

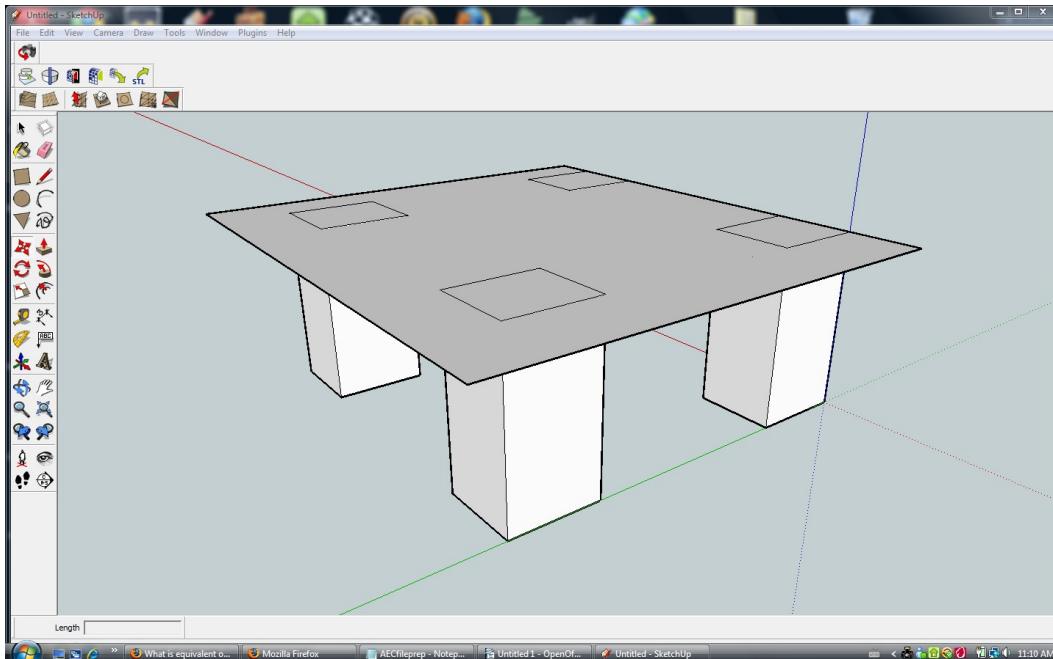
Things to watch for when preparing your file for 3D printing:

1. Extrude Planes
2. Scale
3. Planar Surfaces
4. Reversed Normals
5. Water Tight Geometry
6. Transparent Materials/Textures
7. Create Voids
8. Export Types

Extrude Planes

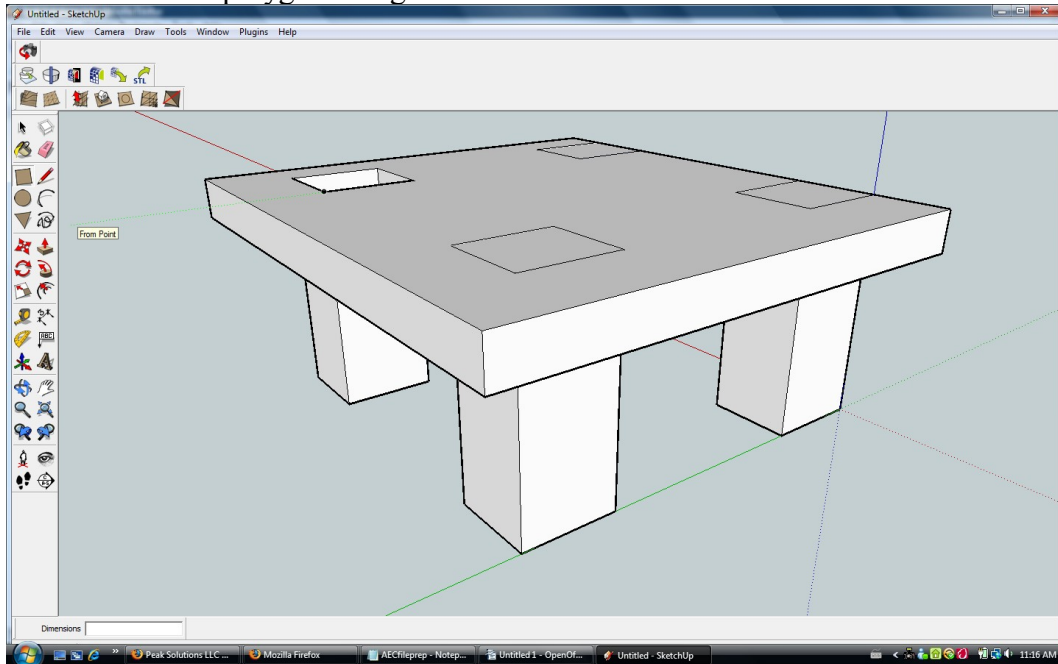
Make sure that in your CAD program that all planes or flat surfaces have a minimum of a 1mm (0.039") thickness. We generally target 2 mm (0.078") wall thickness, but this varies depending on where in the model the feature is. If thin planes are printed they make it impossible to handle the model without it falling apart.

