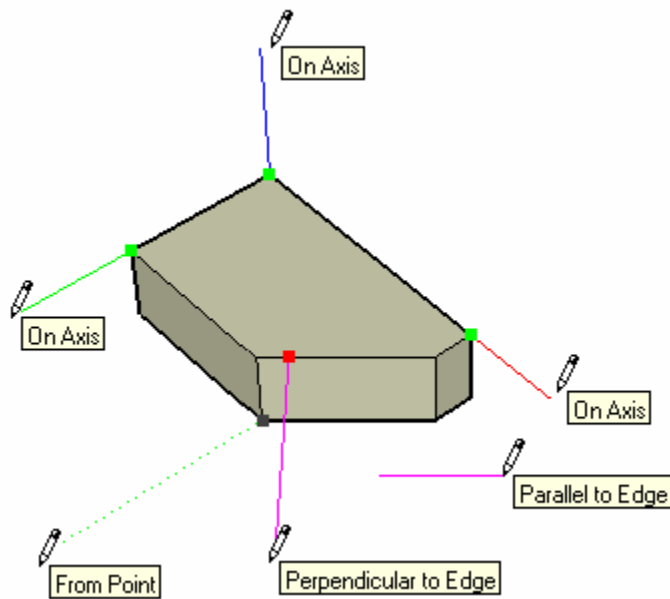
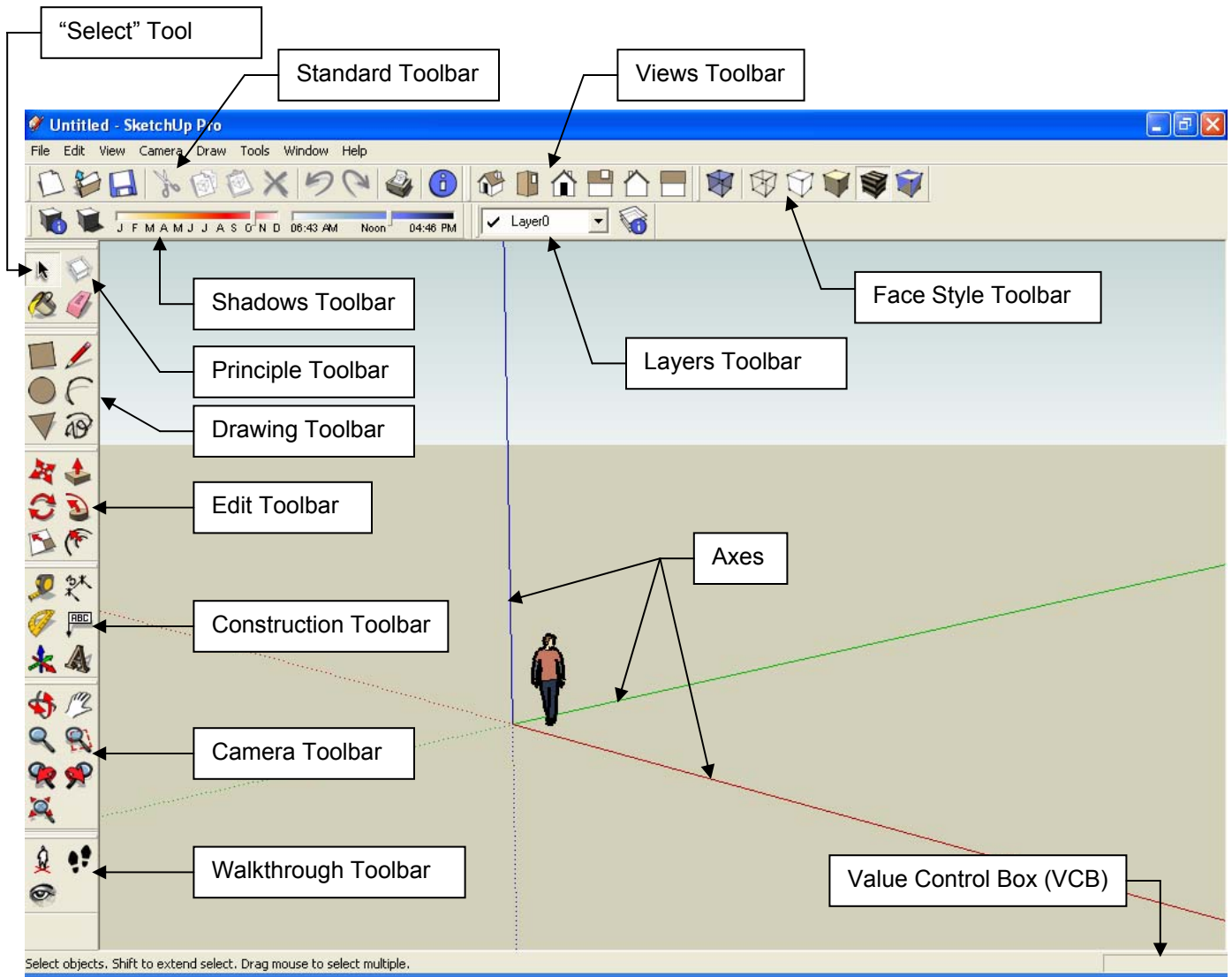
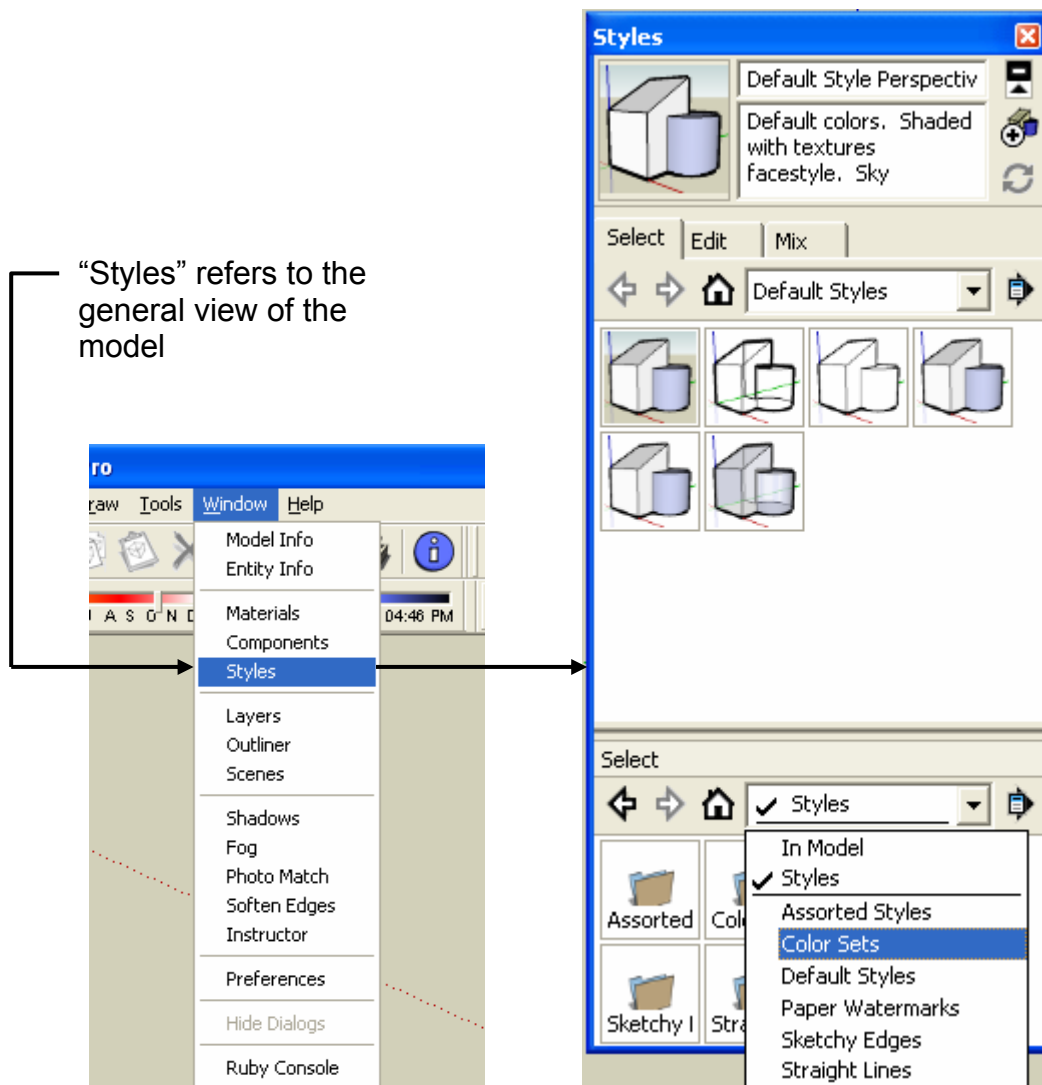
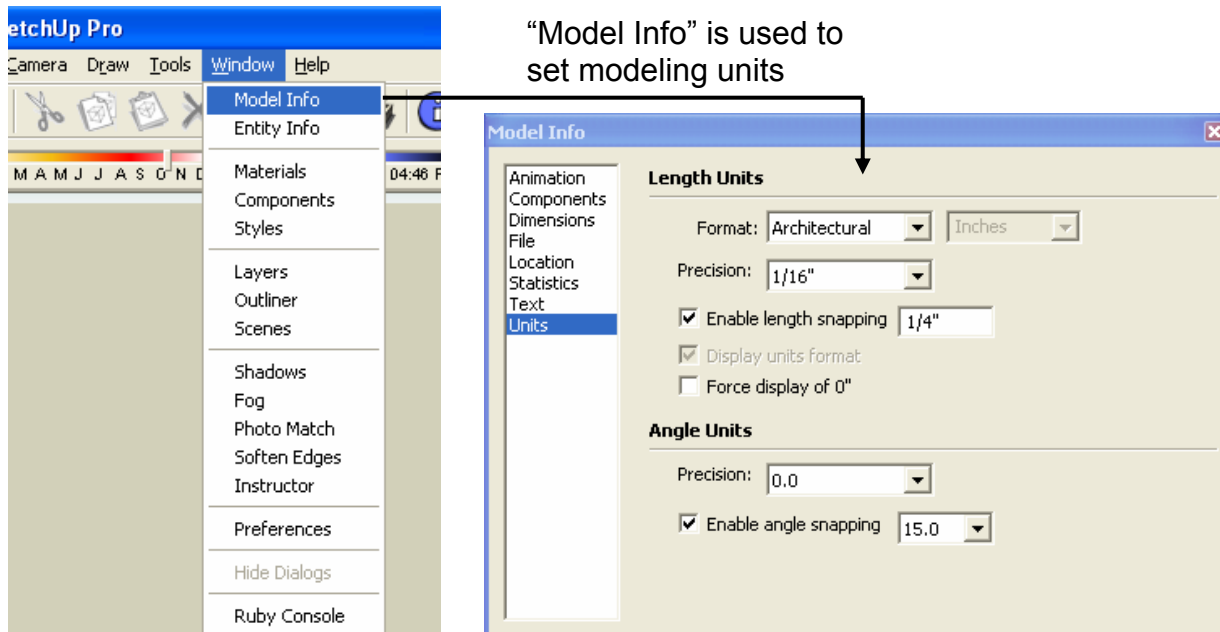


