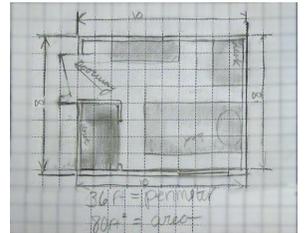


### 3D MODELING- From floor Plan sketch to completed 3D bedroom design.

If we look directly down on a house and remove the roof, we have a ‘birds-eye’ view of the layout. Sketch the top view of a bedroom of your own or one you like- use pencil and ruler on ¼” graph paper. Each box of the grid will represent 1 square foot of the ‘real’ world.

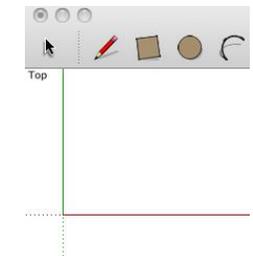
Since each grid line on the graph paper grid is ¼” x ¼”.  
If two grid squares = ½”, the scale of your paper based drawing is ½” = 1”.  
When drawing on the computer you have to type in the actual, real life dimensions.



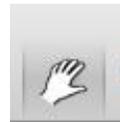
Your bedroom can have a bed, a dresser, a lamp, a closet, chair, window and door. Refer to the symbol sheet for the sizes of furniture items and how doors and windows appear from above.

There are several ways to bring your bedroom floor plan ideas to the computer. We will be drawing the floor plan and furniture directly in a program called SketchUp. One advantage to drawing on the computer is that it is easy to make changes.

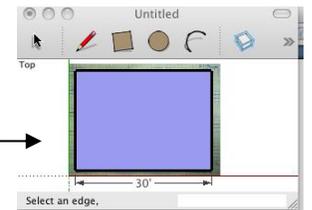
To start, open SketchUp. Set the **CAMERA VIEW** to STANDARD and TOP. You will see two axis lines and an origin point. These will be our X and Z axes. Now go back to the **CAMERA VIEW** and uncheck the word PERSPECTIVE.



Use the **HAND** tool to move the ORIGIN POINT to the lower right hand corner of the drawing space.



To draw the outside of the house, select the **RECTANGLE** tool.



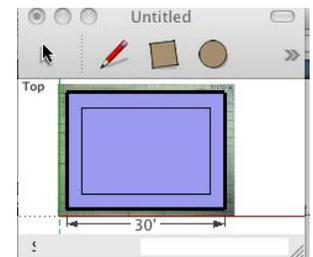
Then, Click and Drag a rectangle to cover the bedroom plan. In the Dialog Box in the lower Right hand Side of the screen you’ll see a number. To change this number use your keyboard.

Without moving the mouse, just type in 8’, 10’ (or your exact dimensions) and press the RETURN key to set the room size. A room size can be undone by pressing key combination Control and Z on a PC (or Command and Z on a Macintosh). The apostrophe key (‘) is used as a symbol for the word “feet”. Parentheses (“) are used to symbolize “inches”.

Now choose the **OFFSET** tool.

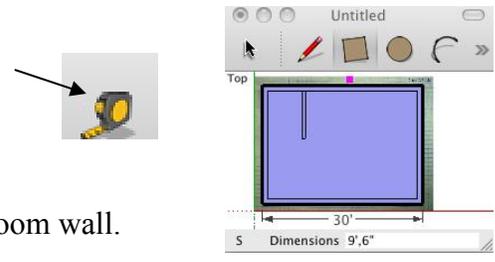


Every wall has a thickness. To create the 6” thick wall of the room click and click and drag the inside of your bedroom wall. Inside walls in a wood framed house vary from 4”-6” in thickness.



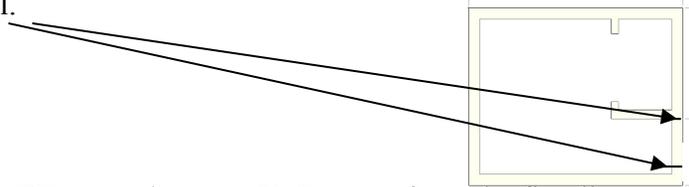
Release the mouse button and type in 6” to set the wall thickness at 6 inches & press the RETURN key. Next: **How to add a closet, closet opening and to raise your walls.**

The next step in creating your bedroom is to draw the closet area. Use the **MEASURING TAPE** tool to measure and create guidelines for a closet that will be at least 2' 6" wide by 4' long. These guidelines help to position the **RECTANGLE** tool.



