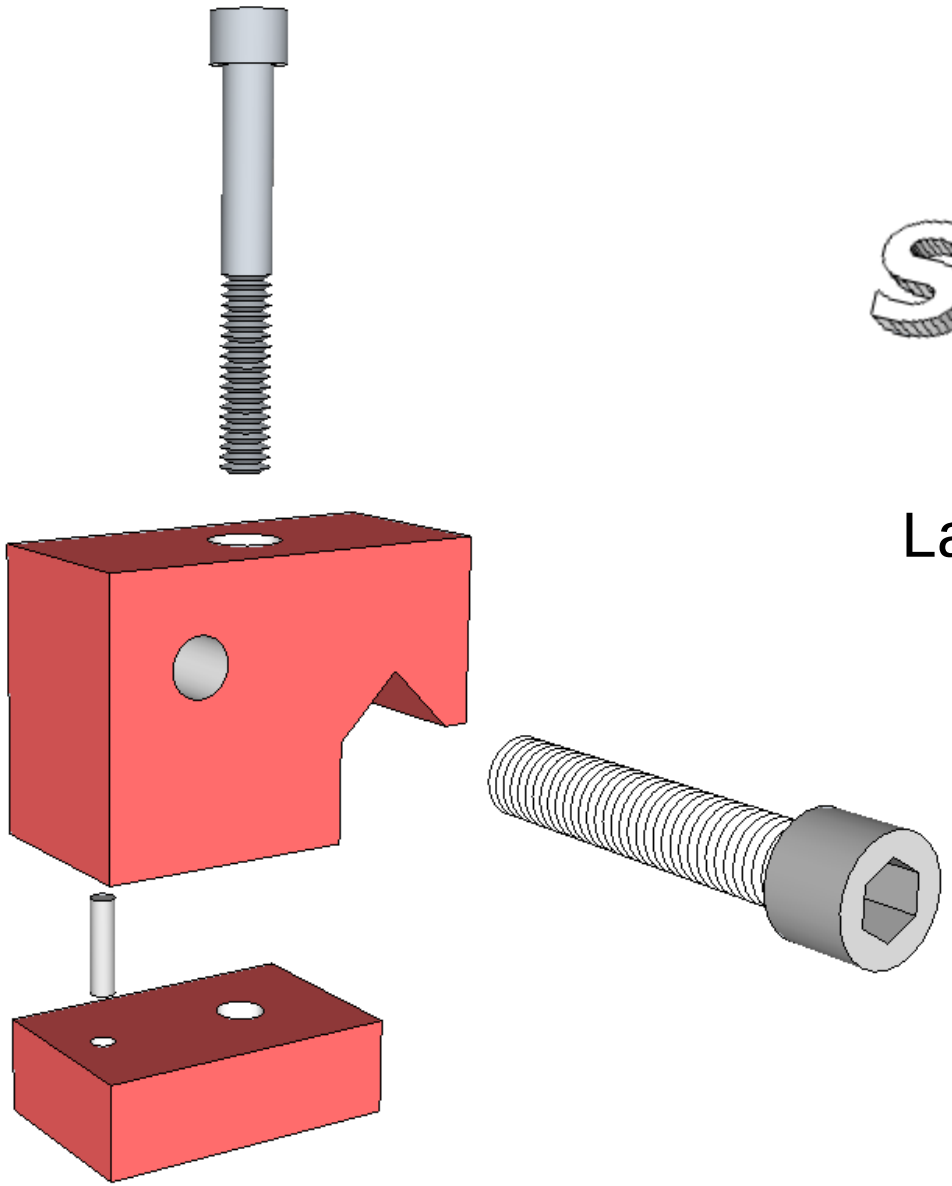


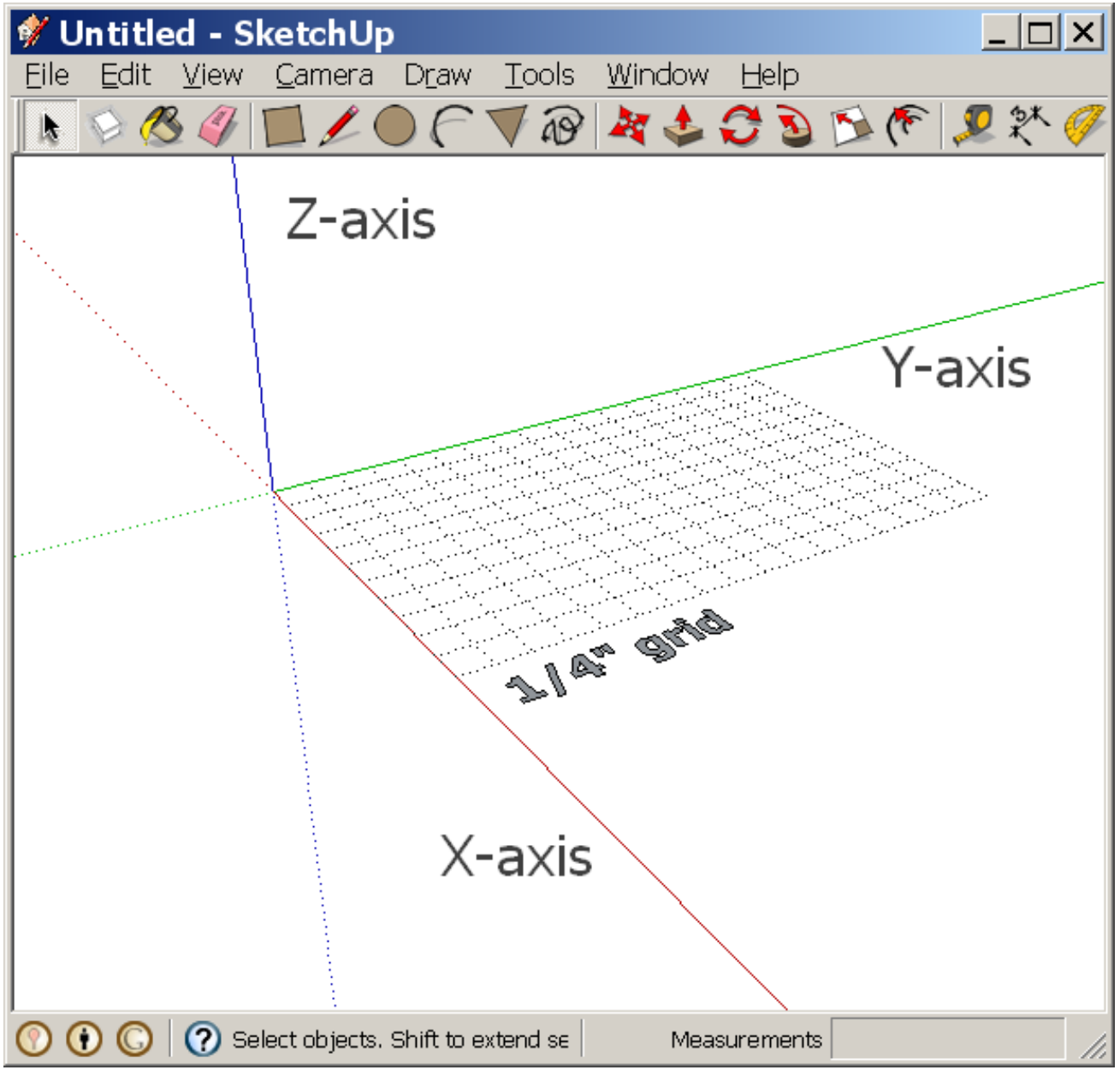
Using Google SketchUp to Design a Lathe Carriage Stop

