

# Tutorial: SketchUp

## Drawing a Cardboard Chair



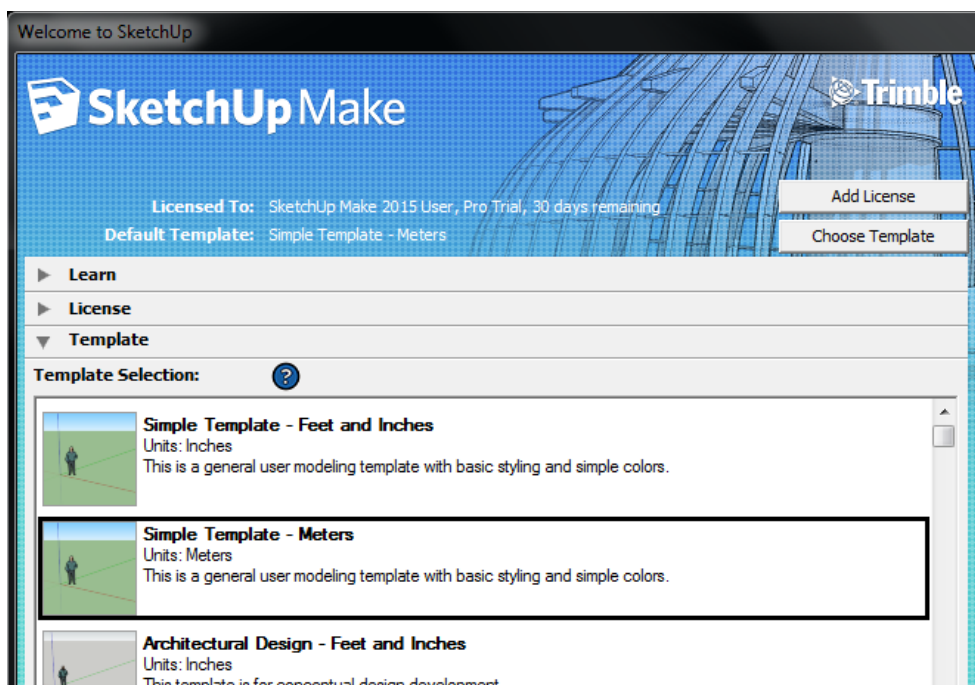
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SketchUp is a computer modeling tool used to create 3D drawings. You can download the free version *SketchUp Make* here: [www.sketchup.com](http://www.sketchup.com).

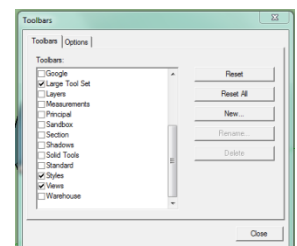
Video tutorials can be found here: <http://www.sketchup.com/learn/videos/58>

Once you open SketchUp it may ask you to select a template, which defines the units (meters versus inches) and the basic style of SketchUp. To change your template once you are in SketchUp, go to Window>Preferences>Template.

I selected the Simple Template with units in meters for my drawing.



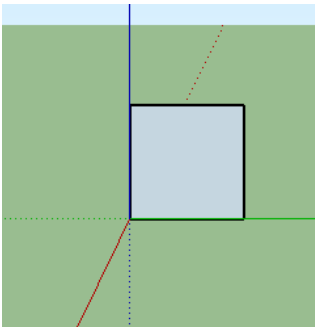
I then changed the view so that I was looking at the right side of the drawing by going to Camera>Standard Views>Right. I recommend adding the Large Tool Set and Views Toolbars by clicking Views>Toolbars... then checking the box for the Large Tool Set and Views toolbars and clicking on Close.



Spend some time experimenting with panning , rotating  and

zooming.  

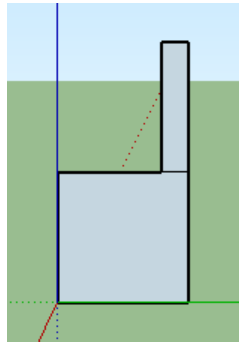
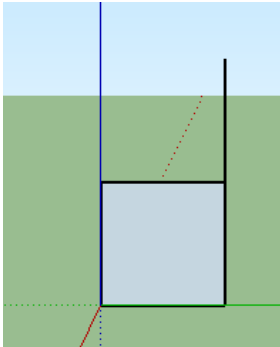




To start my cardboard chair, I drew a square that was 0.5m x 0.5m in size. To do this, first select the



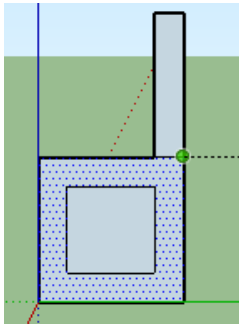
rectangle tool. Then click somewhere in the drawing – I started on the origin. Rather than clicking again, type in 0.5m, 0.5m to draw a square with those exact dimensions (you should see the dimensions as you type them in the bottom right corner of the screen. Note: the person in the drawing is for reference and may be deleted at any point.