Click and drag a closet wall that is 2' 6" x 6" starting from one bedroom wall. From the corner of the new rectangular wall start another rectangle. Drag the shape until it is 4' x 6" long and remember that you can type the size of the rectangle at any time.

All doors on the inside of your house will be 2' 6" wide so door openings must be made for the closet and for the bedroom itself. To make the openings, use the **PENCIL** tool to draw in one edge of a door opening. Draw a line across the wall.



Use the **MEASURING TAPE** to mark a spot 2' 6" away from the first line you drew for your door opening. Use the **PENCIL** tool to draw a line across the to make the other edge of the door opening.

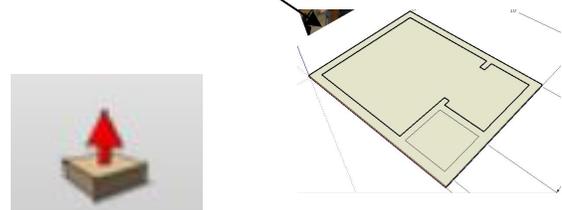
Use the **SELECTION** tool to select the line segment across the door opening. Press the Delete button to get rid of the two lines blocking the door opening.



You can also use the **ERASER** tool to delete unwanted details.



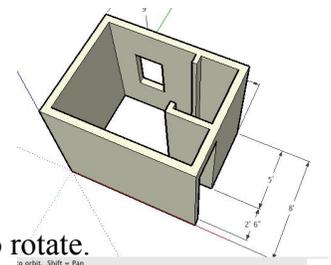
When the walls are a continuous blue color and all extra lines have been deleted, change the **CAMERA** view to **PERSPECTIVE** and use the **ORBIT** tool to view your floorplan in 3 dimensions.



Use the **PUSH-PULL** tool to pull the walls upwards. Watch the lower right dialog box for the height.



When you complete your wall height (by clicking the mouse), type in the wall height. House walls (ceiling height) should be 7'-6" or higher. Between 8' and 10' high is expected. A small room with a high ceiling often feels much larger and more open.

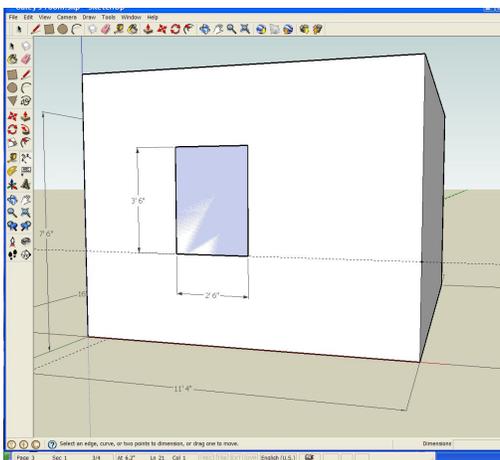
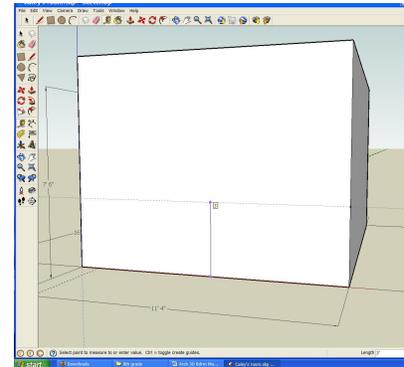


To look at your bedroom from all sides, use the **ORBIT** tool – click and drag to rotate.

**The room shown to the right has an opening for the window and door.**  
**Next: Designing and drawing your Windows, Doors and Furniture.**

To meet Building Code each room must have natural light. The area of the window must be 10% of the area of the room. If your room is 8 feet x 10 feet, the area will be 80 SF (the smallest bedroom acceptable If you are following our city building code) and **10% of 80 sf is 8**. Your window could be 2' x 4' = 8 sf in size or 1' x 8' = 8 SF or any measurements whose product = 8 sf.- or 10% of the SF.

Once you've decided on the size of the window, it is easiest to create the window opening on the outside of the room- on the wall that is the outside wall of the house. If you have a long, tall and thin window, you can simply draw a **RECTANGLE** starting from the floor and stretch a rectangle across the opening. Type in the size. If you have a more common window, the bottom of the window rectangle will start 3' off the floor. Use the **MEASURING TAPE**. Create a guide line 3 feet from the floor. Draw the window rectangle using the guide as the window baseline.