By Dick Kostelnicek

Presented at the
Home Metal Shop Club
May 8, 2010

What is Google SketchUp ?

- 3D content creation computer program
- Draw as you would with paper and pencil
- Intuitive with short learning period
- Has most CAD features for the Home Shop
- Free Internet download with training video
- Additional I/O functionality for $500
- Numerous web components and plugin



Draw Tools

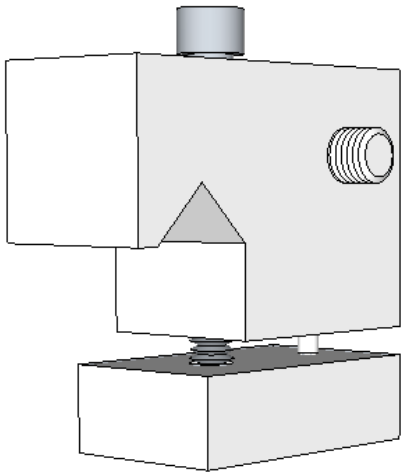
- Rectangle
- Line
- Circle
- Arc
- Polygon
- Freehand

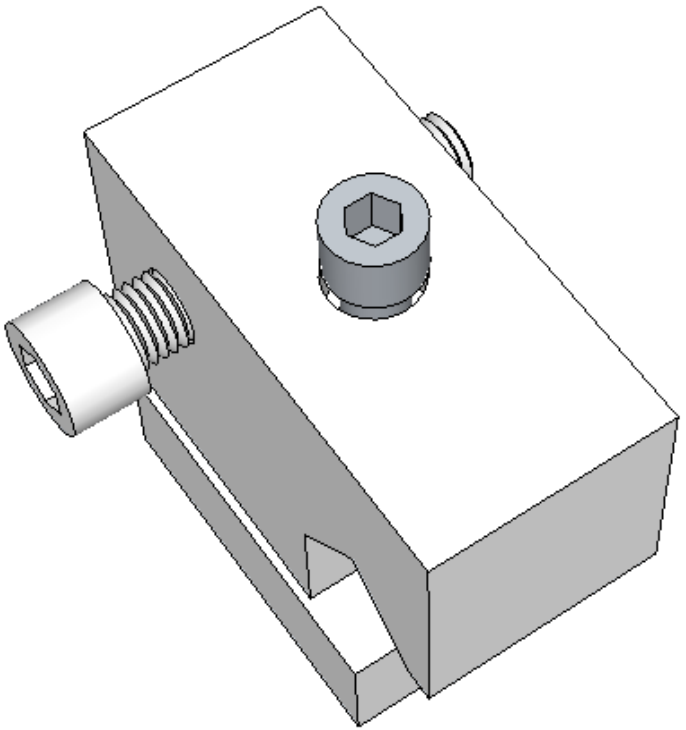
Layout Tools

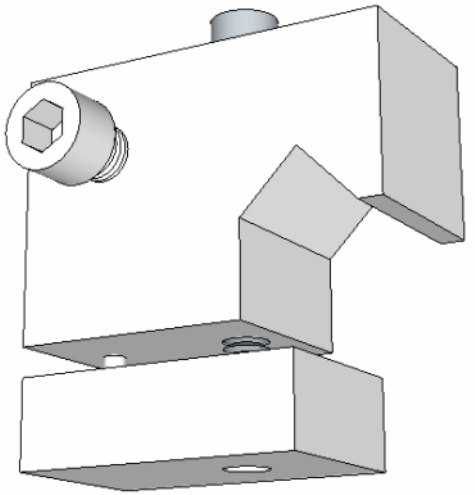
- Tape Measure
- Protractor

Modify Tools

- Paint
- Erase
- Move
- Push/Pull
- Rotate
- Follow Me
- Scale
- Offset

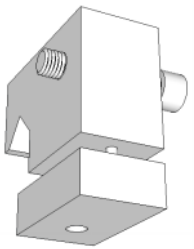


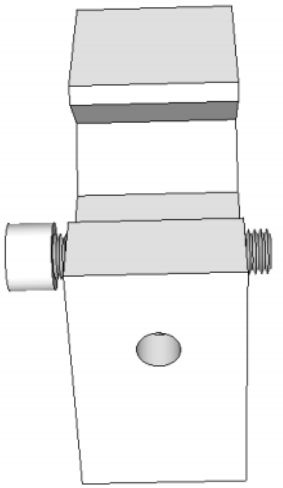




With the mouse wheel and shift key you can

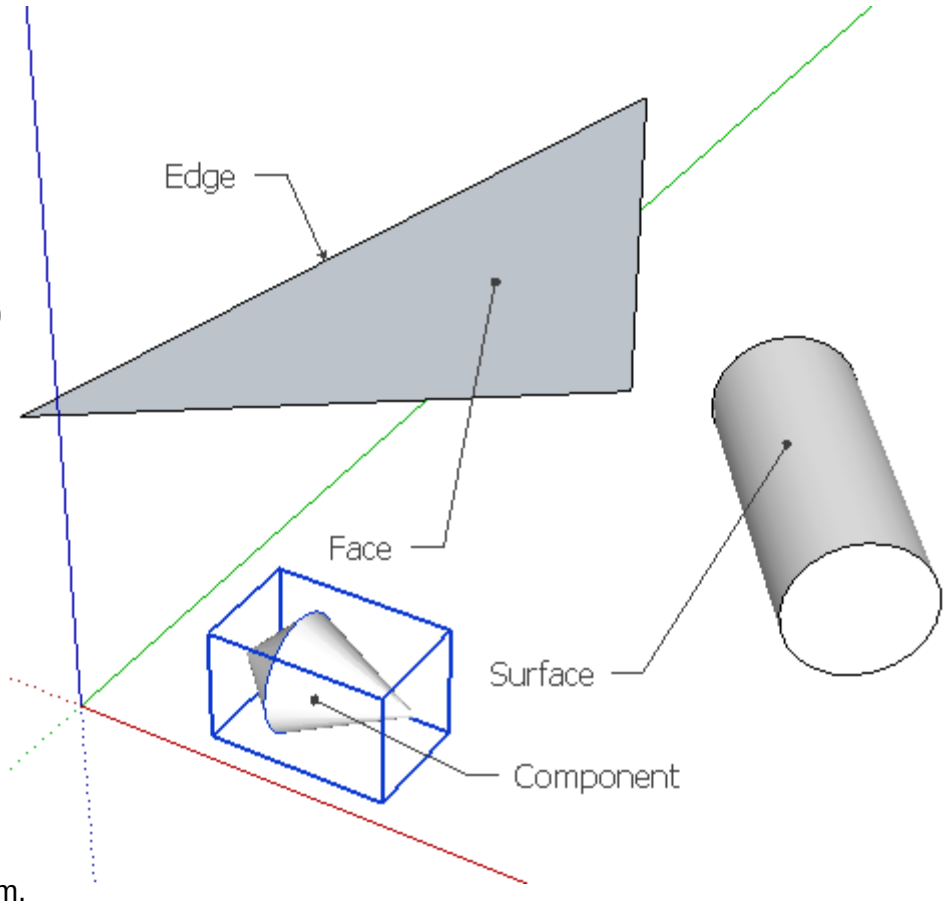
Rotate
Zoom
Pan





Drawing in SketchUp

- **Edges** are straight lines
- **Face** is a closed loop of coplanar edges
- **Surface** is smoothed group of faces
- **Component** is group of edges & faces

