



## CAD SKILLS



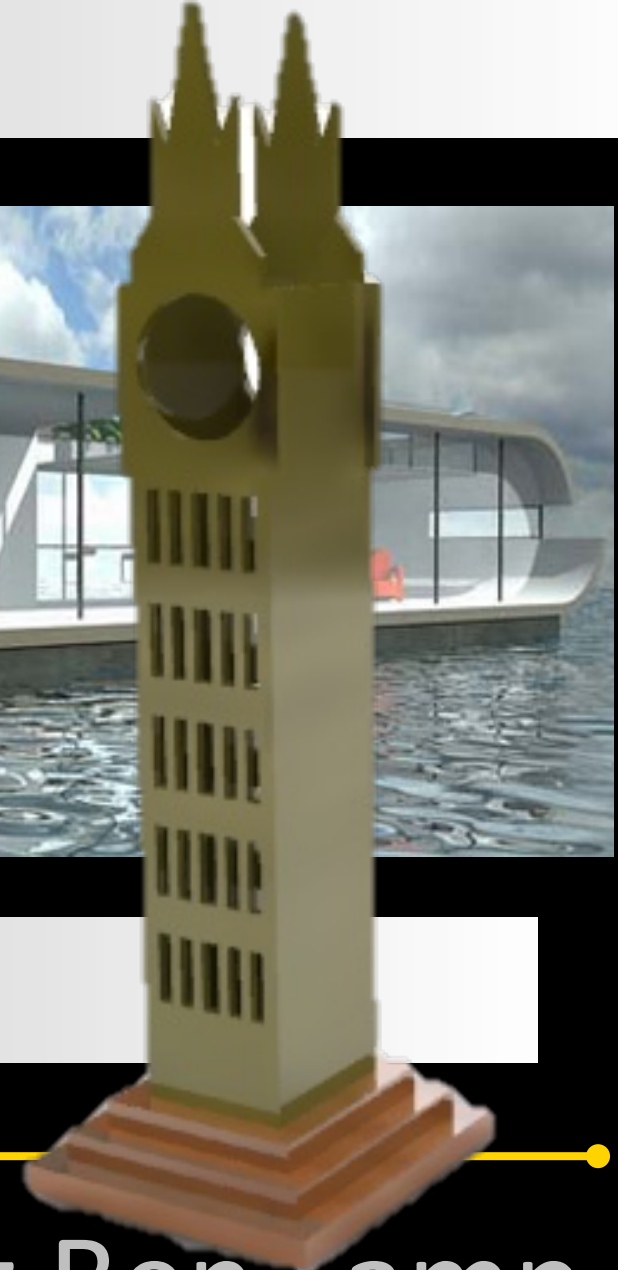
# Tutorial 15: Big Ben Lamp

Level of Difficulty



Time