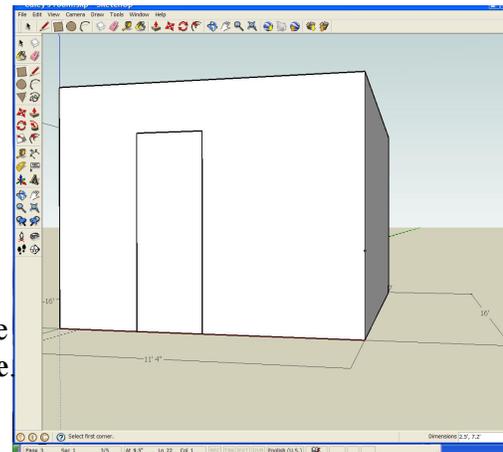


Use the **PUSH/PULL** tool to push the window inwards until it disappears (reference the inside wall). Alternatively, you can click the **PAINT BUCKET** & look in the **MATERIALS menu** for Transparency to turn the wall into glass.

Use the **ORBIT** tool to look around the outside of your room.



If you didn't leave a space on your floor plan for a door to the room you can simply drawn in much the same way as the window is drawn. On the outside, draw a **RECTANGLE** up from the floor by dragging the rectangle upwards. Release the mouse & **type the numbers 2.5', 7.5'** to resize the rectangle

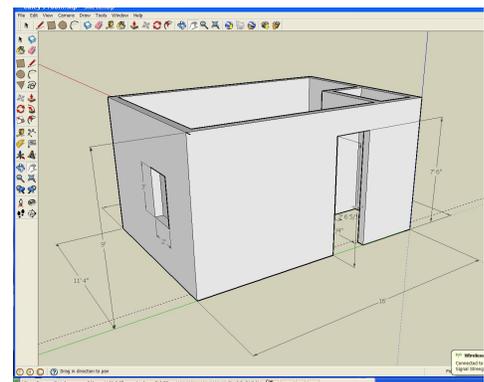


Now **PUSH/PULL** the door until the opening is empty and you can see inside the room. (As you PushPull, 'reference' the inside of the wall to set the amount you want to 'lose'.)

If you already have an opening for the door and your walls are raised, the top of the door will need to be filled in with a "header". Make a rectangle that will fill the top of the open wall. Make sure that the opening for the door stays 7.5 tall. You can add details to the edges of the door and window.

When you have a window, door, closet & walls **GROUP** your room.

Use the **SELECTION** tool-click and drag a box around the room. **Go to the EDIT menu and GROUP the whole room**. This will keep the walls and the geometry of the room intact- no matter what else you put inside the room. Nothing will 'stick' to the walls



**With the room now completely drawn, it is time to draw and design some furniture.**

Think about furniture that is needed in a bedroom. You can often find a bed, table, dresser, lamp, desk, chair, bookcase and several electronic devices.

Use the same tools you used to create your room to make at least three pieces of furniture. Please make sure to include a Bed, a lamp and a dresser. You can be as creative as you want! Try out some new tools.

We will watch 2 [www.Go\\_2\\_School.org](http://www.Go_2_School.org) tutorials in order to learn about how a bookcase, a dresser and a lamp can be created in Sketchup. These tutorials are entitled: Woodworking and Lamp.

Start a bed by drawing a simple rectangle on the ground, outside the Bedroom.

create all the furniture outside and then group each piece before you move it into place.

Make sure of the sizes by looking at sheet of Architectural Symbols for furniture dimensions.

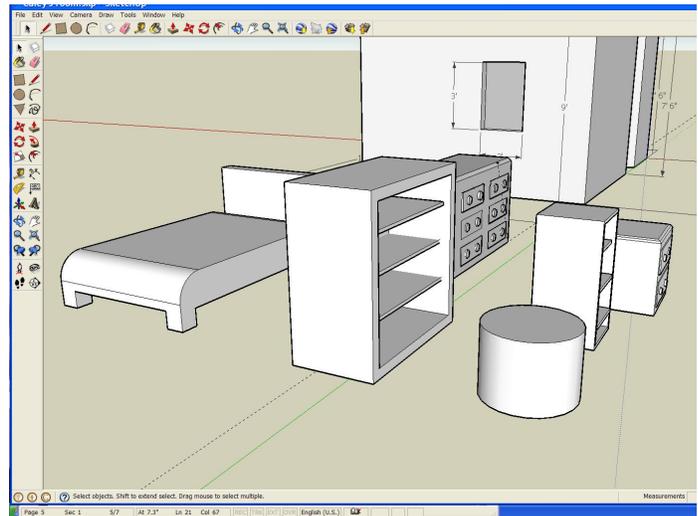
### Moving Day!