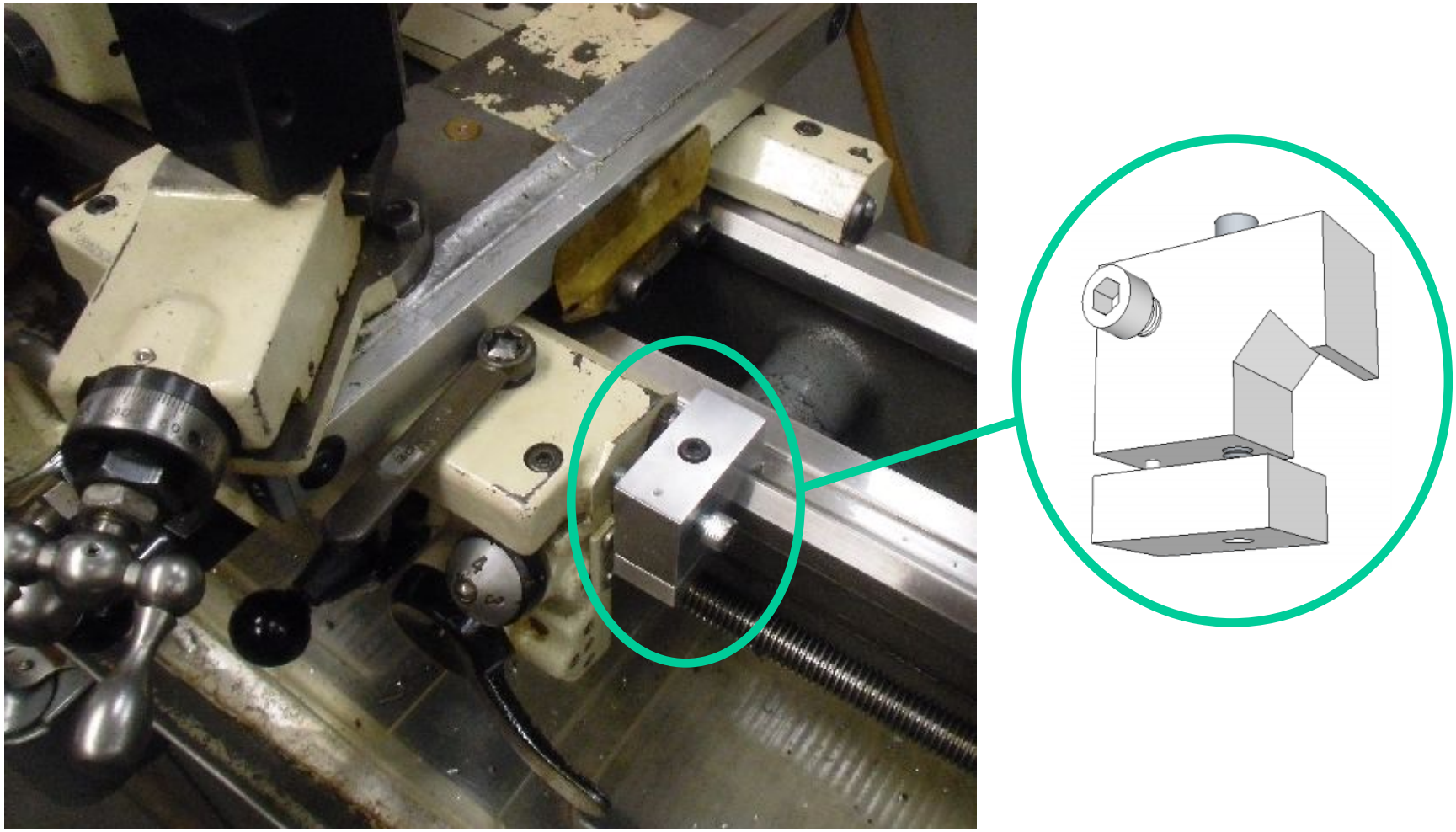


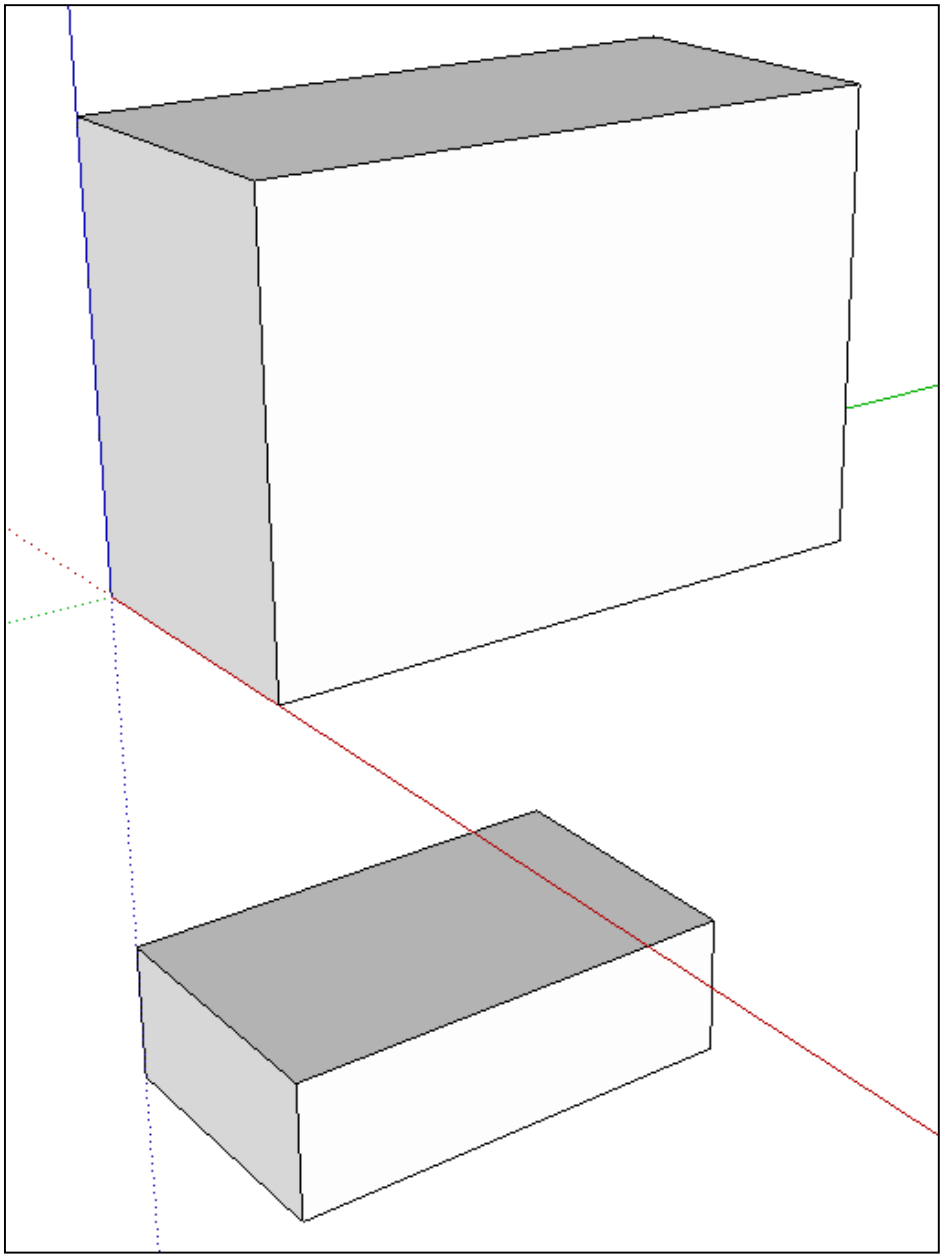
Dynamic Components can have attributes attached to them.

Warehouses, Plugins, Tutorials

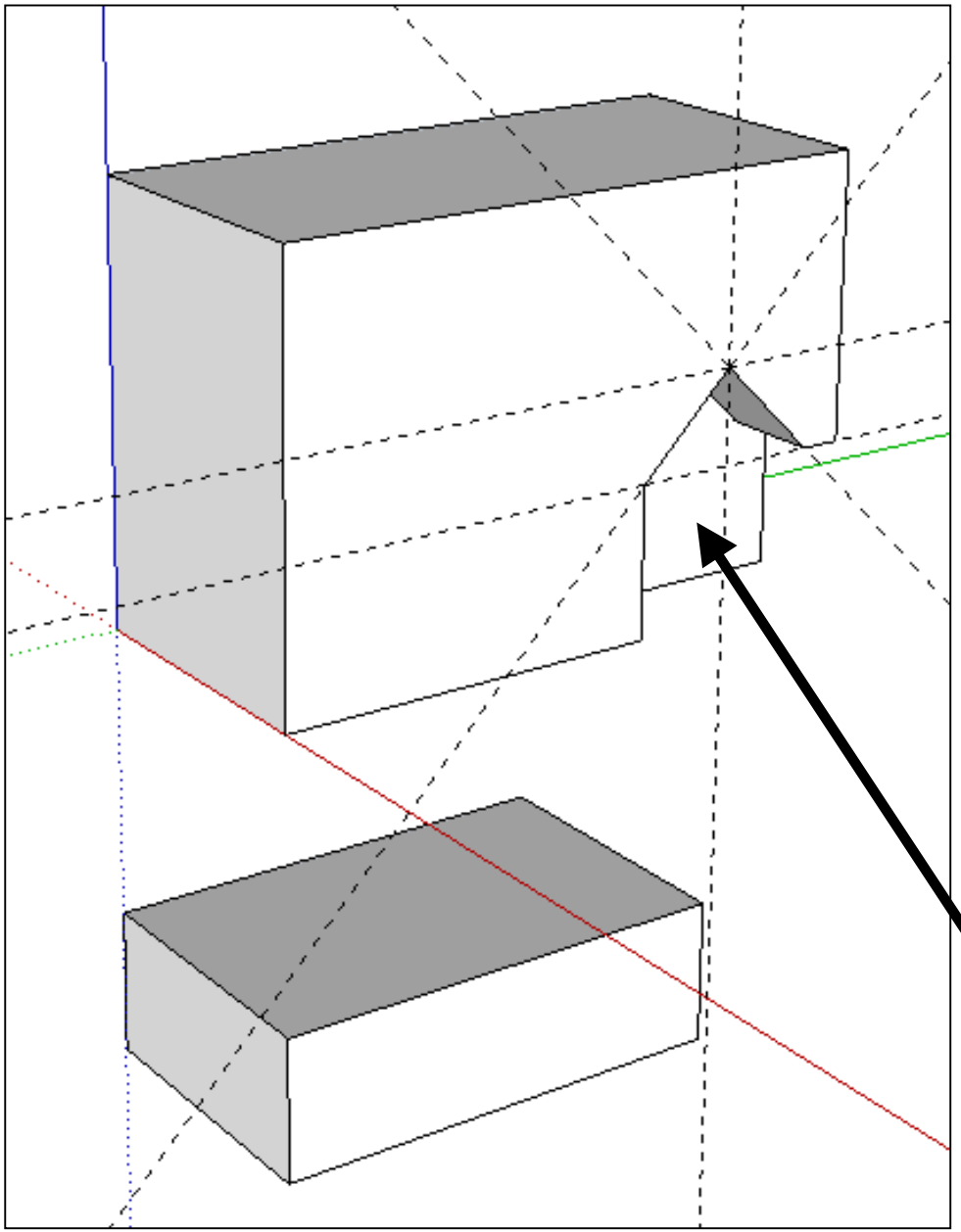
- **Warehouse** websites provide components like nuts and bolts that can be imported into a drawing.
- **Plugin** websites provide scripts to perform specialized tasks like mirroring or computing the centroid of a face.
- **Tutorial** videos are numerous on Google's website.