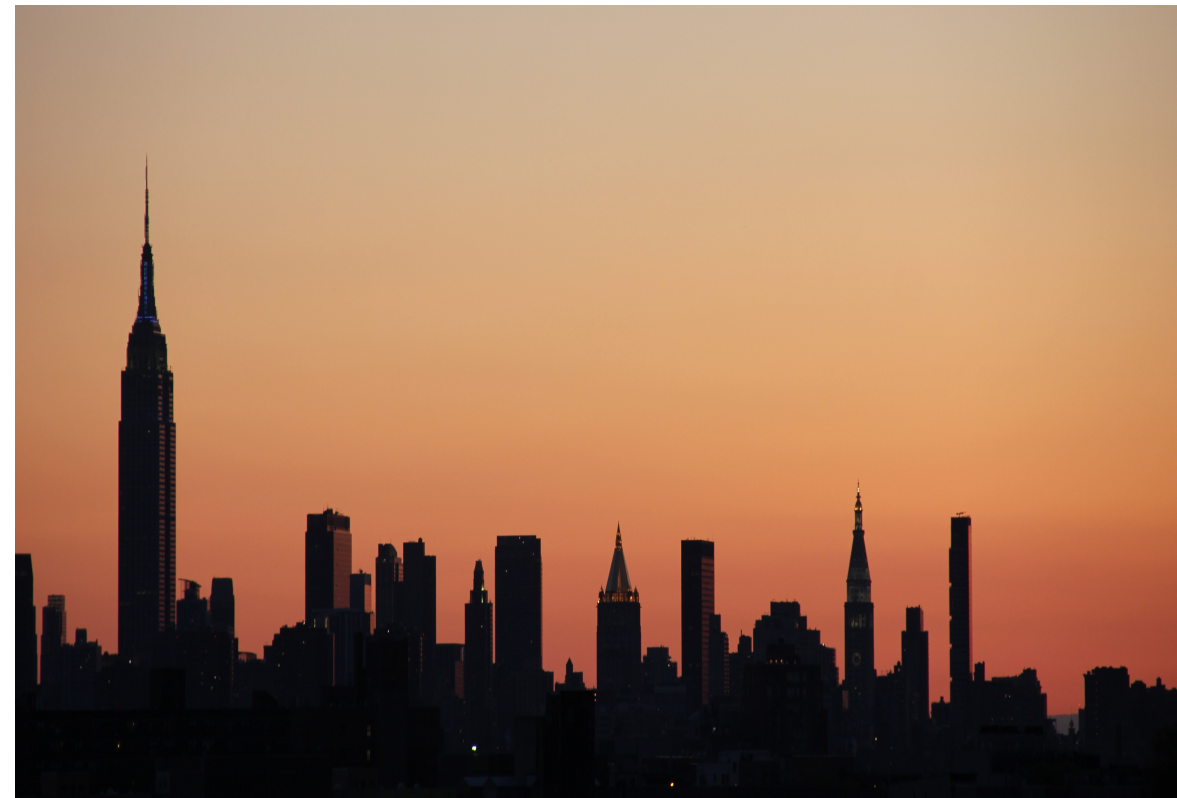
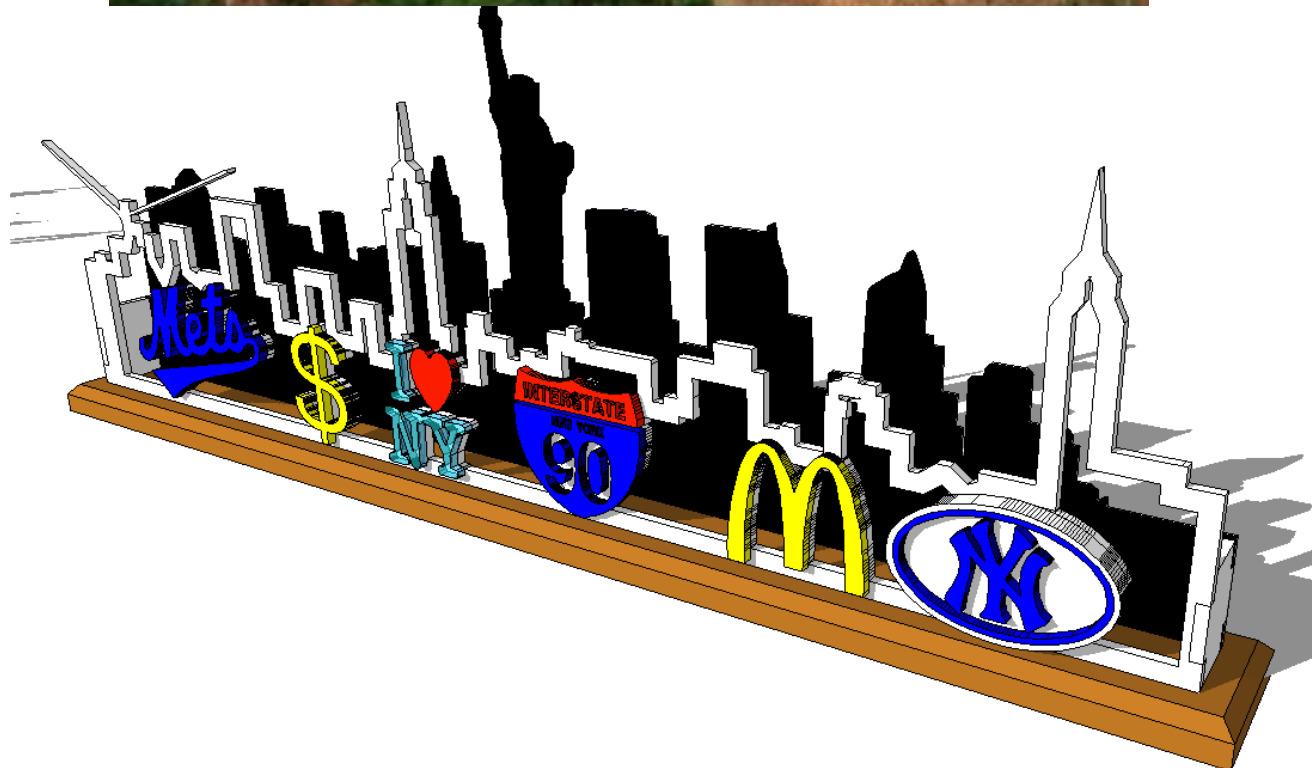
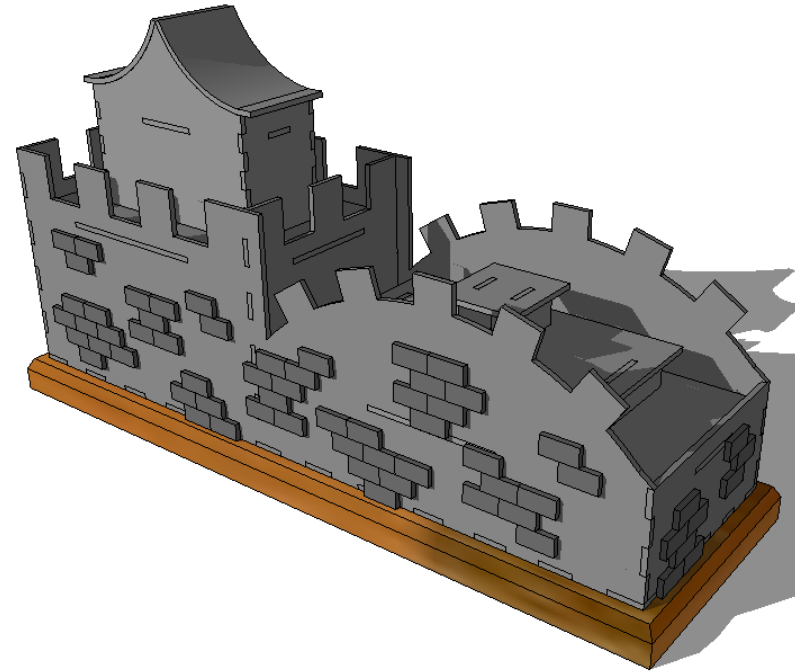
Approximately 60–120 minutes