Below is a picture of table that only has a plane for the top surface.



To correct this problem, simply extrude that surface to a minimum of 1mm according to the scale of your overall model construction.

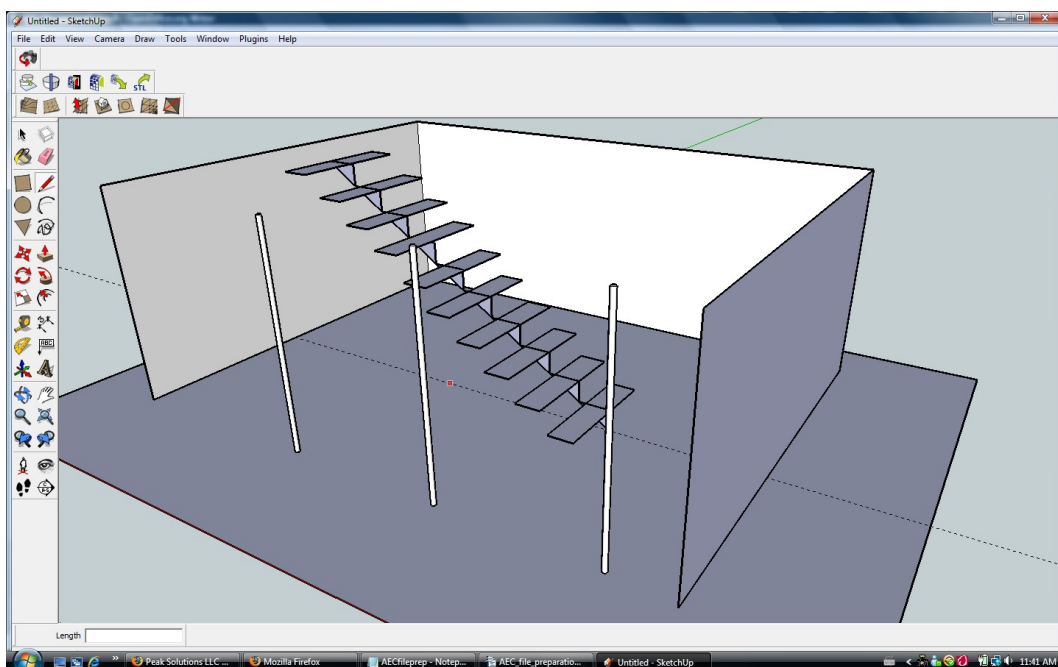
The picture below shows a polygon being extruded to a desirable thickness.