Drawing a Lathe Carriage Stop in Google SketchUp





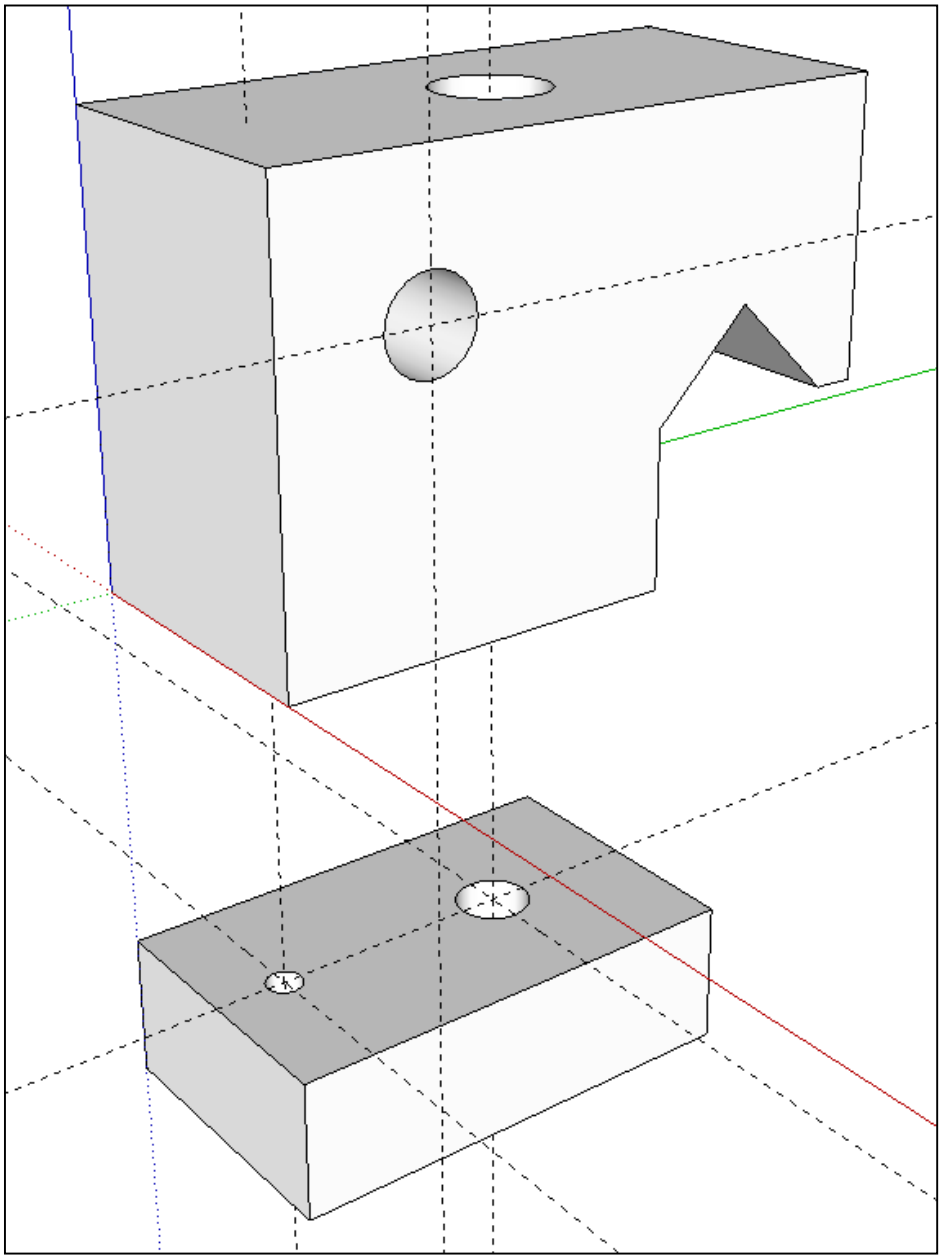
Use the **Rectangle** and the **Push/Pull** tool to roughed out parts for a Carriage Stop.



Dotted guide lines are added with the **Tape Measure** and **Protractor** tool.

A closed profile of the prismatic way cut-out is drawn with the **Line** tool.