# Starter Activity

- Design a lamp based around a famous landmark or iconic building.....



# Computer Aided Design: Aircraft Lamp

## Lesson Objectives...

Computer Aided Engineering: Step by Step Guide to Lamp Construction

- To understand the basic tools used in SketchUp.
- To understand the advantages of using CAD
- To be able to successfully use CAD independently to complete a range of tutorials in 2D and 3D
- To develop advanced skills and problem solving skills when using Sketch Up
- To use correct dimensions when using sketch up to draw models that can be 3D printed or manufactured using CAM machines in school (i.e. Laser Cutter, 3D Router).

# Skills to be used in this project...

Basic Skills	New and Higher Skills
Zoom tool	Rotate tool
Orbit tool	Move tool
Pan tool	Offset tool
Line tool	Arc tool
Rectangle tool	Follow Me tool
Circle tool	Paint Bucket tool
Eraser tool	Dimensions tool
Push/Pull tool	Making Components

**Basic skills** are those required to do very basic drawings and are detailed as part of this presentation.

**New and higher skills** may be new to the novice and are the focus for learning in this presentation.



# Lesson Outcomes...

By the end of this tutorial you will be able  
to...

- Use the push pull and move tool
- Learn about centre lines
- Create, Move and Rotate components
- Use the offset tool to make objects and add detail
- Shape and form your design
- Draw your design to the correct size to enable it to be manufactured.