Scale

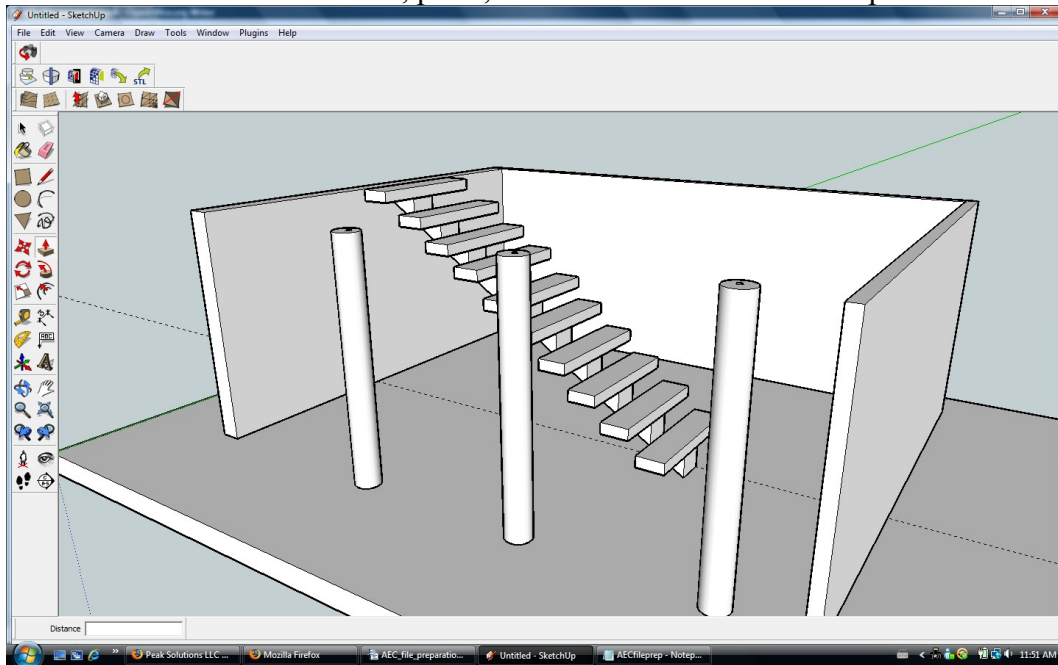
Scale is often the most trouble with large scale models of landscapes or architecture. When models are built to scale in the real world but scaled down to fit inside the build area in a 3D printer there are problems. A common problem with the scale of a building is the support structures and beams that simply become too thin to print when scaled down. Another common problem is railways and stairs that flatten down and shrink to an unprintable size. Also geometries that float in 3D space will not survive the print because that won't be attached to something firm and solid.

This sample of a room shows very thin features and the stairs are not connected to the wall and floor. Also the bottom floor is a plane and will not print out, thus causing the upper part of the model to be unstable.



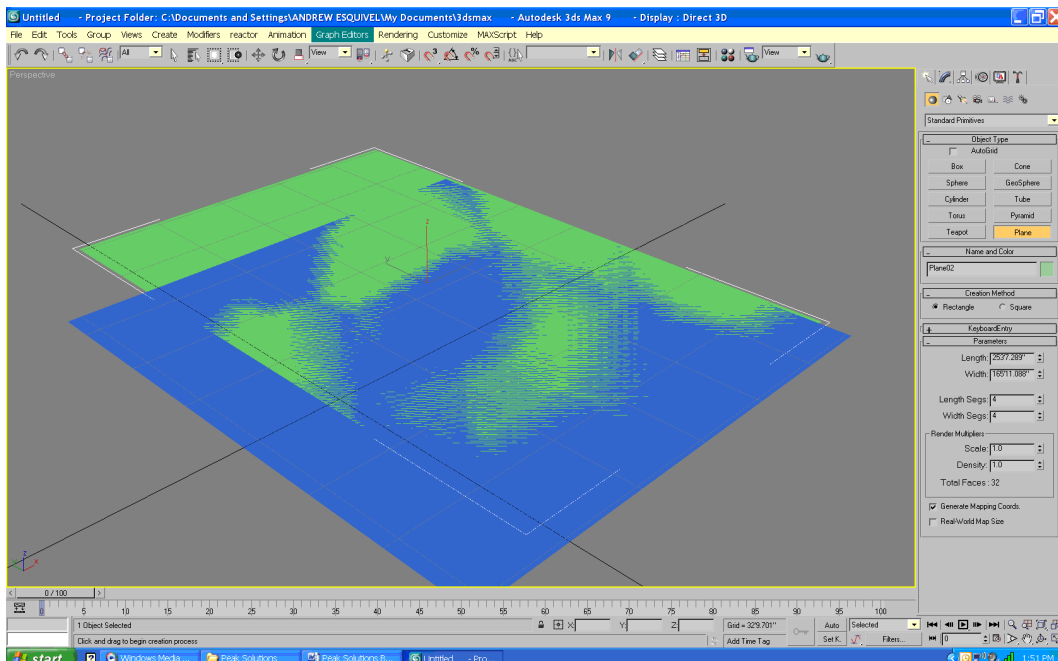
A way to correct these problems is to upscale your model in certain areas to make sure the 3D print will come out. One thing to remember while 3D printing is that all of the material used in the model is that same plaster based powder cured with a glue type binder.