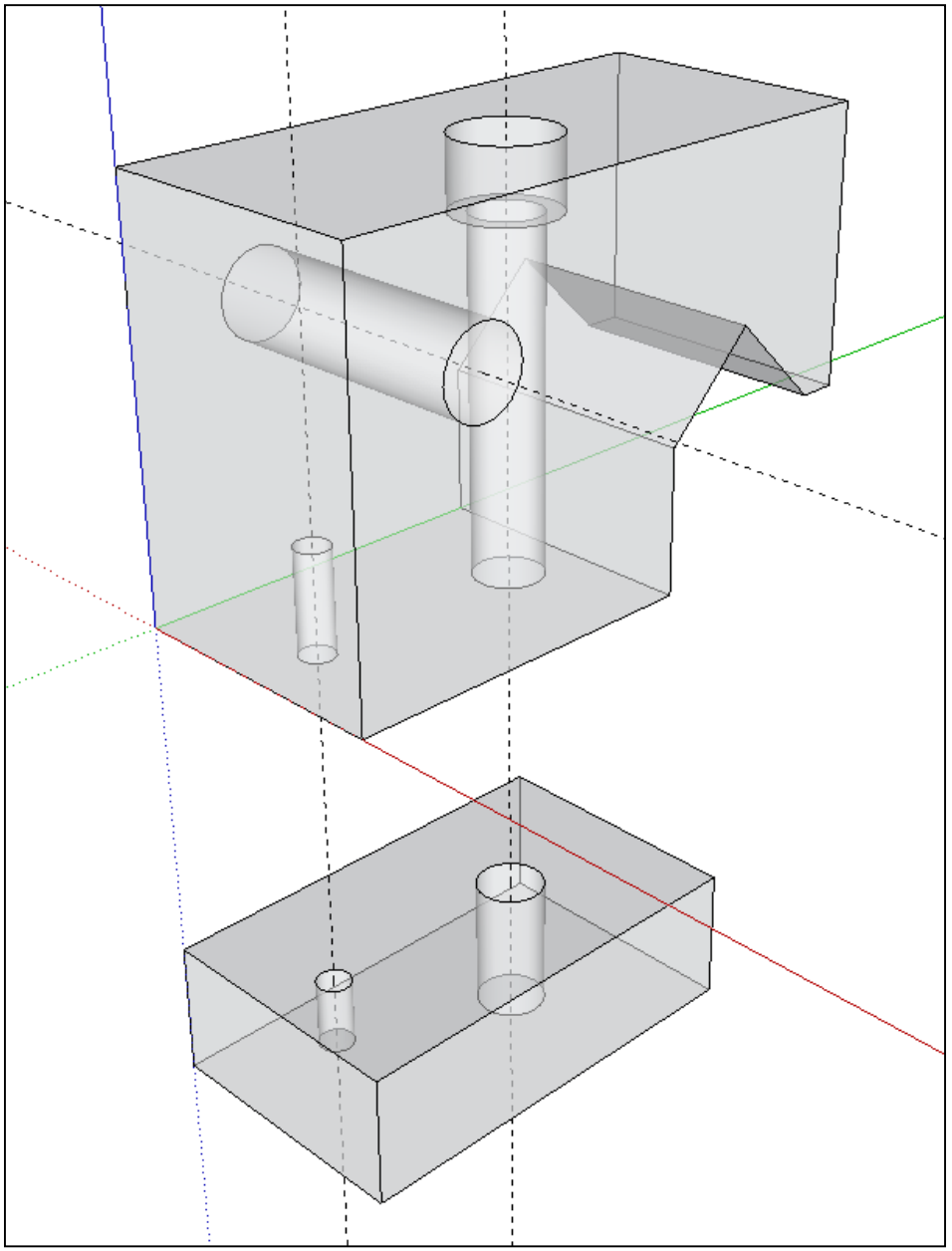
The cut-out is removed with the **Push/Pull** tool.



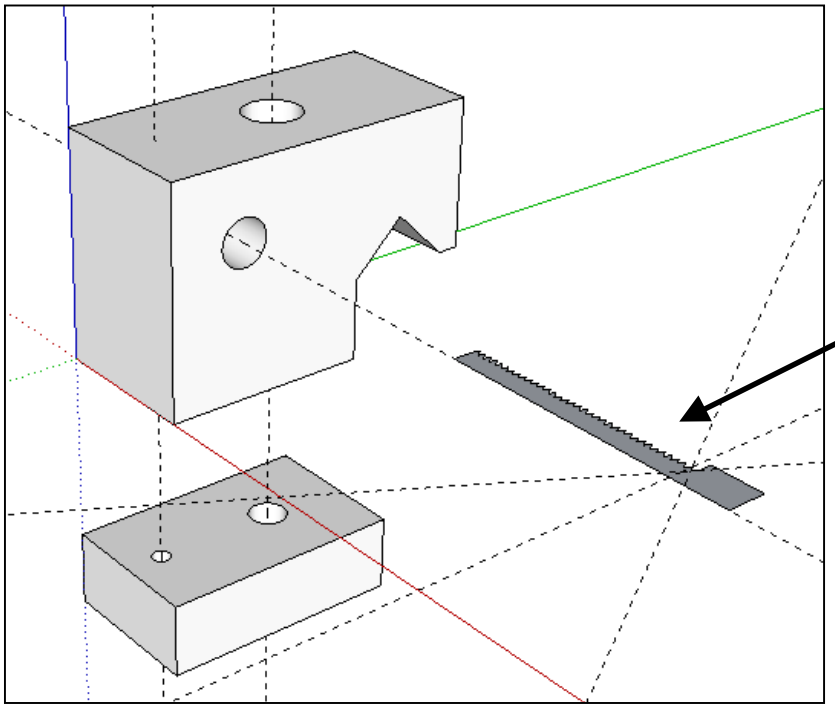
The **Tape Measure** tool adds additional dotted guide lines.

Holes are located and sized with the **Circle** tool on the face of the parts.

The **Push/Pull** tool bores the holes into or completely through the parts.

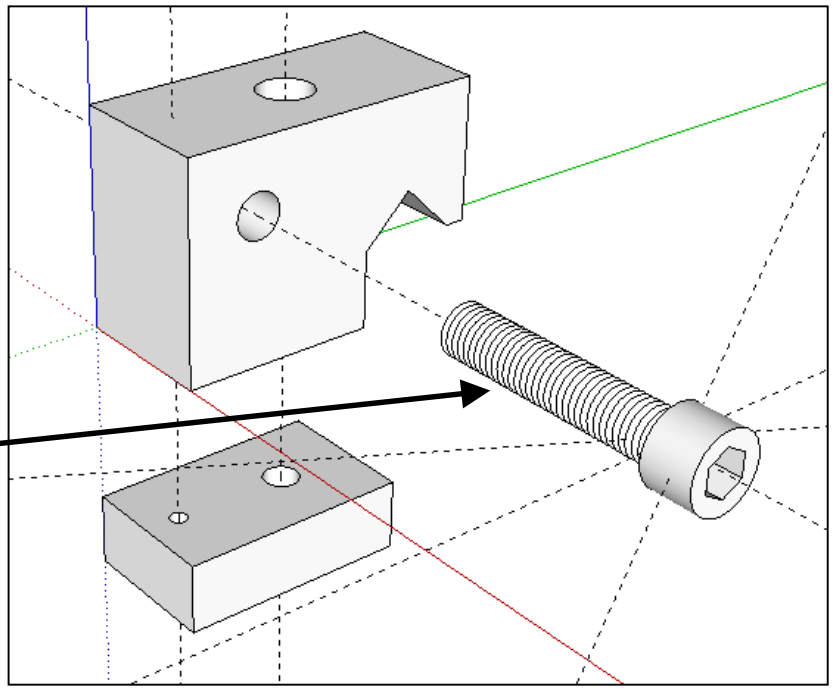


An X-ray view shows the location of holes and “push-outs” or cuts allowing identification of possible conflicts with their positioning.