# Learning Styles







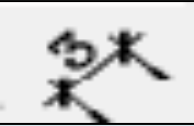





**Visual : *Presentation***

**Auditory: *Video***

**Kinaesthetic: *Demonstration***

# Sketchup Help Guide:

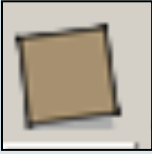






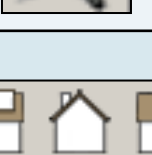

## Computer Aided Engineering: 15. Drawing and Modification Commands

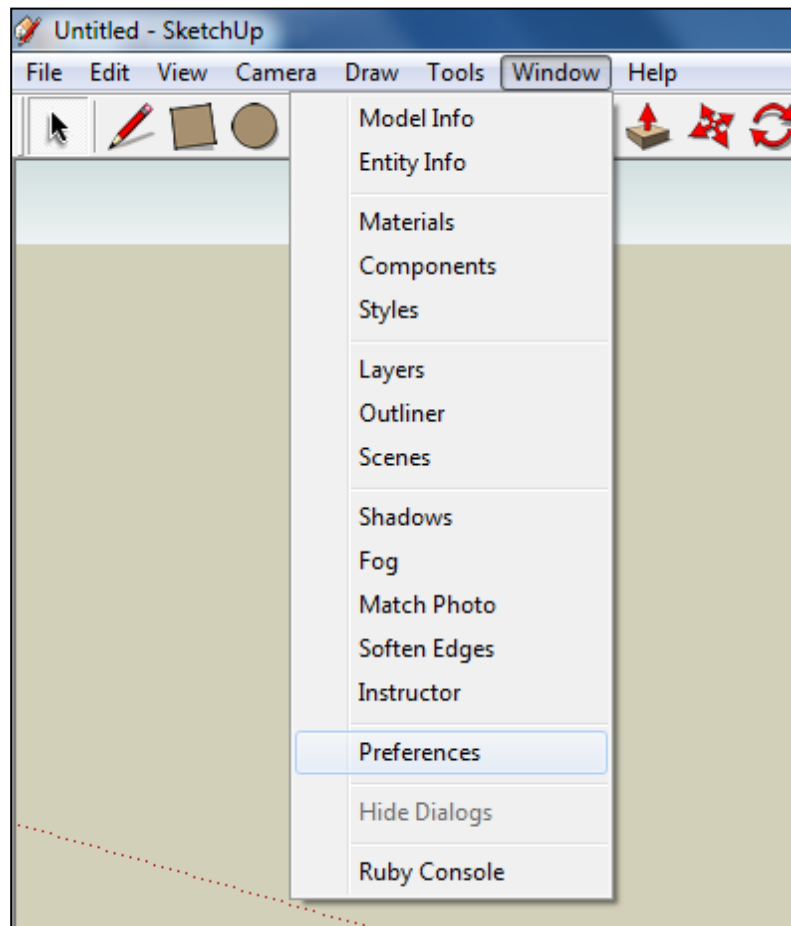
Drawing and Modification Tools	image	Description	Advantages
Modifying Tool 1. <a href="#">Pencil tool</a>		used to draw lines in X, Y and Z direction. Can draw simple or complex shapes very quickly.	<b>Advantages:</b> <i>Allows user to draw or modify shapes very quickly and can be used to construct 3D objects faster than traditional hand drawings</i>
Modifying Tool 2. <a href="#">Trim tool</a>		allows the user to remove overlapping elements.	<b>Advantages:</b> <i>Allows user to erase overlapping lines and edges to draw complex 3D shapes very quickly.</i>
Modifying Tool 3. <a href="#">Push/pull</a>		tool used to turn solid objects into 3D objects instantaneously. Typing a size allows a user to extrude or pull an object to a certain size or height	<b>Advantages:</b> <i>Allows user to draw or modify 3D shapes very quickly faster than traditional hand drawings. You can click on a face (plane) and adjust. Can be used to extrude shapes on 3D objects already drawn.</i>
Modifying Tool 4. <a href="#">Move Tool</a>		used to move entire shapes or pull lines on a drawing.	<b>Advantages:</b> <i>Allows user to draw or modify shapes very quickly and can be used to construct unusual 3D shapes quickly</i>
Modifying Tool 5. <a href="#">Dimensions tool</a>		used to show sizes and radius of drawn objects	<b>Advantages:</b> <i>Allows user to draw or modify 3D shapes very quickly faster than traditional hand drawings to correct size if drawn incorrectly. Drawing can be transferred onto the CNC machines directly</i>
Modifying Tool 6 <a href="#">Extrusion Tool (follow me)</a>		allows the user to highlight a path that turns blue. A chosen shape will then follow the chosen path	<b>Advantages:</b> <i>Allows user to draw profiles of shapes and follow the path to draw complex 3D shapes very quickly.</i>
Modifying Tool 7. <a href="#">Arch tool</a>		You can use the <b>arch</b> tool to draw a radius from two given points. Can be used to draw corners etc..	<b>Advantages:</b> <i>Allows user to rotate and position shapes quickly to draw complex 3D shapes very quickly.</i>
Modifying Tool 8. <a href="#">Circle tool</a>		allows the user to draw different sized radius circles and chamfered corners	<b>Advantages:</b> <i>Allows user to draw profiles of shapes and follow the path to draw complex 3D shapes very quickly.</i>
Modifying Tool 9. <a href="#">Orbit tool</a>		You can use the <b>Orbit</b> tool to change the angle that you are viewing your design from. You can do the same by pressing the middle wheel of your mouse	<b>Advantages:</b> <i>Allows user to rotate and see all angles of their design quickly</i>
Modifying Tool 10. <a href="#">Tape measure tool</a>		allows the user to draw guide lines to given sizes and mark out radius etc.	<b>Advantages:</b> <i>Allows user to draw guides of shapes and draw complex 3D shapes very quickly.</i>