Now you can see the room with the walls, posts, stairs and base extruded to a printable size.



Planar Surfaces

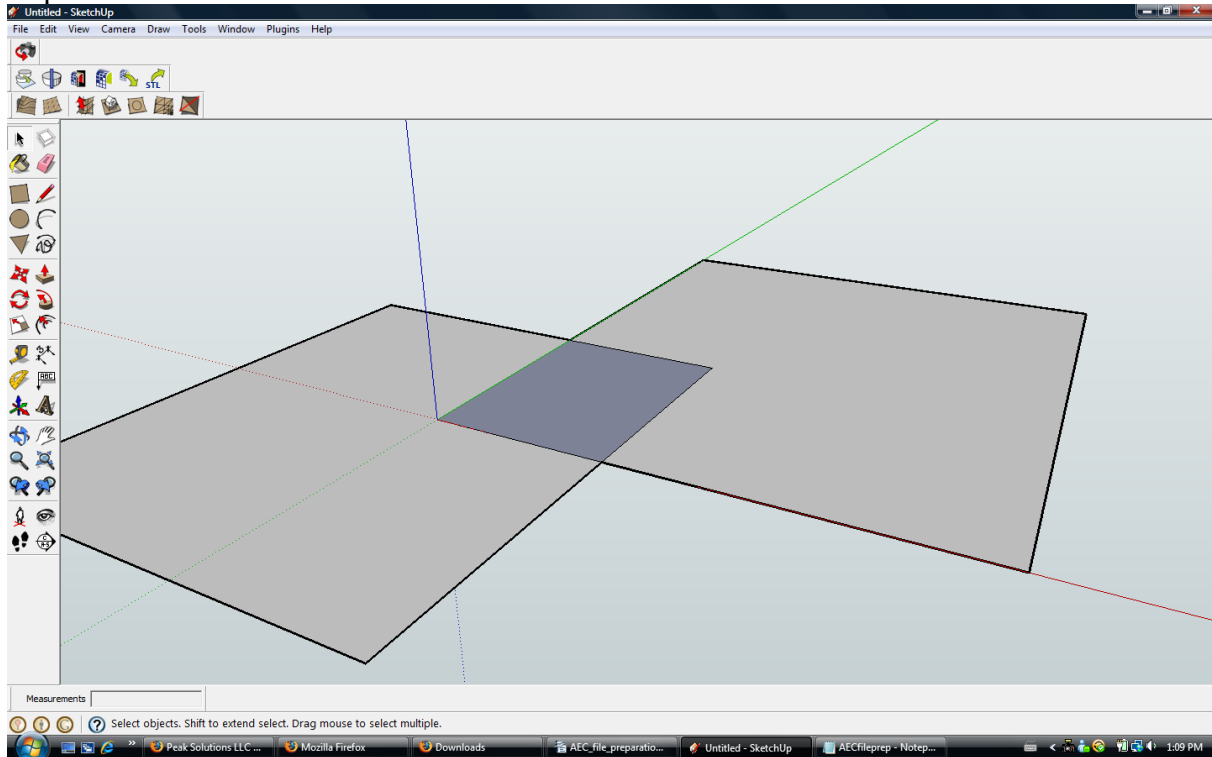
In the 3D modeling world when two surfaces lie directly on top of each other it's what is known as planar surfaces. It is easy to tell that a model has planar surfaces when you rotate the model around you will see faces that flicker and distort.



To correct this problem, delete the unnecessary plains or faces that are causing planar surfaces or extrude the faces so that they do not rest on top of each other.