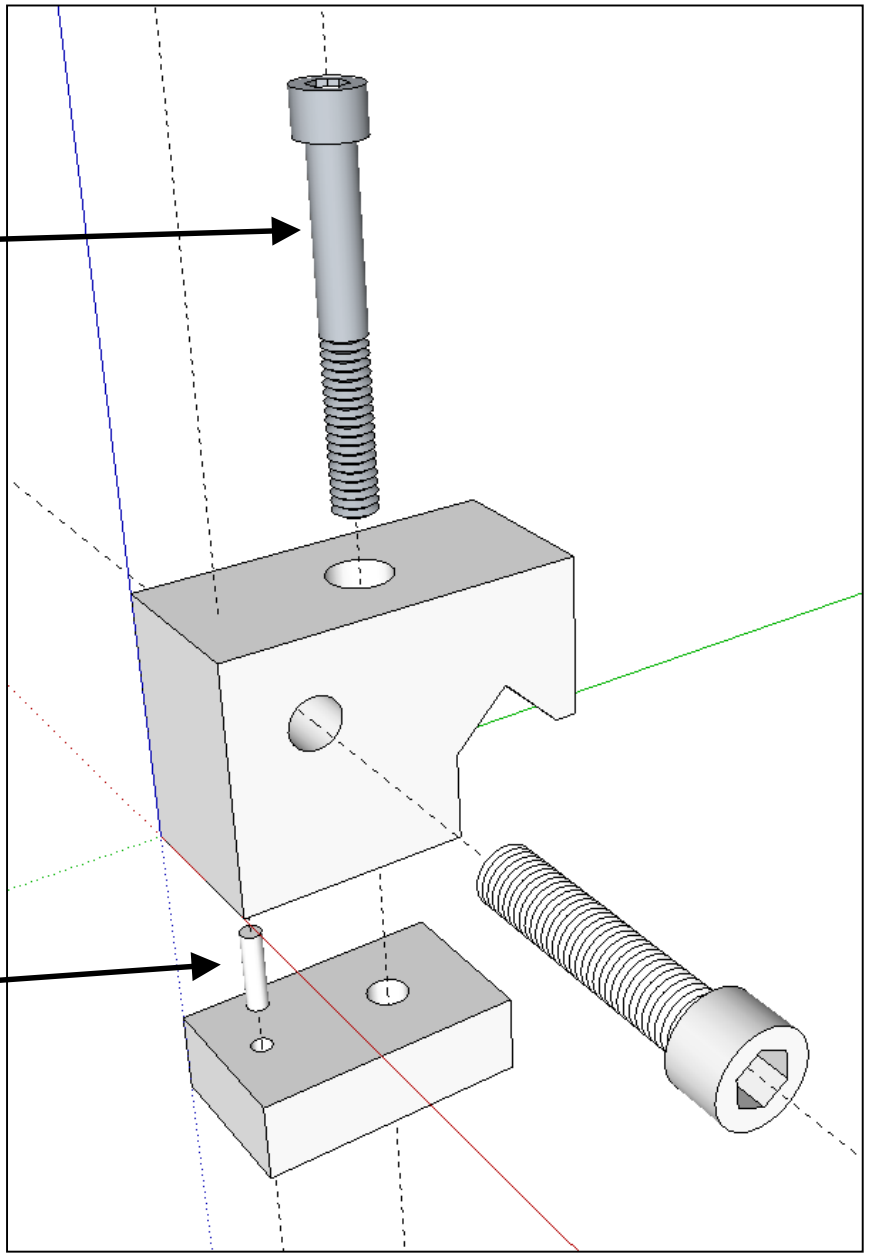
The half section of the socket head cap screw is drawn using the **Tape Measure**, **Protractor, Rectangle**, and **Line**, tools.

The screw's section is rotated about a circle with the **Follow Me** tool. A hex key socket is inserted with the **Polygon** and **Push/Pull** tools



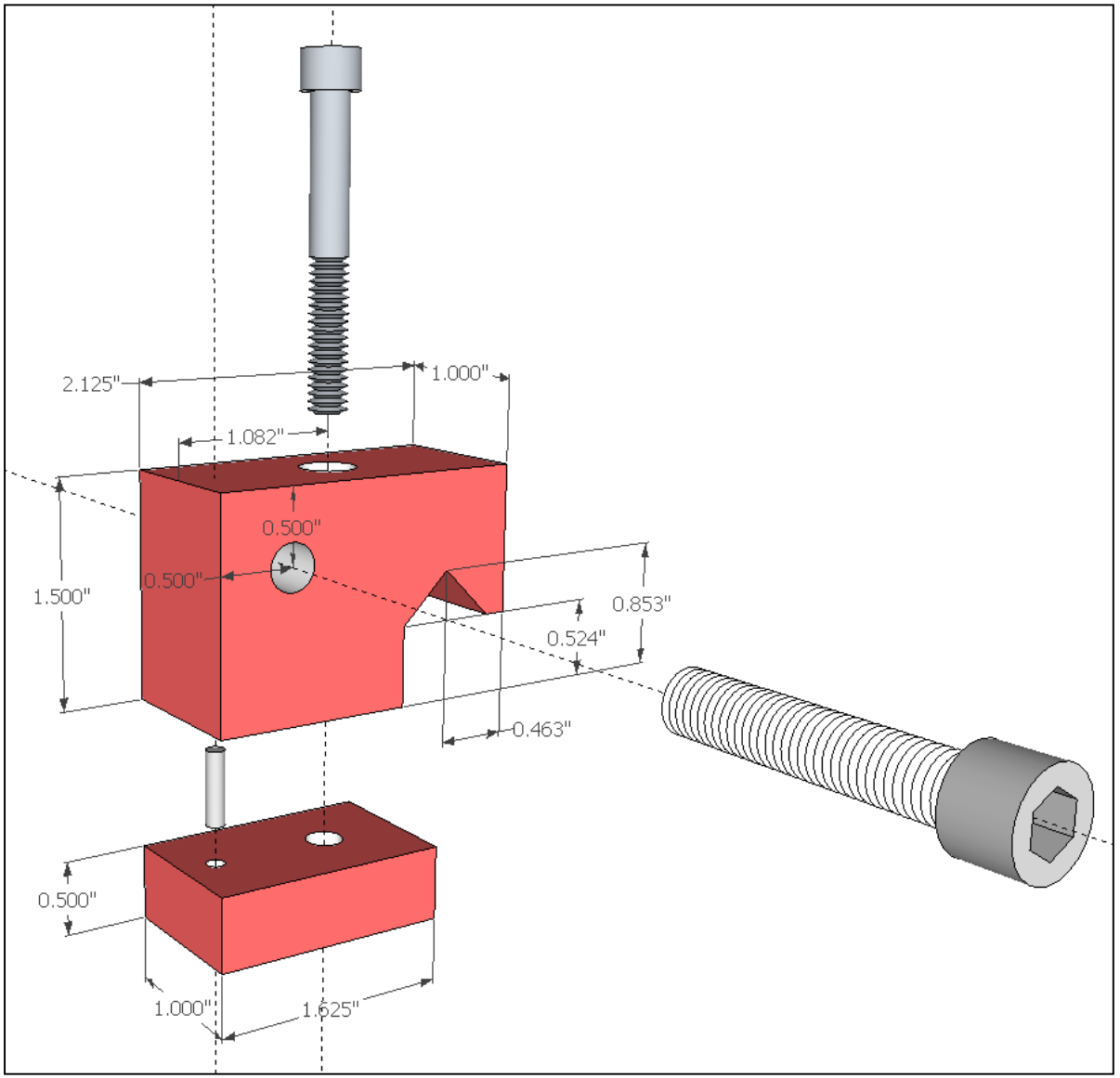
Another screw is created by rotating it's half section about its hole with the **Follow Me** tool.