# Sketchup Help Guide:

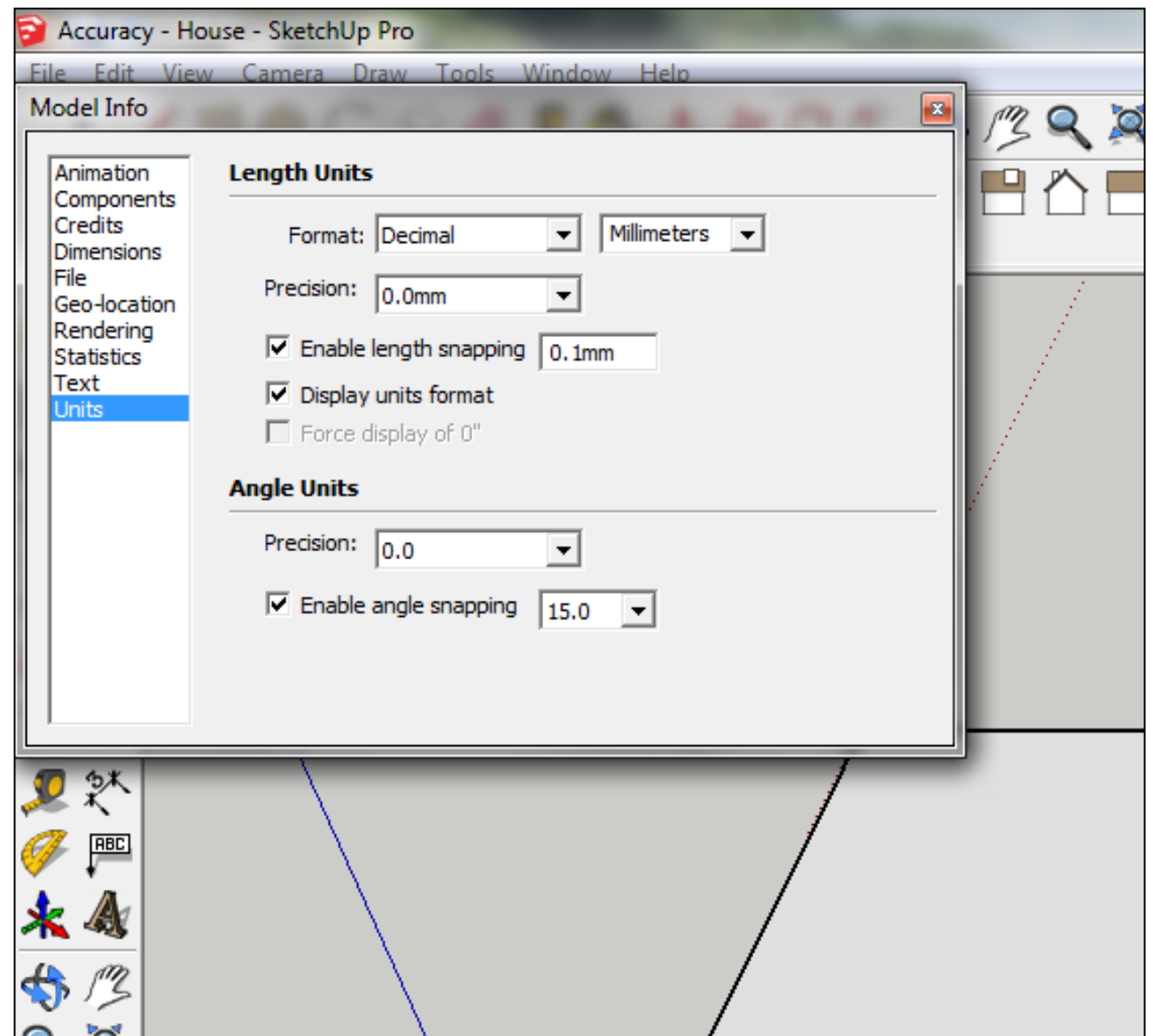
## Computer Aided Engineering: 15. Drawing and Modification Commands