Reversed Normals

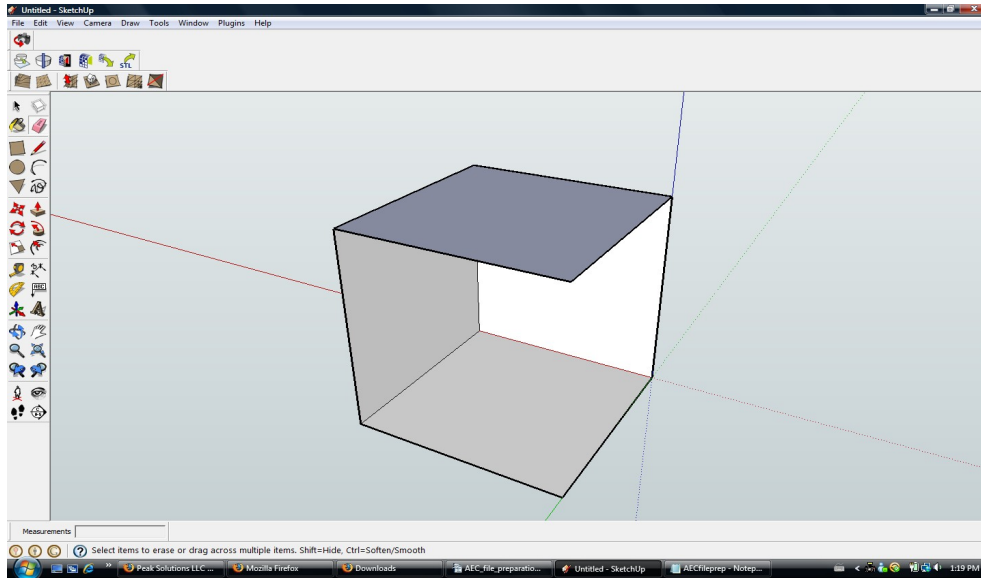
In 3D modeling a reversed normal is the direction that a face is pointed at. If a normal is pointed toward the outside of a model there is no problem for 3D printing. But if a normal is pointed toward the inside of the model it will make the geometry appear to be blacked out and when 3D printing nothing will be printed as a result of a reversed normal.



To correct these problems simply select the object in your CAD software and reverse the normals.

Watertight Geometry

Watertight geometry means that there are no holes or gaps in your geometry. As you can see in the picture below the cube is missing some of its faces causing it to not be 'watertight'. Nothing will be printed because the 3D printer will attempt to print the very thin planes that make up the sides of the cube instead of the whole cube as a solid.

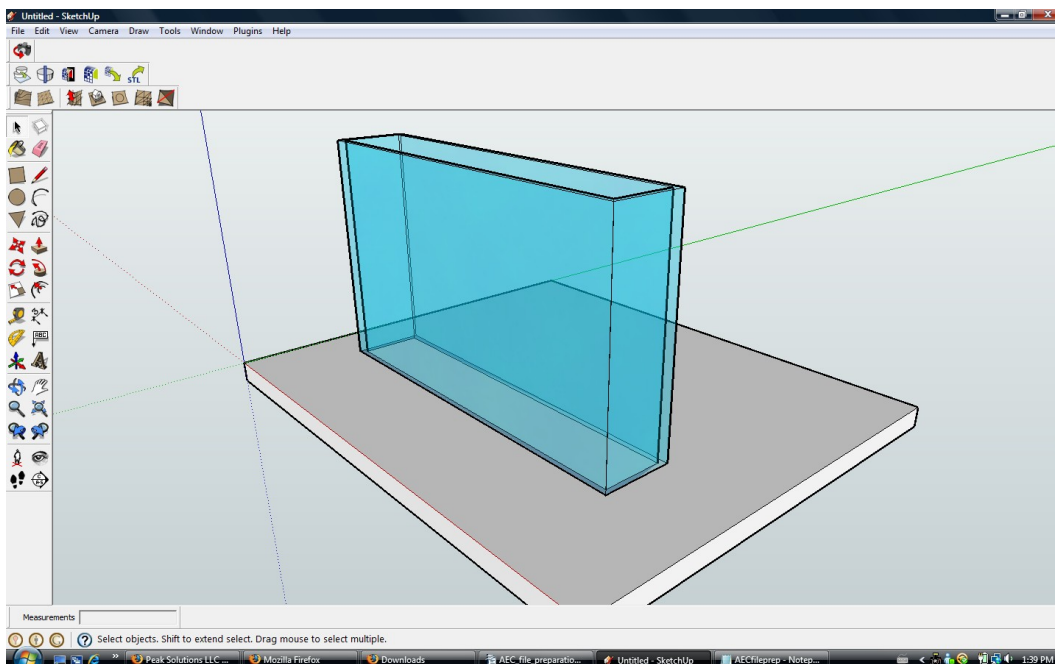


To correct this problem you will need to add the faces that are missing on the geometry until there are no holes or gaps in the geometry.