To move your furniture into the bedroom you will have to orbit around in a lot of directions. You will become an expert with the MOVE tool. There are three things to remember.

1. Use the **ARROW** tool to choose objects.
2. The best way to use the **MOVE** tool, is to carefully choose a corner that you can see.
3. The **MOVE** tool can be 'interrupted'.

You can use the **MOVE** tool to click on one corner, go get the **ORBIT** tool, orbit around until you know where you want that object's corner to be placed and go back (click back on the MOVE tool) to adjusting the placement of your object.

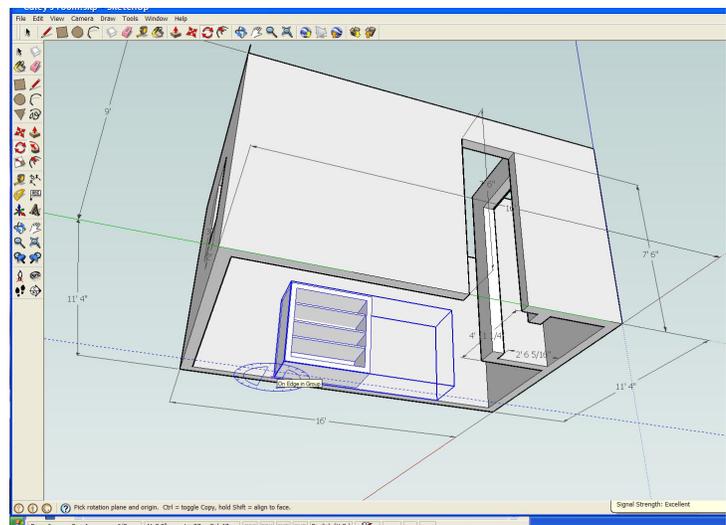


You can align your object with a surface by hovering over the selected surface as you place your object. SketchUp uses the surface you've hovered over as a reference surface. An object can 'snap' into place. This will all take a bit of practice, but it is well worth the effort!

Sometimes an object must be rotated. You will have to learn to move around in 3 dimensions.

This tool acts just like a protractor when you touch an object that you want to move. If the protractor turns green, you will be rotating around the **GREEN axis**- Likewise for the **BLUE** or the **RED axis**. This will take a bit of thought and experimentation to get right. If in doubt, you can always undo your actions!

First, we want to rotate the bookcase to fit between the closet and the wall.



Now we use the **PROTRACTOR** tool to rotate the shelf unit around the **BLUE axis**.

Select the bookcase

Click on the **PROTRACTOR** tool.

Touch the bottom left hand corner of the shelf.

Move the mouse until the protractor turns Blue and then click, pull the mouse out to the right

(just an inch or so) and then Click again & start to drag to rotate the chest into position.

Watch the angle change & watch the dialog box record the angle. In this case, we'll drag the mouse until the angle is 90 degrees and then click the mouse a third time to confirm our choice.

It's time to get the **MOVE** tool again and to move the bookcase into the corner of the room.

Remember to select the object first and then

Touch the move tool to an outside corner of the object. Move that corner exactly where you want it to be. Be patient, your skill is growing by the minute.

Continue to move the other furniture into place.

Next we will learn how to import COMPONENTS.

Go to the **WINDOW Menu** and choose **COMPONENTS**.

A dialog box will open showing doors, windows, etc.

These are objects in the SketchUp library on the hard drive.