Drawing and Modification Tools	image	Description	Advantages
Modifying Tool 11. <a href="#">Square tool</a>		used to draw squares and rectangles.	<b>Advantages:</b> <i>Allows user to draw guides of shapes and draw complex 3D shapes very quickly.</i>
Modifying Tool 12. <a href="#">Offset tool</a>		You can use the <b>contour</b> tool to draw parallel lines or lines within lines.	<b>Advantages:</b> <i>Allows user to draw duplicate lines and position them within shapes quickly to draw complex 3D shapes very quickly.</i>
Modifying Tool 14. <a href="#">Rotate Tool</a>		used to move rotate parts of a shape or entire shapes on x, y and Z co-ordinates.	<b>Advantages:</b> <i>Allows user to draw or modify shapes very quickly and can be used to construct unusual 3D shapes quickly</i>
Modifying Tool 15 <a href="#">Scale Tool</a>		allows the user to select an object or part of an object and increase its size from the base point.	<b>Advantages:</b> <i>Allows user to quickly resize objects to draw complex 3D shapes very quickly.</i>
Modifying Tool 16 <a href="#">Paint Bucket Tool</a>		allows the user to select a colour or materials to produce photo-realistic drawing of their object. Shadows etc. can be added.	<b>Advantages:</b> <i>Allows user to quickly draw objects like using materials, textures etc...</i>
Modifying Tool 17 <a href="#">Pan Tool</a>		You can use the <b>Pan</b> tool to grab and move your object around the screen. Alternatively, you can pan by pressing the <b>Shift</b> key <b>and</b> holding down the mouse's middle wheel.	<b>Advantages:</b> <i>Allows user to move and position their object quickly</i>
Modifying Tool 18 <a href="#">Text Tool</a>		You can use the <b>text</b> tool to add text to your object.	<b>Advantages:</b> <i>Allows user to add 3D text by clicking on the extrude button or 2D text</i>
Modifying Tool 19 <a href="#">Zoom Extents Tool</a>		You can use this tool to automatically zoom into your entire project.	<b>Advantages:</b> <i>Allows user to quickly navigate to the entire drawing if they get lost.</i>
Modifying Tool 20 <a href="#">View Tool</a>		You can use the <b>view</b> tool to quickly look at front side and top views as well as 3D views	<b>Advantages:</b> <i>Allows user to complete working drawings quickly as well as enabling them to show a top view for exporting onto the laser cutter.</i>