# SketchUp – Basics

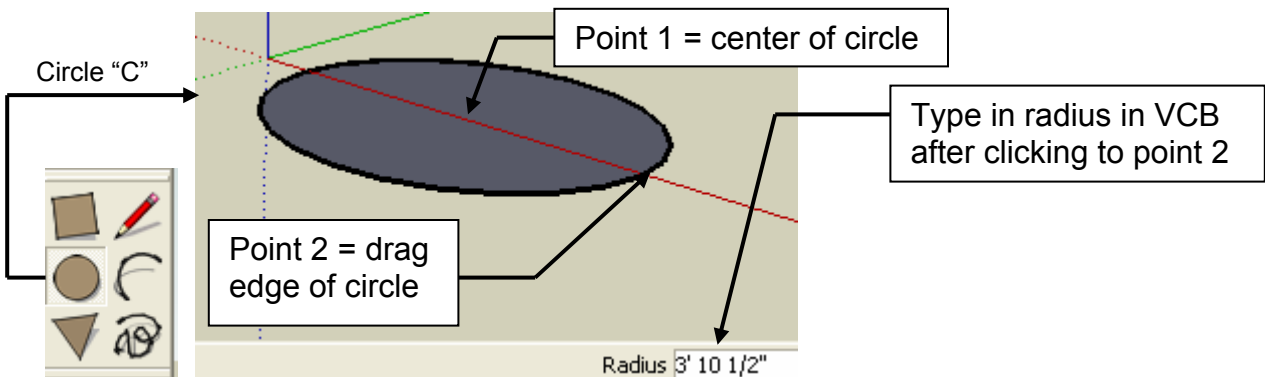
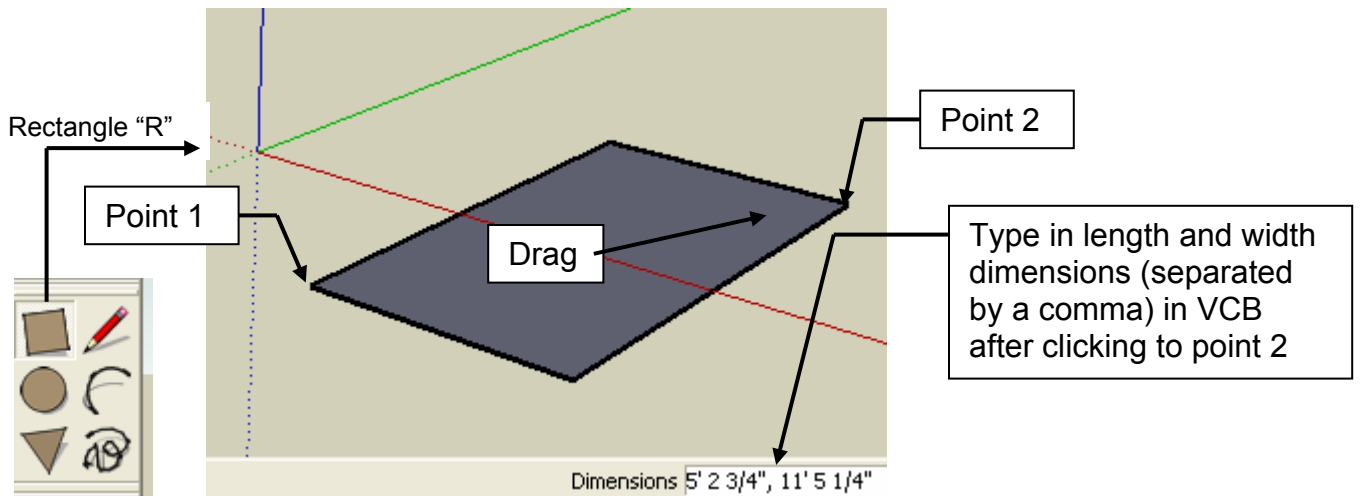
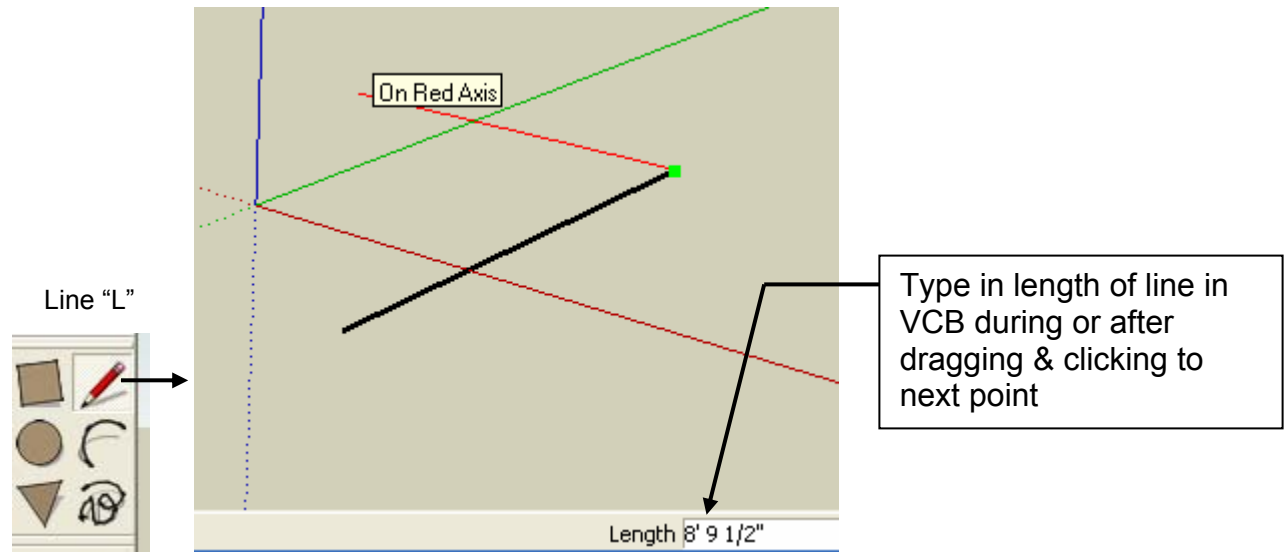