A dowel is created with the **Circle** and **Push/Pull** tool.

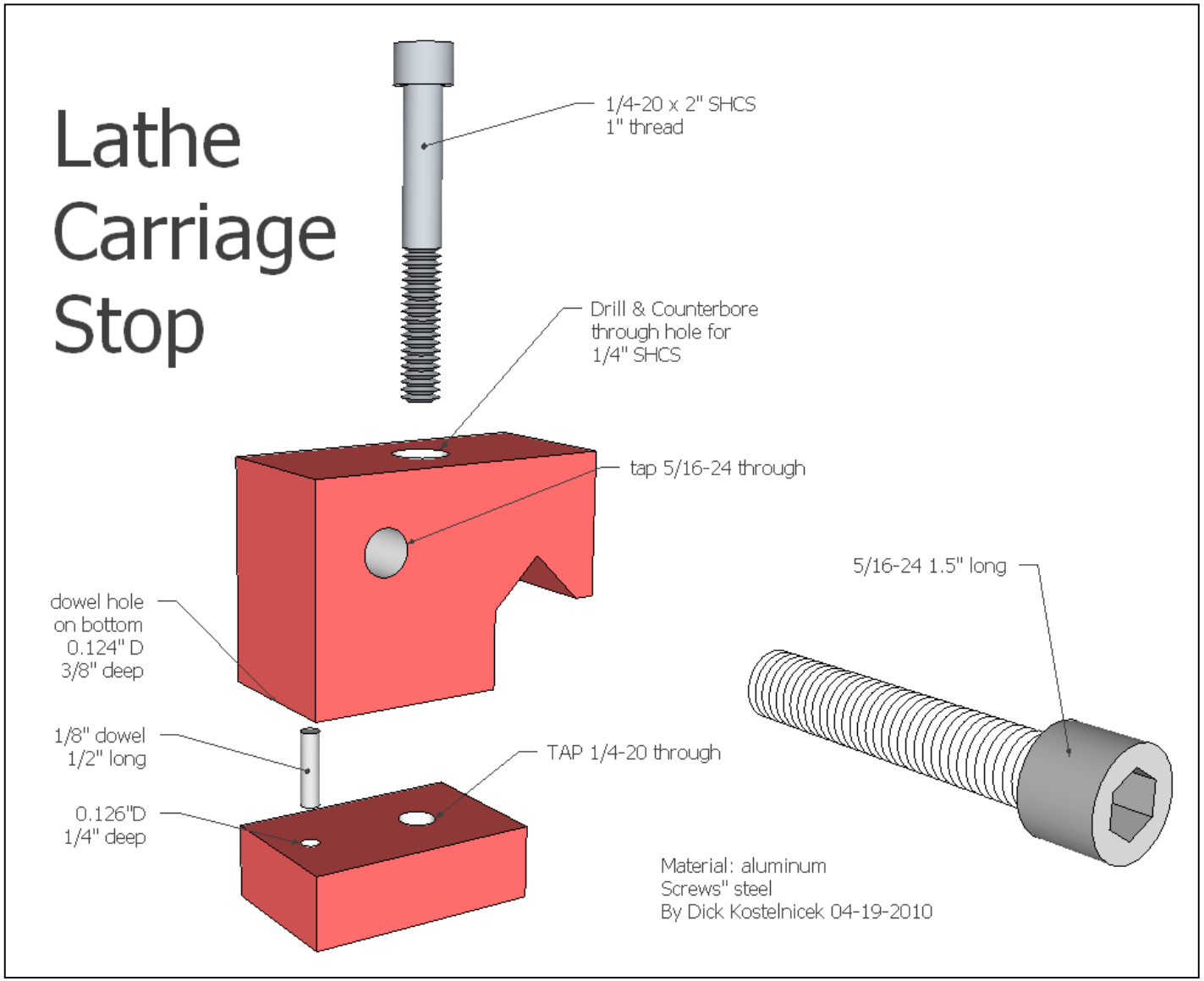


Dimensions and color or texture may be added and turned on/off in different views called **Scenes.**

Once entered, dimensions are dynamic and change with the model.



Annotation is added to a **Scene**.



Scaled Printing is Not Suitable in the Free Version of SketchUp

- Export screen view as **png bmp jpg** and use a graphics program like MS-Paint for sizing and printing.

- **Alt+Print Scr** and paste screen image into MS-Word. Crop with the Edit-Picture option and then print.

SketchUp Free Version I/O

- Output Graphics **png jpg bmp**
- Output Google Earth **dae kmz**

- Input Graphics **jpg png tif bmp tga psd**
- Input Autodesk **3ds**
- Input USGS **dem ddf**
- Input Google Earth **dae kmz**

- Useful Printing requires Google LayOut that comes with the $500 Pro version

Now, let’s make the drawing with SketchUp.