1. Open Library /Designoutthebox.com/ CAD Skills/ Lesson 15 / Big Ben

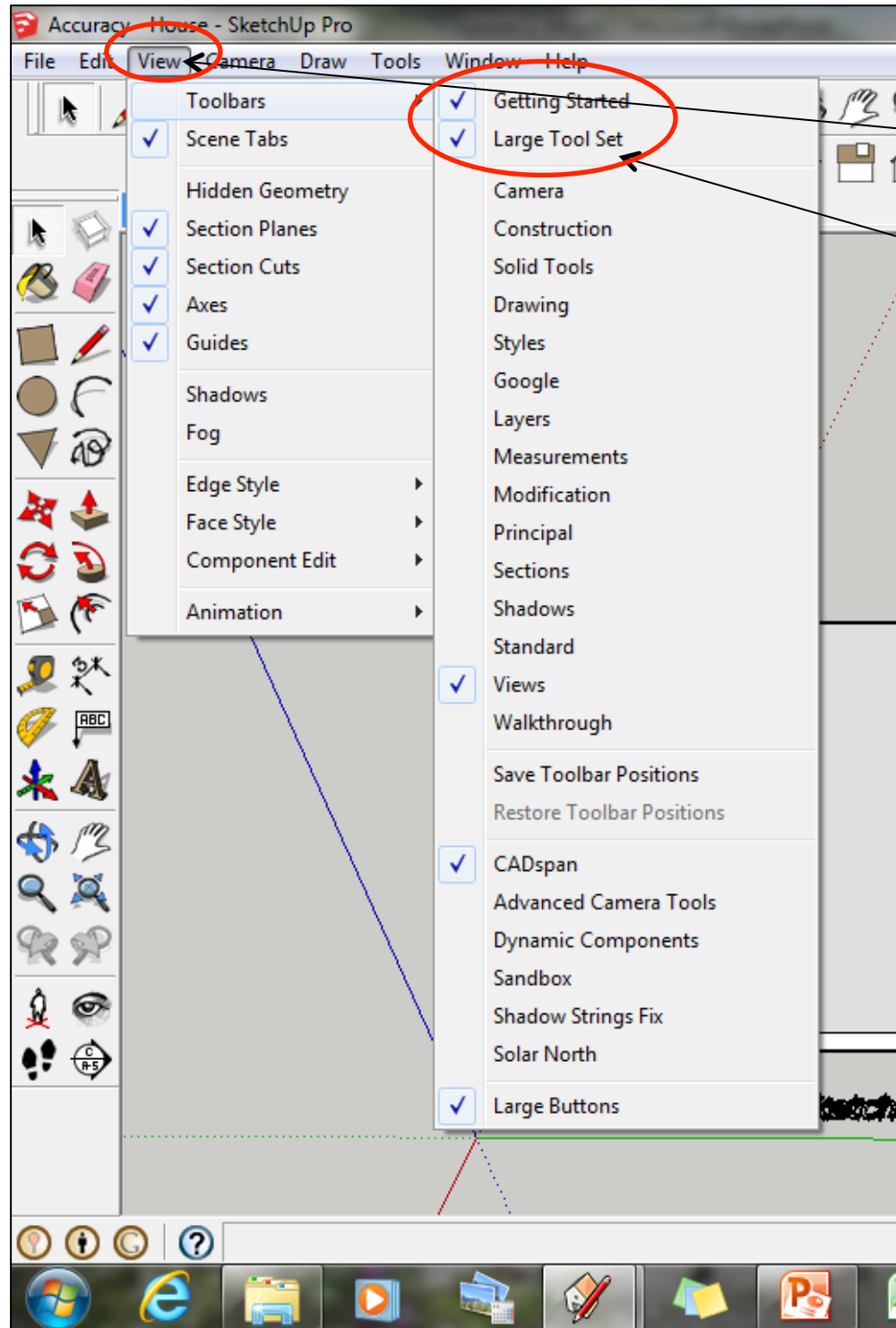
Open the sketch up drawing. Once you have opened SketchUp, go to **Window** and select **Model Info**



2. Select **Units** and choose **Decimal Millimetres**. We are using this template because we are doing a product design.