## Inferences (Object Snaps)

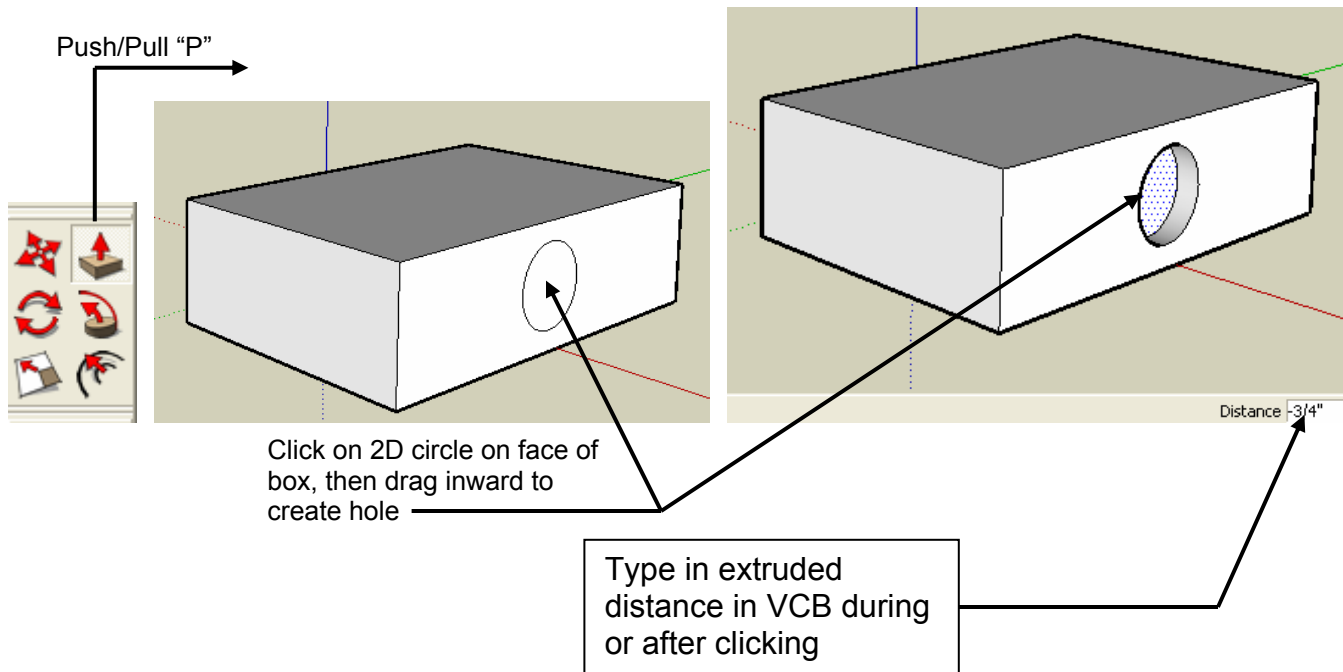
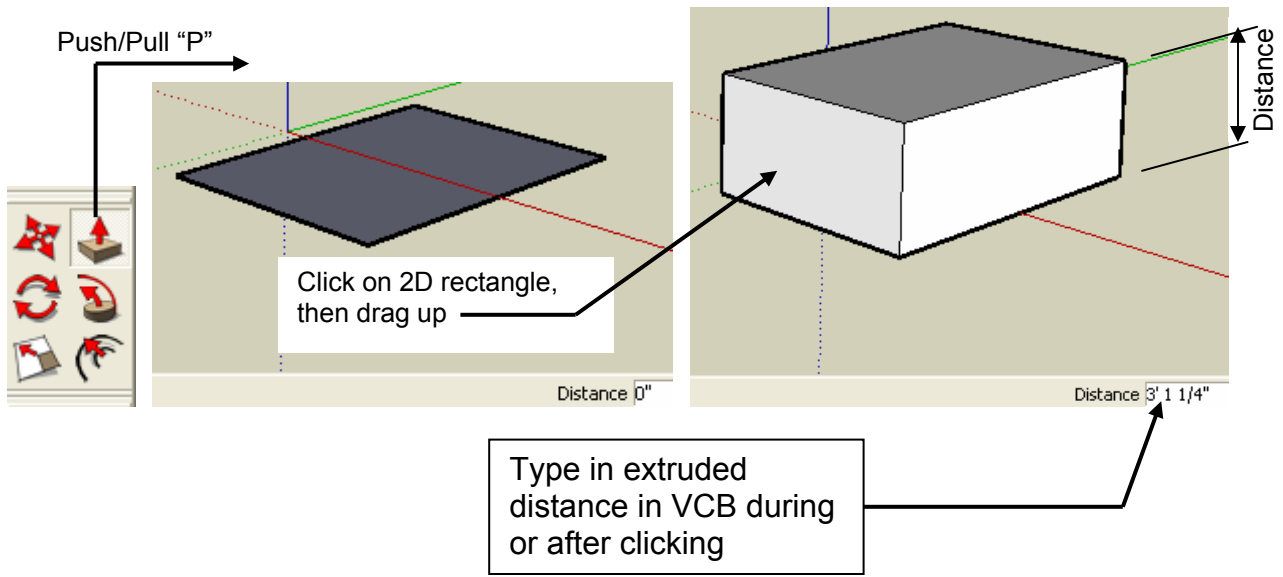
## Customizing SketchUp Units & View:



## Drawing 2D Lines, Rectangles & Circles:

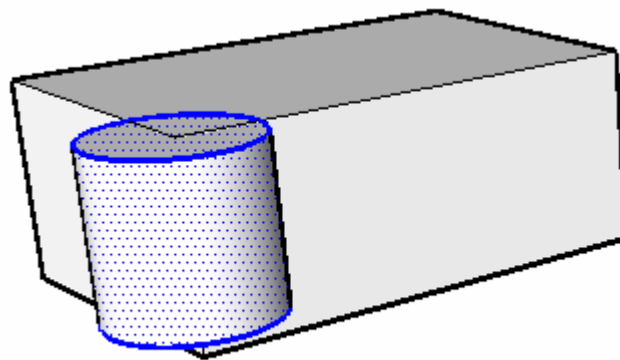
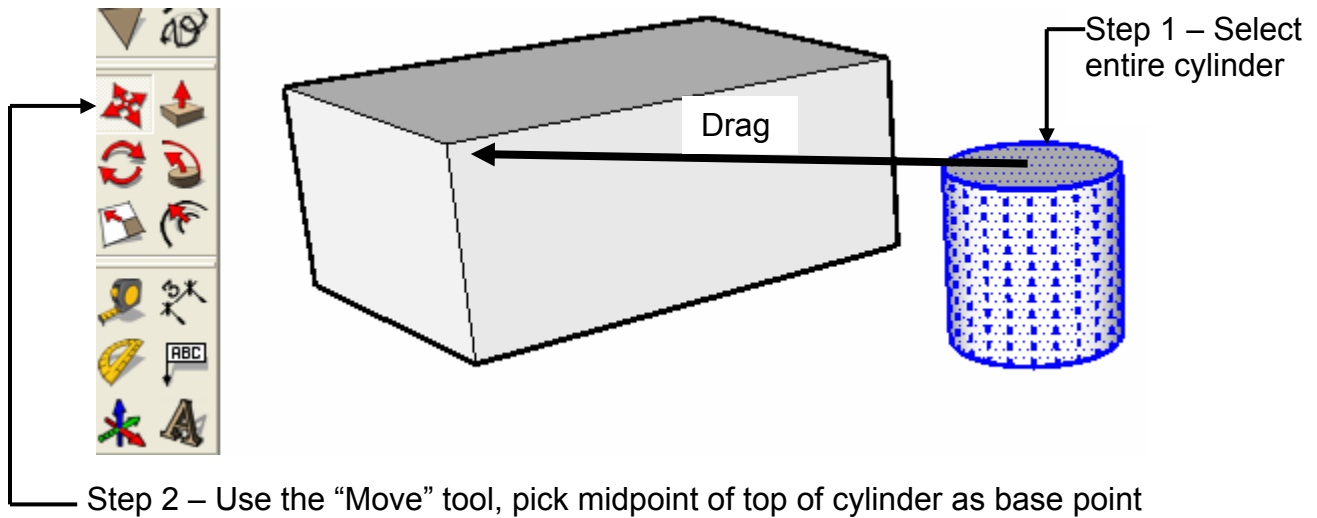


## Extruding 2D shapes into 3D shapes using “Push/Pull” Tool:



## Moving Objects (1):

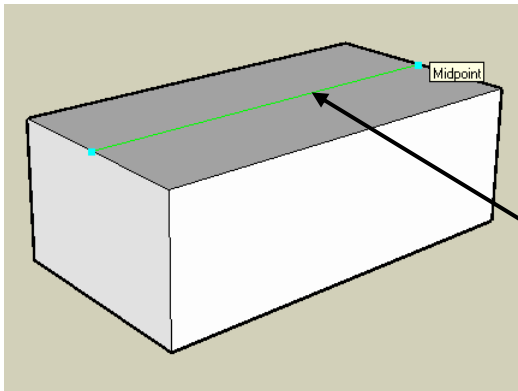
Any object can be moved by selecting it, then clicking the “Move” Tool. The exact distance of the move may be typed in the Value Control Box (VCB).