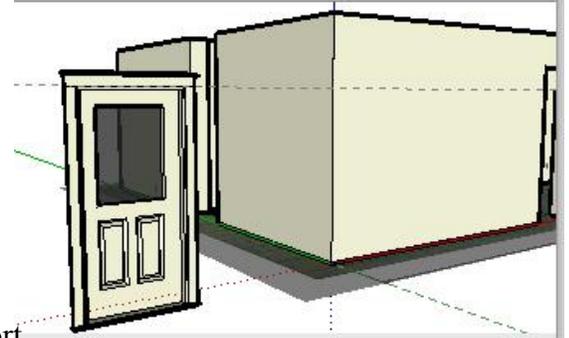
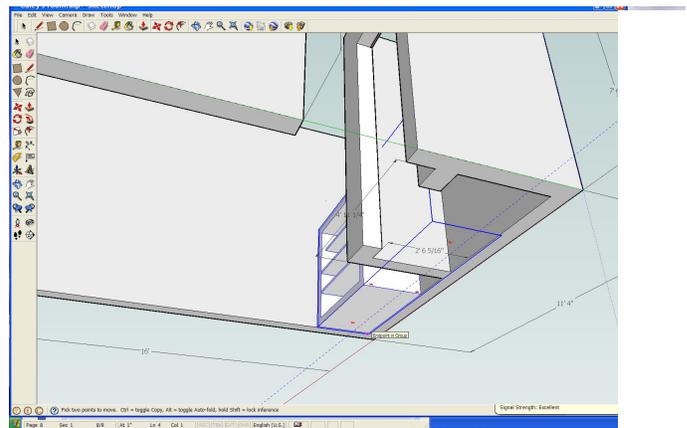
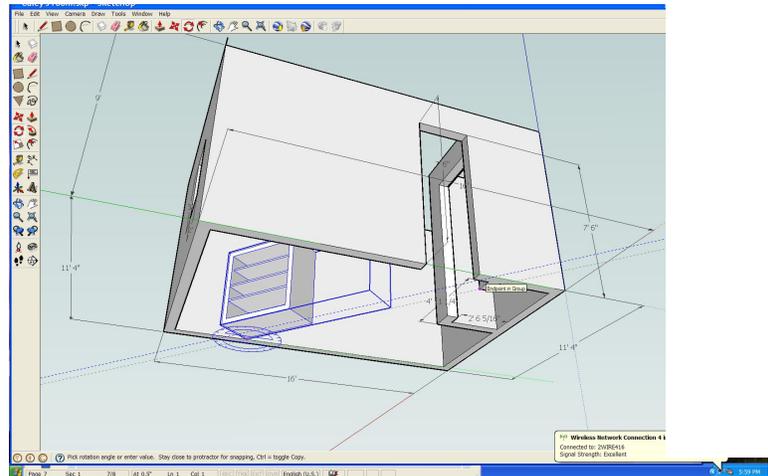
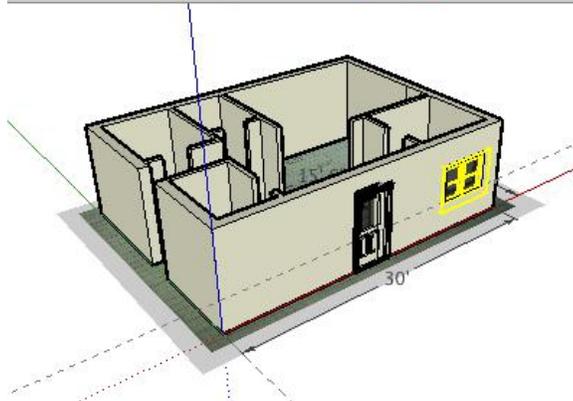
Choose a component by double clicking or highlighting and confirming by clicking in the OPEN box.

When you bring in a component and place it, you will need to

Stretch it to the size desired before your import is complete.

Just press the **ESCAPE** key (**ESC**) to start over.

You'll need to move, rotate and resize every component you import.



Start by importing a **DOOR** and place a corner at the edge of the door opening on the outside of your room. Stretch and click when the door fits the opening.

You may need to resize the door width as well

After the door is moved and placed carefully, add a

window component. Place it in the opening you made.

**Finally, your bedroom will need paint and textures.**

A floor and a ceiling can be drawn afterwards.

Start by clicking on the **PAINT BUCKET** Tool and choose a color and/or a material. By choosing a color, material or texture and clicking on a surface, you will be able to change how your room looks. You may need to **EDIT – UNGROUP**, in order to paint objects from time to time.



Painted colors and textures can be edited by using the slider in the paint dialog box as well. This will be important when you are creating your final views and walk-around because the shadows cast by the different sides of the building will darken some wall colors. (**VIEW menu – SHADOWS**)

When your entire room is complete, it's time to import a poster for your wall! Go to **FILE- IMPORT-2d GRAPHIC** and when the dialog box pops up be sure to set the file type to **ALL FORMATS** so that you can see pictures you may want to use.

On your computer, look in the Documents Folder in the Pictures SubFolder and double click the picture you would like to use as a poster for your room. Import the picture and move and rotate it into place.

Add a floor to your room and go to the **VIEW – SHADOWS** menu option to add a realistic touch. Rotate your house to find the best view and go to the **FILE- EXPORT** menu option to save an image.

If you bring in any components or pictures from other sources, remember, you are required to cite your Sources- and acknowledge their creators.

**Once your bedroom is complete, Save it to TECH ED- FINAL HAND IN folder to receive credit!**