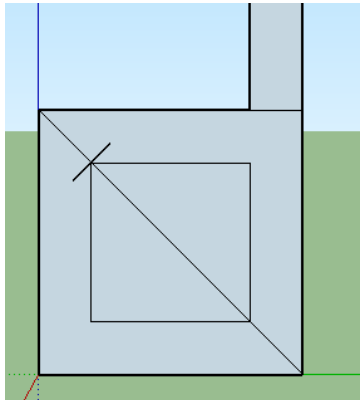
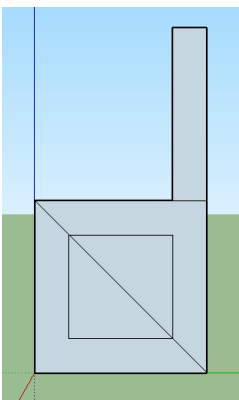
Now draw a line for the back of the chair by clicking on the line



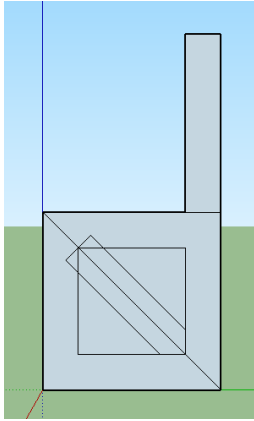
tool, then clicking on the upper right corner of the square, moving your cursor upward, and then typing 0.5m. I then added another horizontal line that was 0.1m long, and finally closed the line to create the back of the chair.



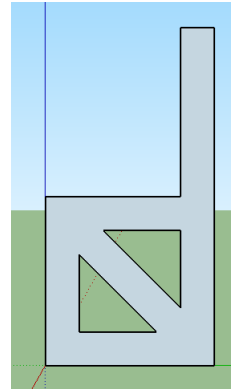
Now I'd like to give the lines some width using the offset tool . First click on the original square and then click on the offset tool, move your cursor toward the inside of the square, then click somewhere inside the square, and type in 0.1m to create a second, inner square.



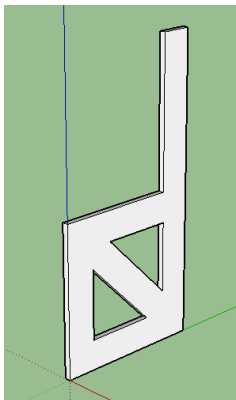
Next I drew a diagonal line through the square using the line tool and created two guidelines (I just used the line tool again). To add the guidelines click on the corner of the inner square; next hover over the diagonal line and then move the cursor so it is perpendicular to the diagonal line and type 0.05m. Do this in both directions.



Using these guidelines and by hovering over the diagonal line, I drew lines using the line tool that are parallel to the diagonal line on either side.



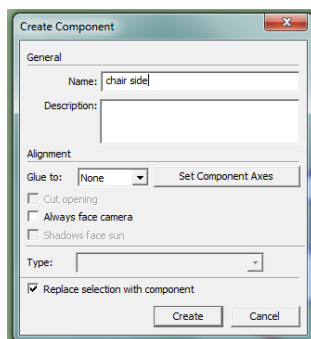
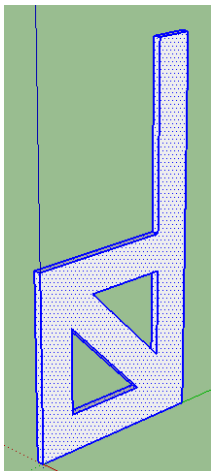
I used the eraser tool to erase all of the extra lines. And finally, I deleted the triangles by clicking on them and hitting the delete key. Now I have my basic form for the side of a chair.