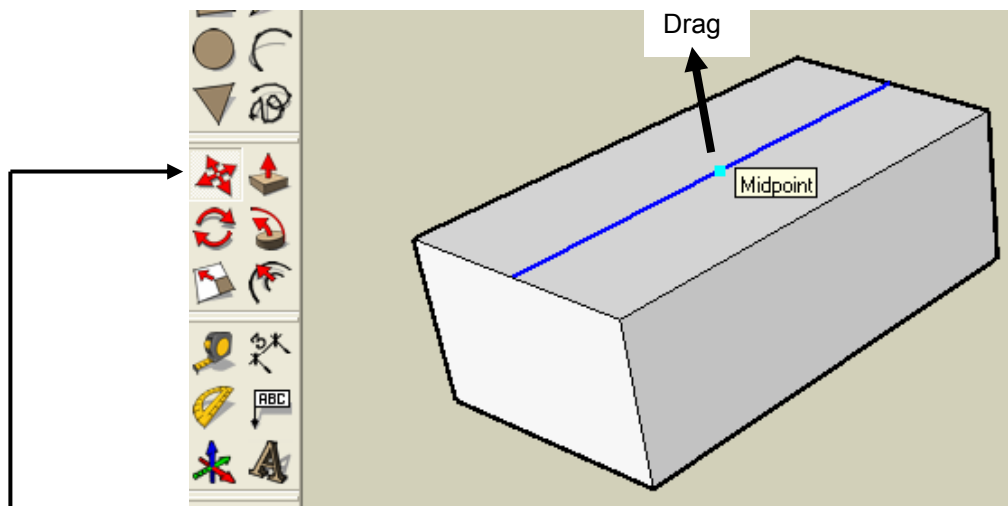
Step 3 – Drag the cylinder to corner of block

## Moving Objects (2):

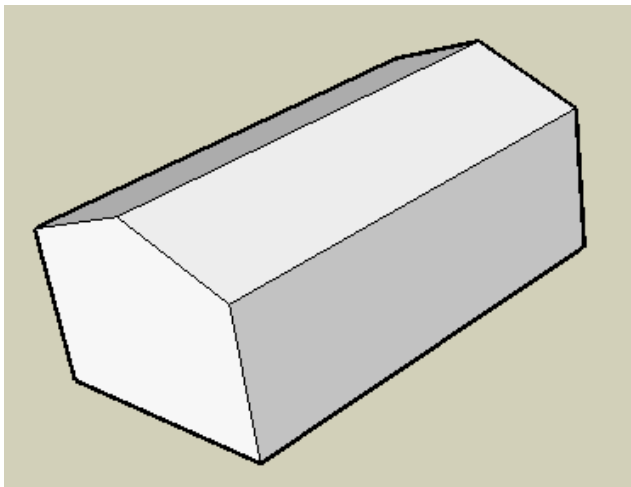
Objects touching each other are “sticky” in SketchUp. For example, a line that is attached to a 3D object will distort the entire object when moved.



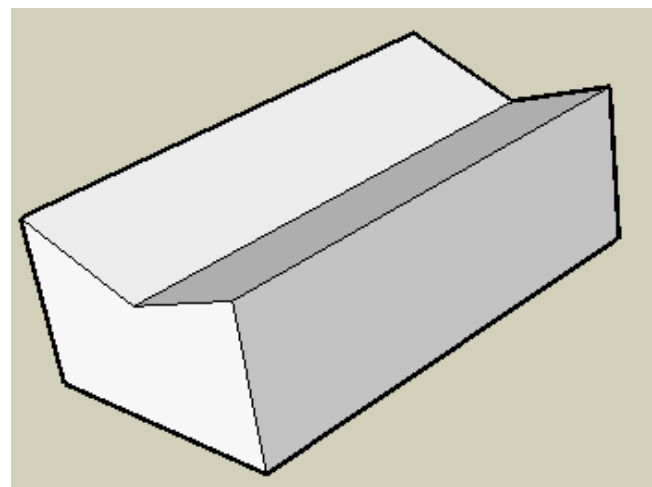
Step 1 – Draw line at midpoints at top of block



Step 2 – Use the “Move” tool, pick midpoint of line and drag up in the blue direction (type in distance in VCB if necessary)



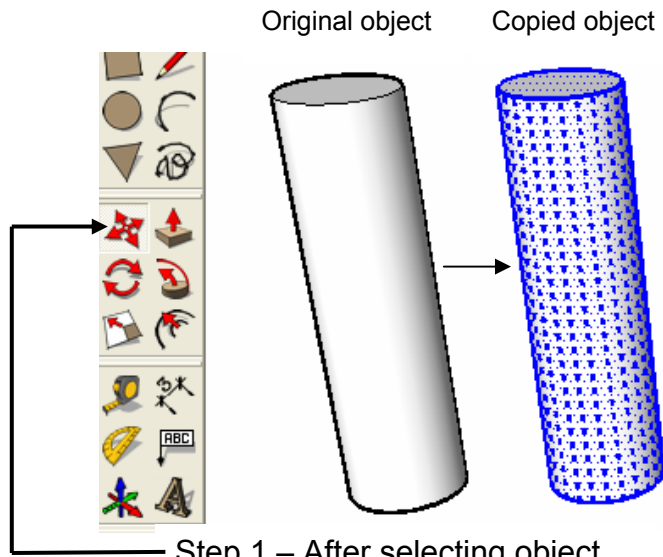
Result – if dragging up



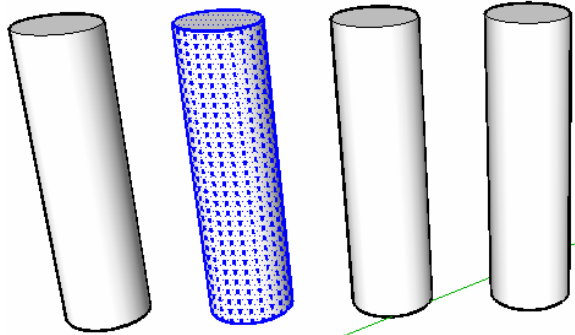
Result – if dragging down

## Copying Objects:

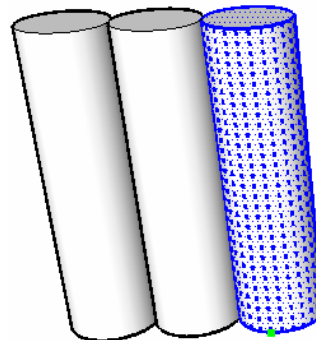
To copy an object, use the “Move” tool, then hit “CTRL” key.



Step 1 – After selecting object, Use the “Move” tool, hold the “CTRL” key then drag in the appropriate direction (type in distance in VCB if necessary)



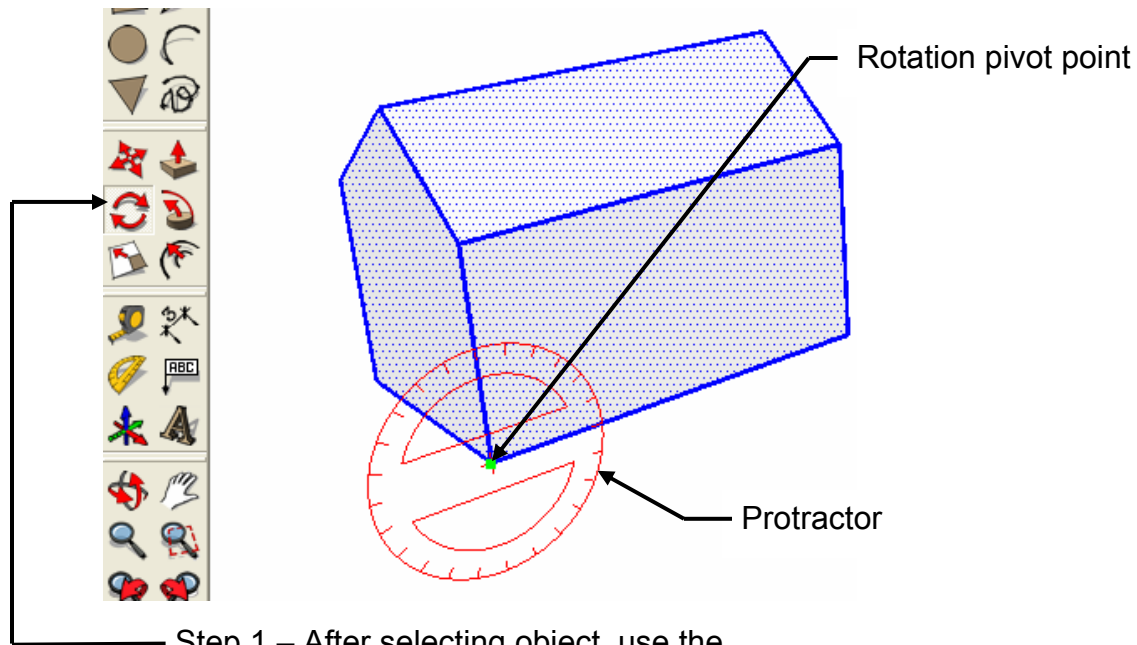
Step 2 – After making copy, type in “X3” to make 3 multiples