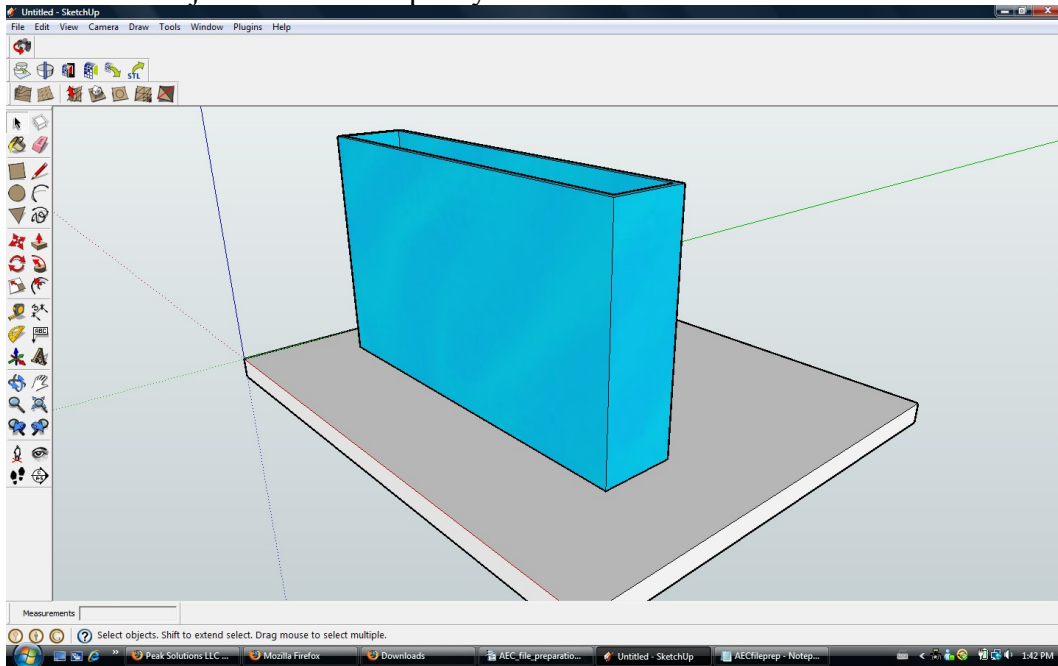
Transparent Materials/Textures

In many 3D CAD programs you can assign different types of materials to an object. One that can cause problems is transparent or opacity type materials or textures. If these are set to be less than 100% opacity then Z print won't exactly know what to do with transparent faces. In some cases it won't make a difference as long as the object is 'watertight' but in other instances it will cause the 3D model to be missing faces and not come out in the print or even cause anomalies in the print.

This picture shows an object with 30% opacity.



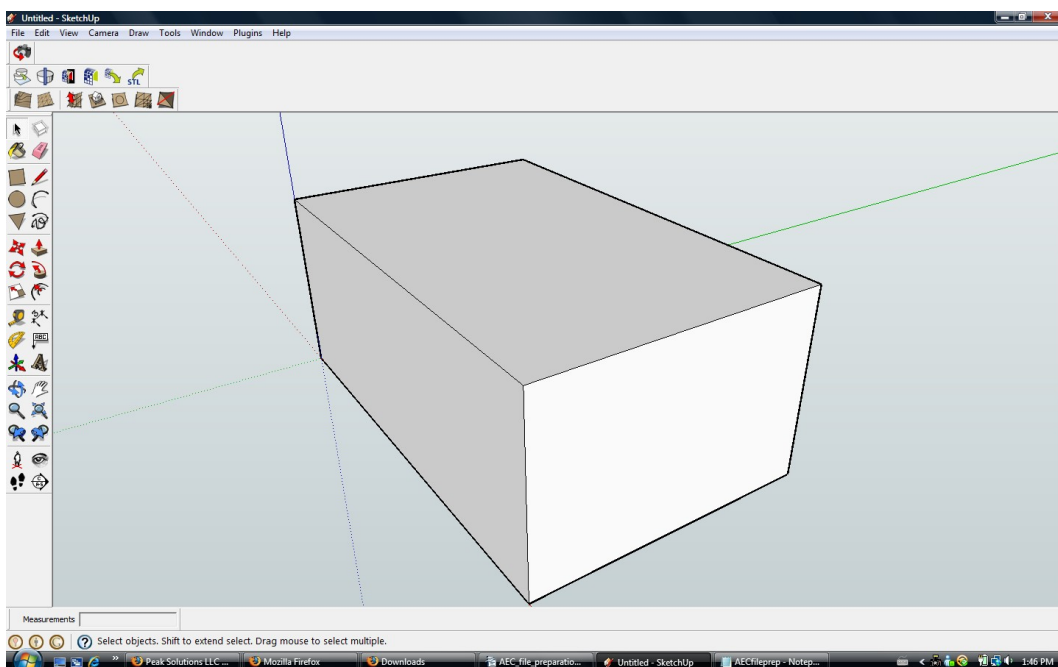
This picture shows an object with 100% opacity