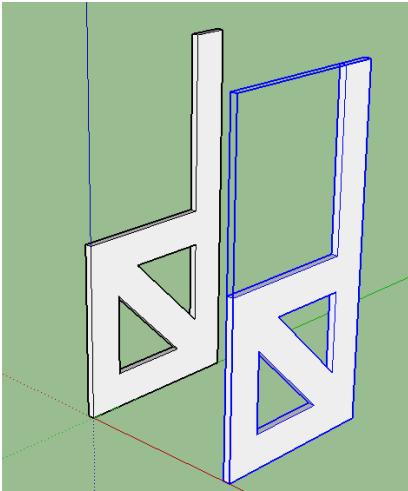
Use the push-pull tool to give the chair some thickness. Click on the push-pull tool, then click on the side of the chair we just drew, and type in the thickness. I made my chair side 0.02m mm thick. I also changed my view to an Iso View




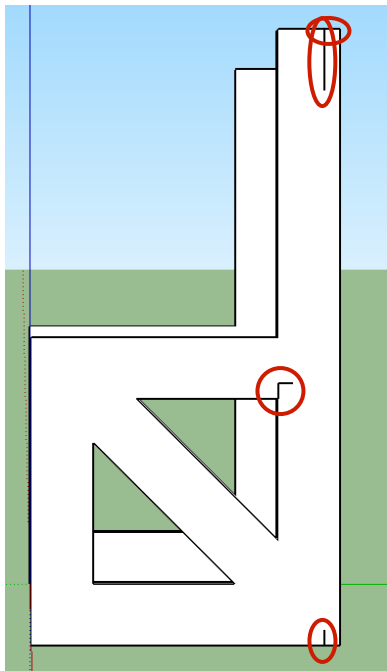
(Camera>Standard Views>Iso or ) so I could see the thickness.




Before I go any further I'm going to make this side of the chair a Component. Doing this will enable me to copy the entire component to other locations in my drawing. By making it a Component rather than a Group, any modifications I make to one of the components will automatically be made to all components. In contrast, if you make an object a Group, each group will be unique. To create a Component, click on the object three times (the outline of the side of the chair should turn blue). Now right click and select Make Component, which should open a dialog box. Name your component (I named mine 'chair side'). Note: SketchUp uses 'sticky geometry' so if you don't make the side of the chair a Component or Group you will have trouble moving forward.

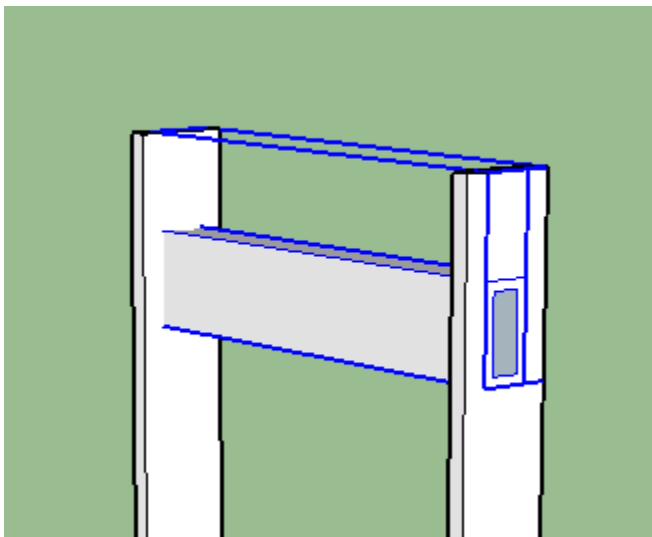


Now I'm going to make a copy of my chair side. To do this, click on the chair side and then click on the move button . Now click on the bottom corner of the chair, press the Ctrl key to copy rather than move, release the Ctrl key and type in 0.5m. You should now have two copies of the chair side.




Next I'm going to draw a back for my chair – using a rectangular tube. Let's first switch to a view of the side by selecting Camera > Standard