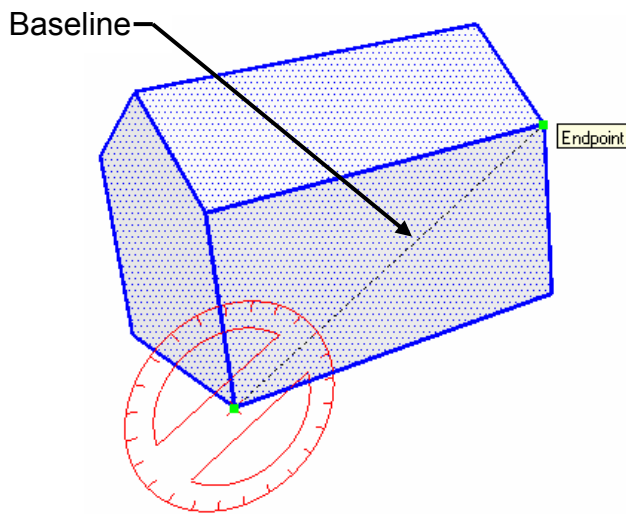
Or – After making copy, type in “/2” to put copy and divide 2 objects in the space defined by 1<sup>st</sup> copy

## Rotating Objects:

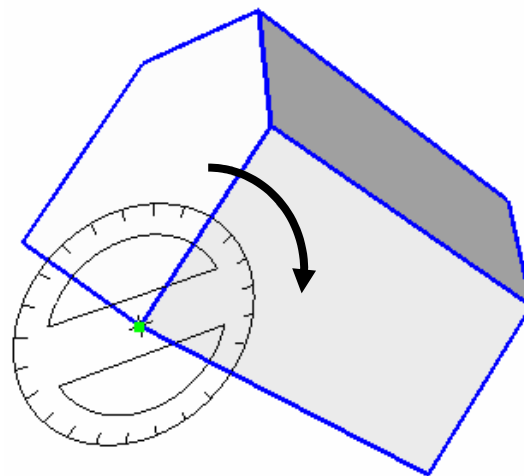
When rotating an object, a protractor appears, allowing you to define the rotation angle which can be typed in.



Step 1 – After selecting object, use the “Rotate” tool. Select the pivot point for the appropriate rotation axis



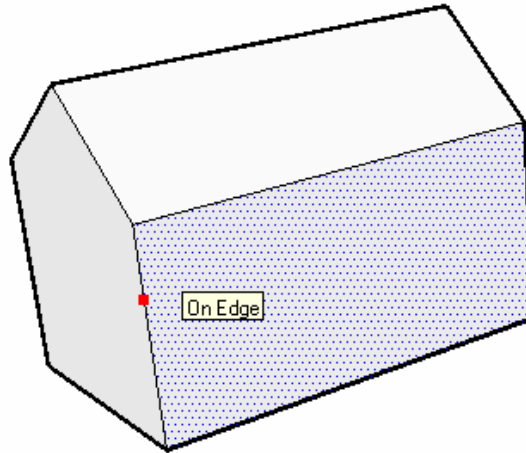
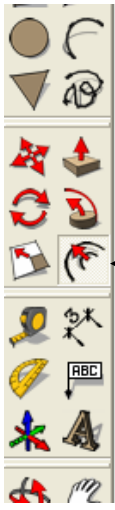
Step 2 – After setting pivot point, rotate protractor to set baseline



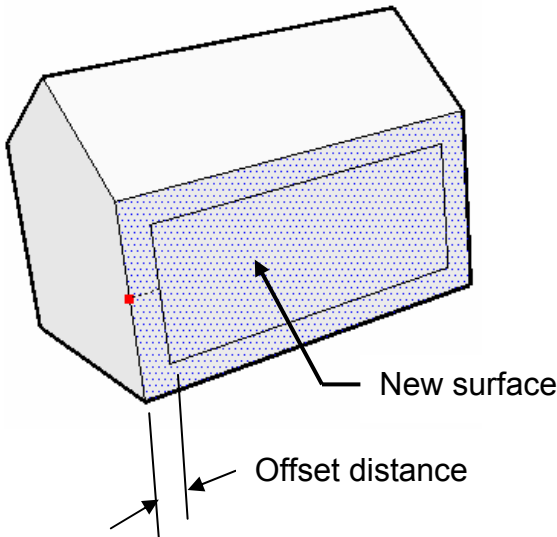
Step 3 – Drag & rotate 45<sup>0</sup> (type in rotation angle in VCB)

## Offsetting 2D Objects:

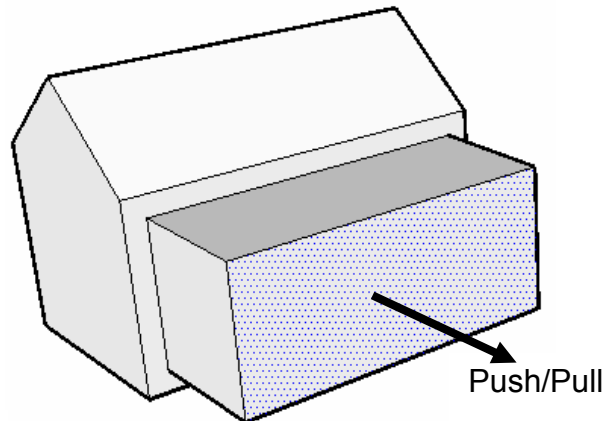
In SketchUp, 2D lines, circles and other objects can be offset using the “Offset” tool. Offset only works with lines **IF** 2 or more connected lines are picked.



Step 1 – After selecting face of object, use the “Offset” tool. Select one of the edges