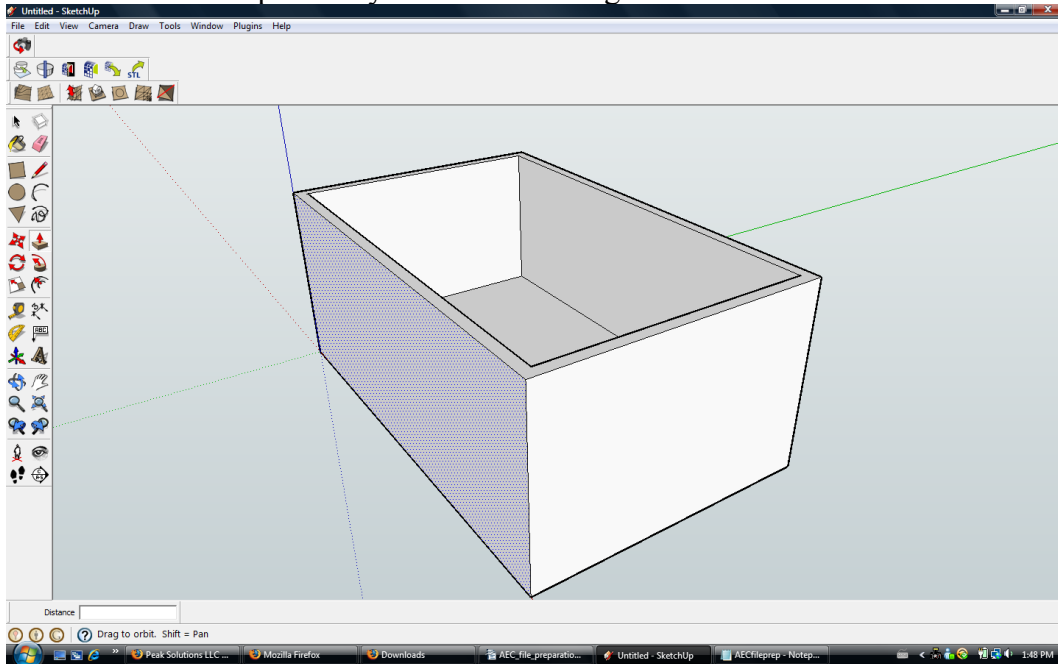
A good way to make sure the model prints correctly is to turn the opacity of transparent materials to 100% or simply delete the features of a model than are transparent such as the windows on a house.

Create Voids

When you are fixing your model for 3D printing it is always a good idea to hollow out or create voids in your large pieces of geometry. This will save time for printing and save you on the amount of powder used for your 3D print.



Let's say this cube is the base piece of your model looking at the bottom face.



One way to create a void is to inset the bottom face of the object and extrude it toward the inside to create a void. Another way to do this is to Boolean a solid object from another solid object, thus creating a void.

Export Types

Files types that can be imported for 3D printing

*Note: To bring texture maps into Zprint, you must have the original texture map in the same folder as the exported file.

STL (.stl)

Common stereo lithography type of export that does not carry color information through with the export

VRML (.wrl)

An older 1997 type of export that is the old reliable in exporting with color for 3D printing.

3D Studio (.3ds)

A newer type of export that works well for color and has many export options in different CAD programs. However, not all programs have fully debugged the .3DS export for 3D printing.

PLY (.ply)

The format was principally designed to store three dimensional data from 3D scanners. A variety of properties can be stored including: color and transparency, surface normals, texture coordinates and data confidence values.

