose to do so.



### **Temperature Control**

In order to control the temperature of the room, we decided to build the walls out of structural insulated panels and the windows out of low-E glass. We also placed the sun blocker outside of the room so that it blocks heat before it even enters the room. These three innovations can lower heating costs by 60%, saving both money and electricity.



### **Repeat**

We then looked back and thought about how our design could be improved. We decided to make the top of our desk glass with a layer of solar panels underneath. This allowed us to We also decided to make the sun blocker out of high density polyethylene, a material that is cheap and environmentally friendly due to its low MI value.

### **CAD Features**

A feature that was found to be very helpful in our CAD drawings was the Render function. By being able to render drawings, a more realistic image was created. This made it easier to apply the drawings in actuality. The mirror function aided us greatly in our drawings as well. By using this function, we were only tasked to create half of our intended object, thus reducing the actual time needed to create the different parts of our assembly.

### **Impact and the Autodesk Sustainability Workshop**

Our robotically controlled room would have a positive impact on the environment. The placement of the desk next to a large window not only allows the desk to be lit naturally, but also increases the efficiency of the solar panels located within the desk. The design of the sun blocker doesn't affect the amount of light hitting the desk, but prevents users from experiencing the irritation of glare. The efficient material the room is made of not only reduces the cost of heating the room, but also reduces the amount of electricity needed to power a heater. The Sustainability Workshop helped us think of all these ideas, meaning it basically shaped our entire project.