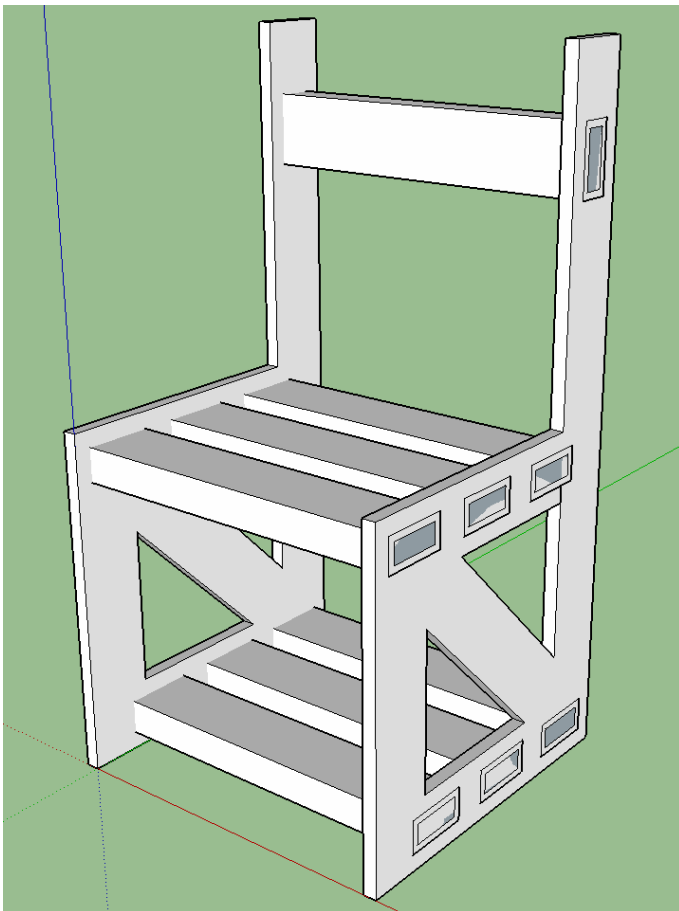
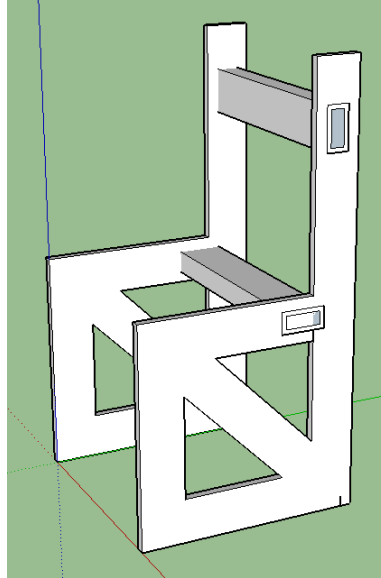
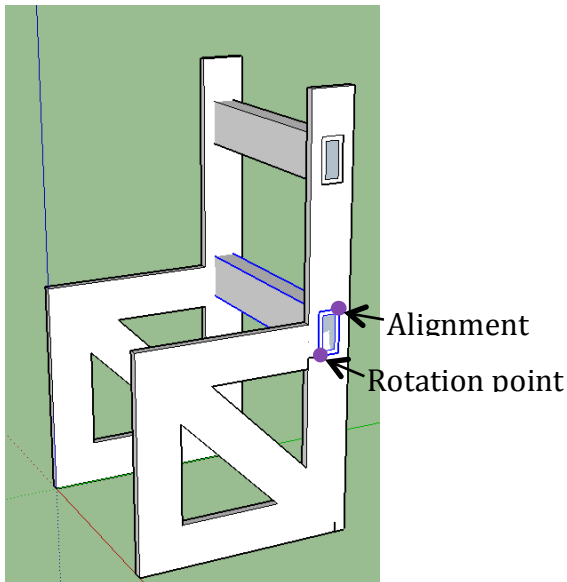
Views > Right or . Now draw a few guidelines (circled in red below); the shorter lines are 0.025m and the longer one is 0.1m.



Now I can draw a rectangle to represent the tubes I plan to use for the back of the chair. I drew my rectangle by starting at the end of my longer guideline and then typing 0.1, 0.05 to dimension it. Then I offset that rectangle inward by 0.01m using the offset tool. I used push-pull on the tube to create the back. Finally, I made the tube a Component so that I'd be able to copy it.

Next I copied my tube component down to make a seat. Note that I also rotated THE tube section

using the rotate tool . To rotate, select the tube, then click on the corner of the tube about which you want to rotate, then align the protractor by clicking on another point on the rectangle, finally rotate.



To finish off the seat and base I simply copied the tube for a total of 6 horizontally oriented tubes (note that I used a distance of 0.05m between tubes or 0.15m between the reference points).

← My finished chair!

\*\* There is a video tutorial of SketchUp Make in the course! Look for the last section Design Thinking \*\*