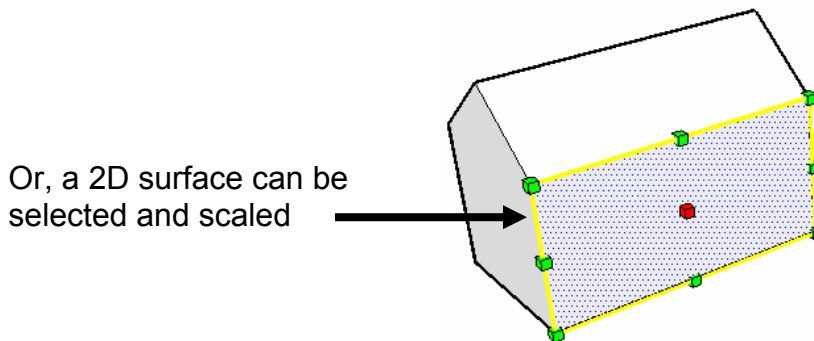
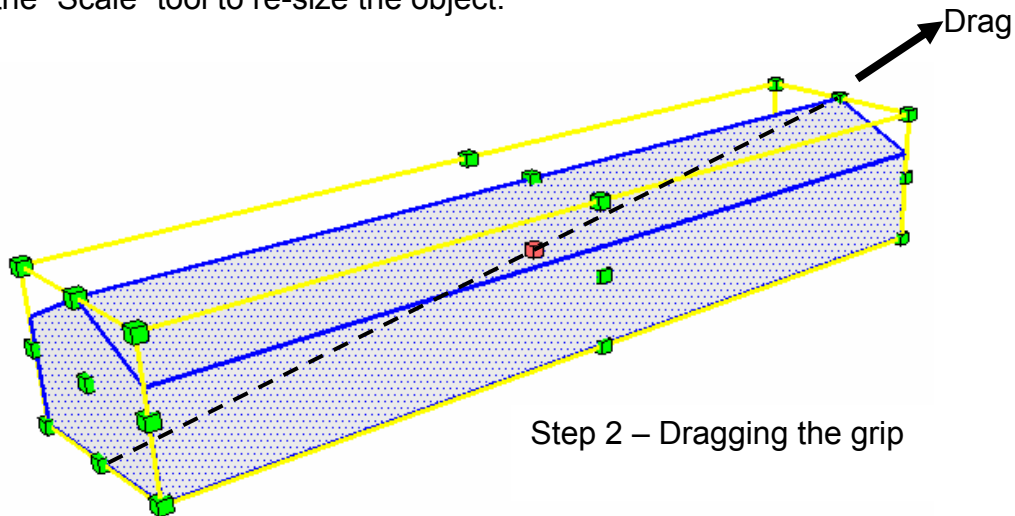
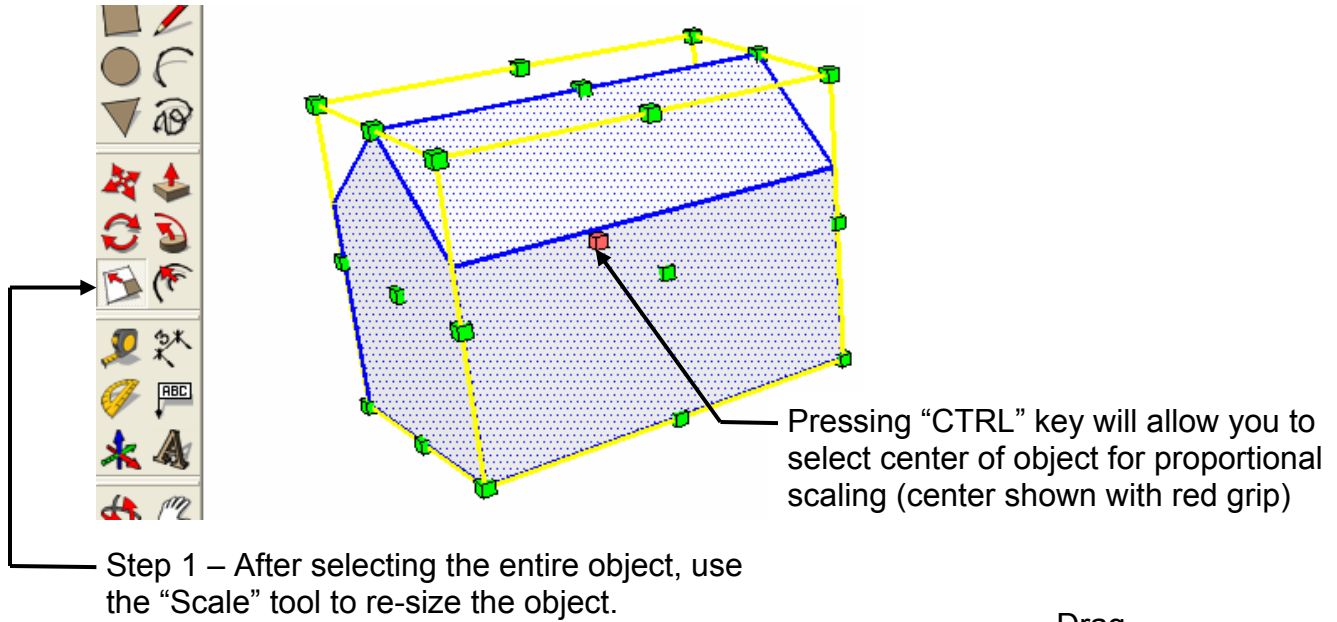
Step 2 – Drag the edge the required offset distance (type in offset distance in VCB)



Step 3 – A new 2D surface is constructed which can be extruded using “Push/Pull”

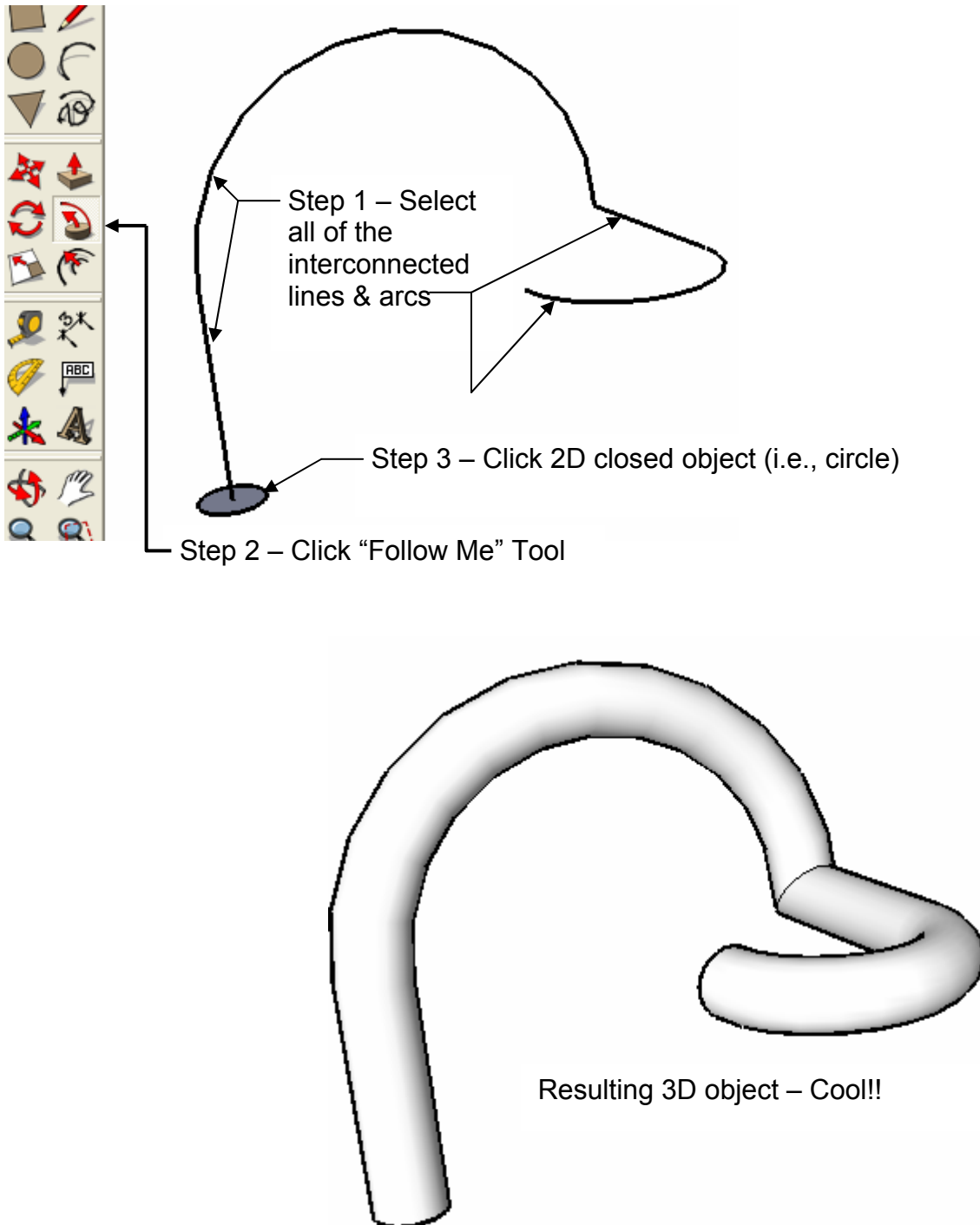
## Scaling Objects:

Objects can be re-sized, or scaled using the “Scale” tool by grabbing the green grips and dragging. If a decimal number is typed in the VCB, then the scale of the object is multiplied by that number. If a dimension is typed it, then the object is scaled to that exact dimension.



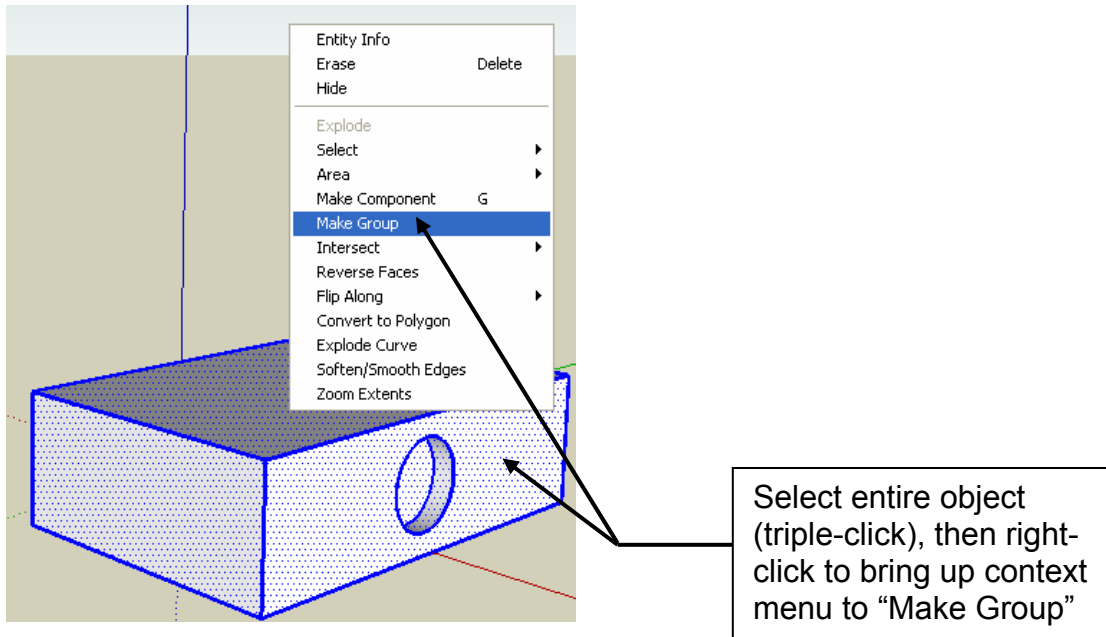
## Extrusions using the “Follow Me” Tool:

Another way to create a 3D object is to extrude a closed 2D object along a path using the “Follow Me” tool. Select an interconnected path of lines & arcs, then pick the “Follow Me” tool and select the 2D surface.

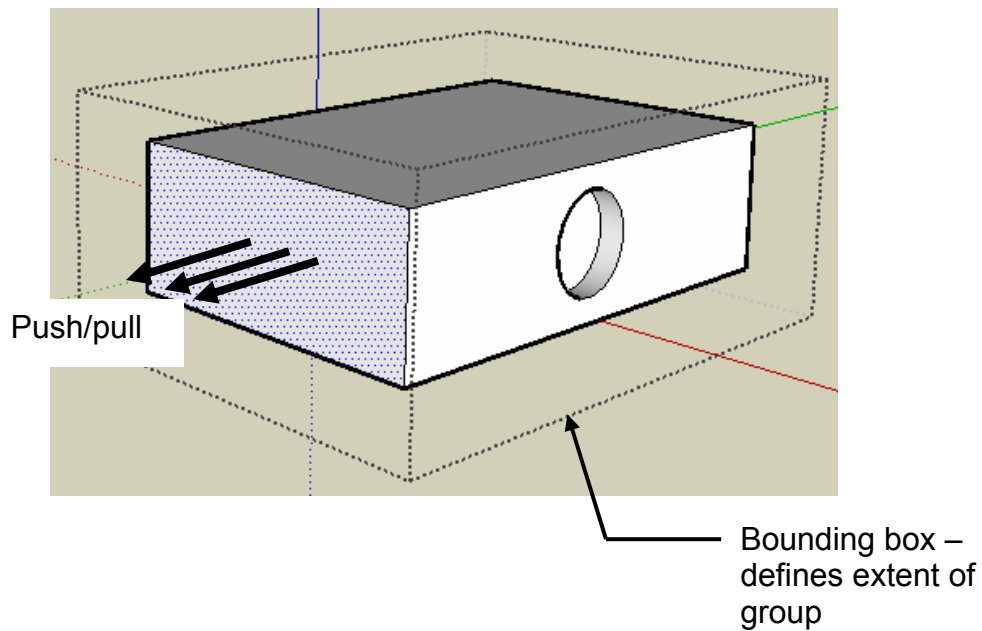


## Creating Groups:

A “Group” is an assemblage of stuff that behaves as one piece when moving, copying, etc.

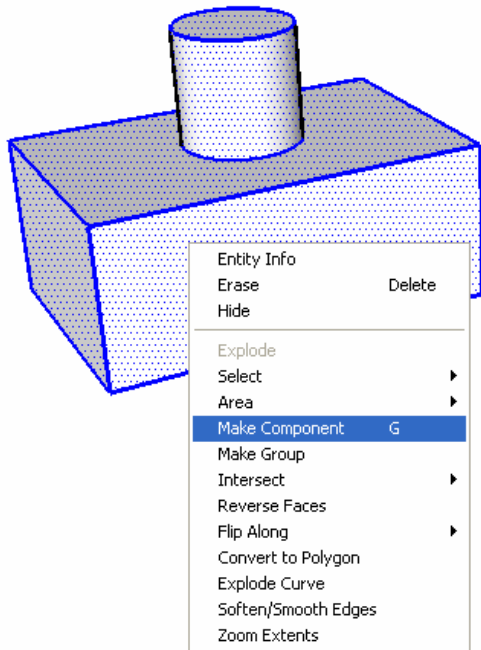


Once a group has been made, it can be modified by **double-clicking** it:

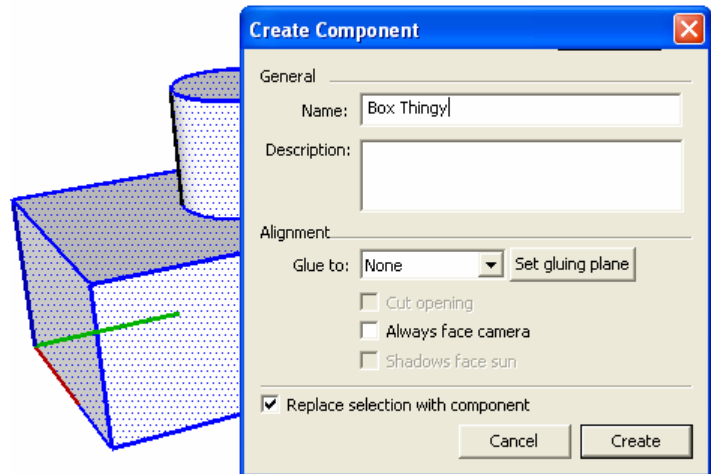


## Making Components:

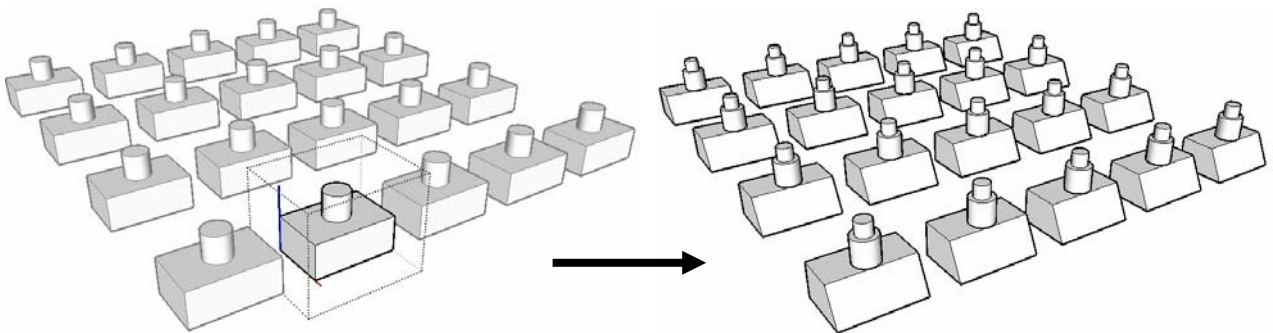
A “Component” is similar to a “Group”, except that if a component is modified, then ALL other copied components are also modified exactly the same.



Step 1 – Select objects to make into a component. Right-click and select “Make Component”



Step 2 – Give the component a name, then click “Create”

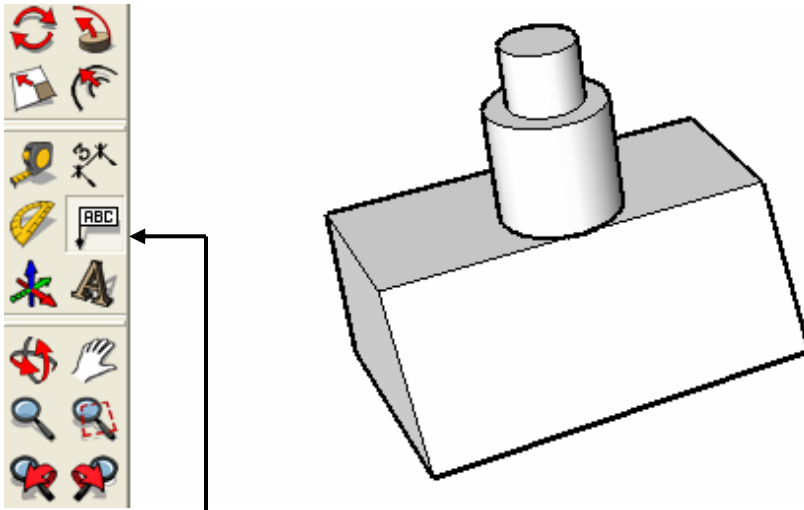


Step 3 – After copying the component, Double-click on any one of the components and make modifications (such as Move, Push/Pull, etc.)

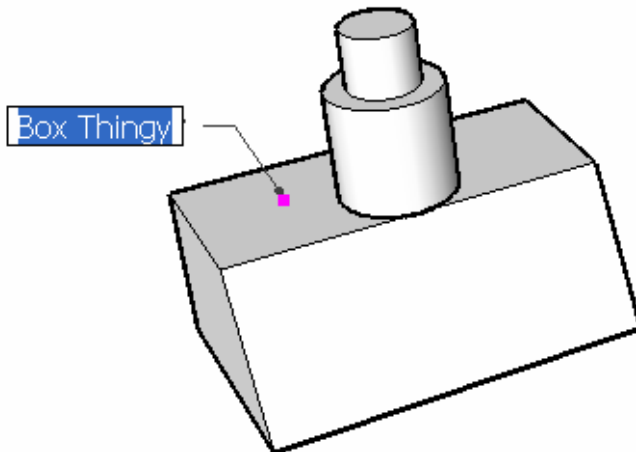
Result – all components are changed exactly as original

## Add Notes using “Text” Tool:

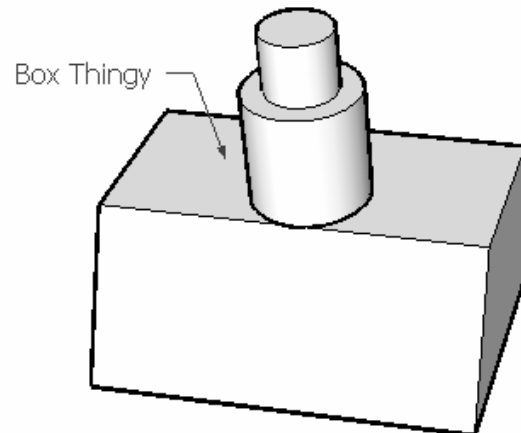
Notes are easily added simply by clicking the “Text” Tool. Then, click on an object and drag to locate.



Step 1 – Click “Text” Tool



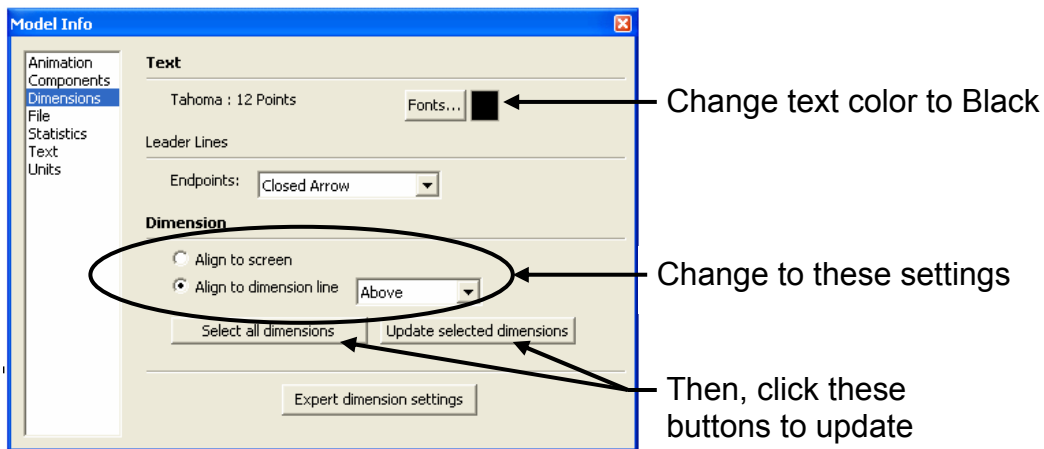
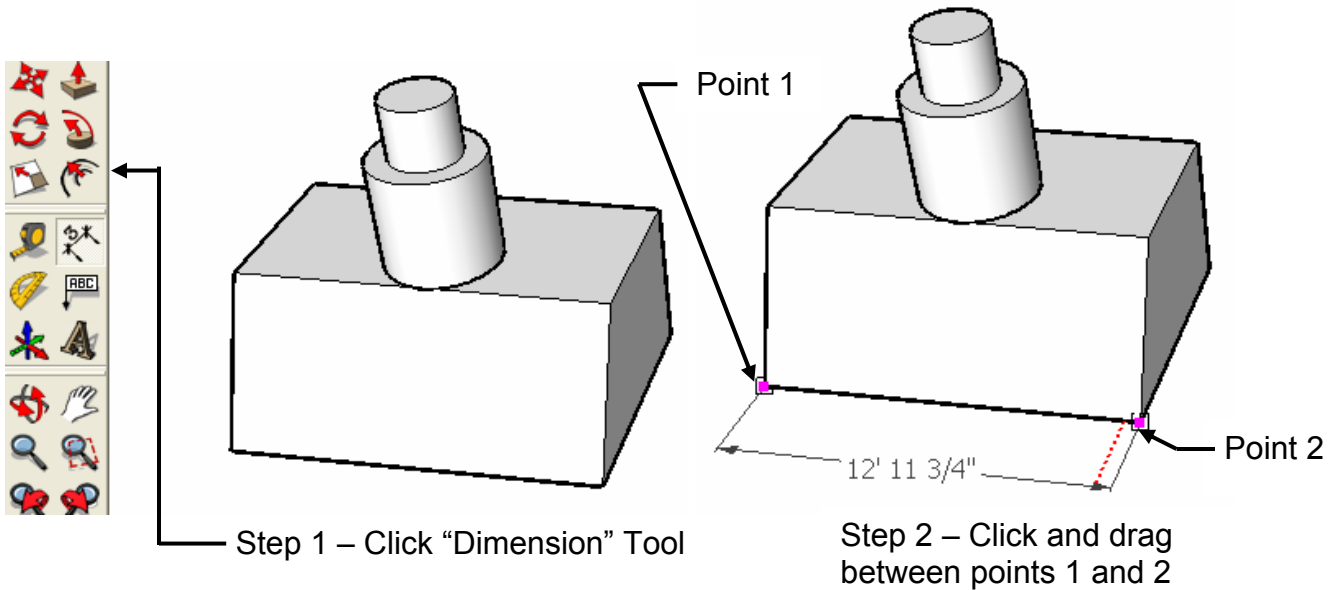
Step 2 – Click face of Component and drag to desired position. Click inside text box to change note if necessary.



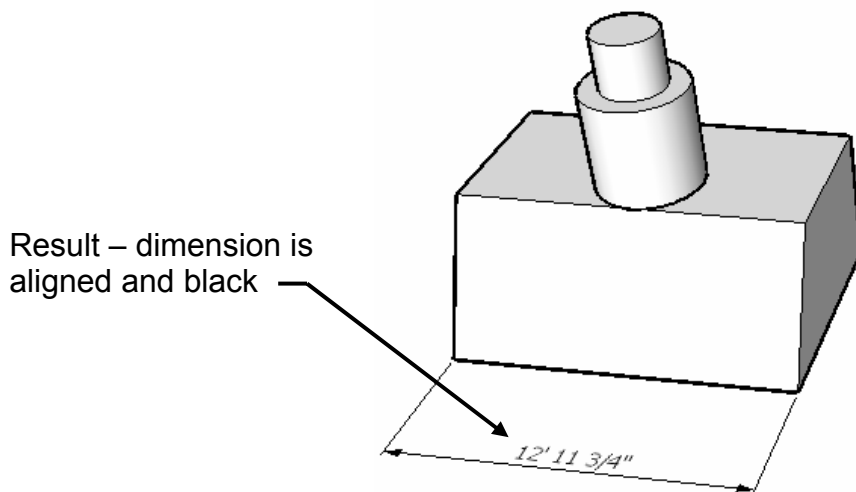
Location of text remains constant no matter how the object is viewed. The orientation of the text is always horizontal left-to-right

## Creating Dimensions:

Dimensions are very easy to insert in SketchUp. Simply click on “Dimension” Tool and pick 2 points.



Change orientation of dimensions.  
Go to Window → Model Info → Dimensions



## Saving 2D Images:

Images are “Exported” as a 2D Graphic to be printed or inserted into a Word file, for example. The entire screen is saved as the image, so it is best to zoom into the object to get the maximum object image size possible.