**Note:** It is often necessary to start a new file to use the new template. Go to **File** then **New**.

3. Now select the **View** then **toolbars** and ensure **Getting Started** and **Large Tool Set** are ticked



3a Select **View**

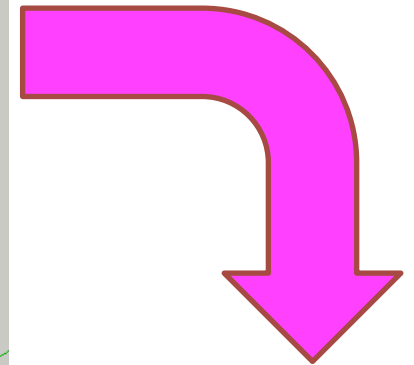
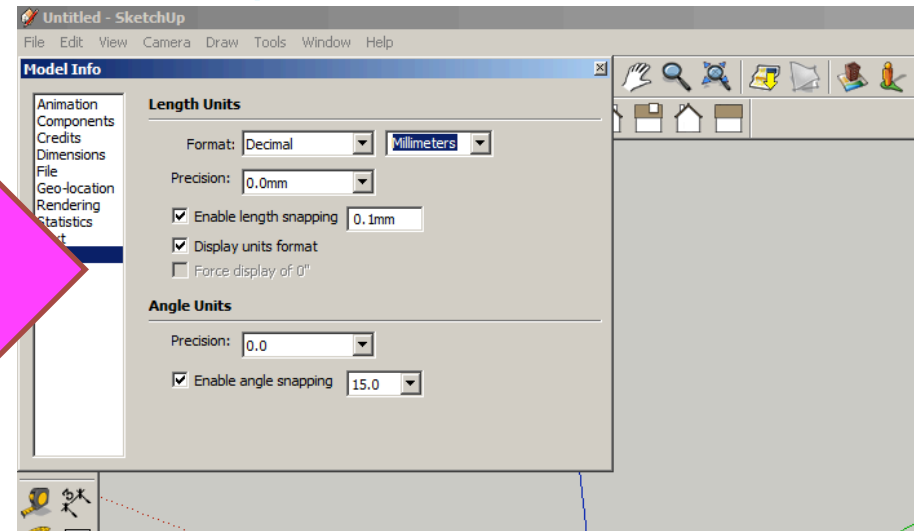
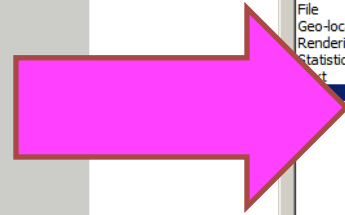
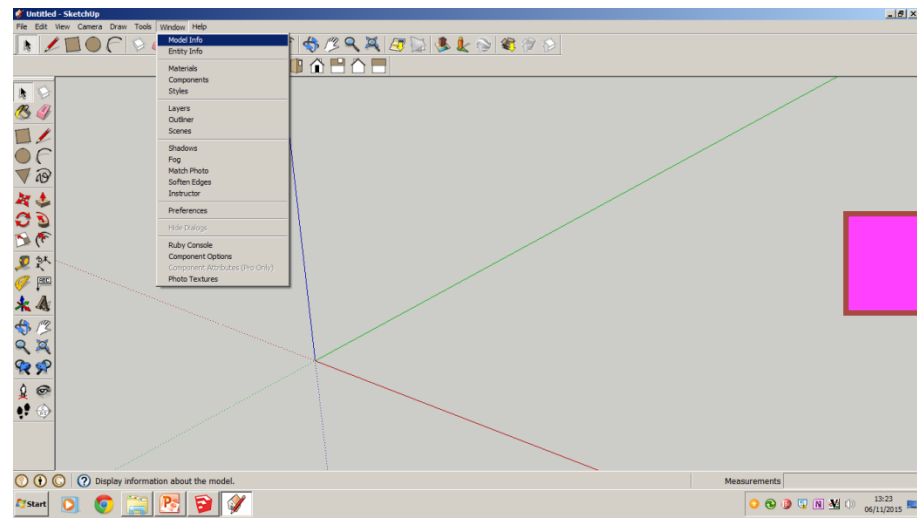
3b Tick Getting Started  
3c Tick Large Tool Set

**Note:** this will place a tool bar across the top (**getting started**) and the side (**Large Tool Set**)



# Computer Aided Design: Big Ben Lamp

## Computer Aided Engineering: Step by Step Guide to Lamp Construction



Start by setting up *window / model info*.

Select Units and change to *decimal - millimetres*

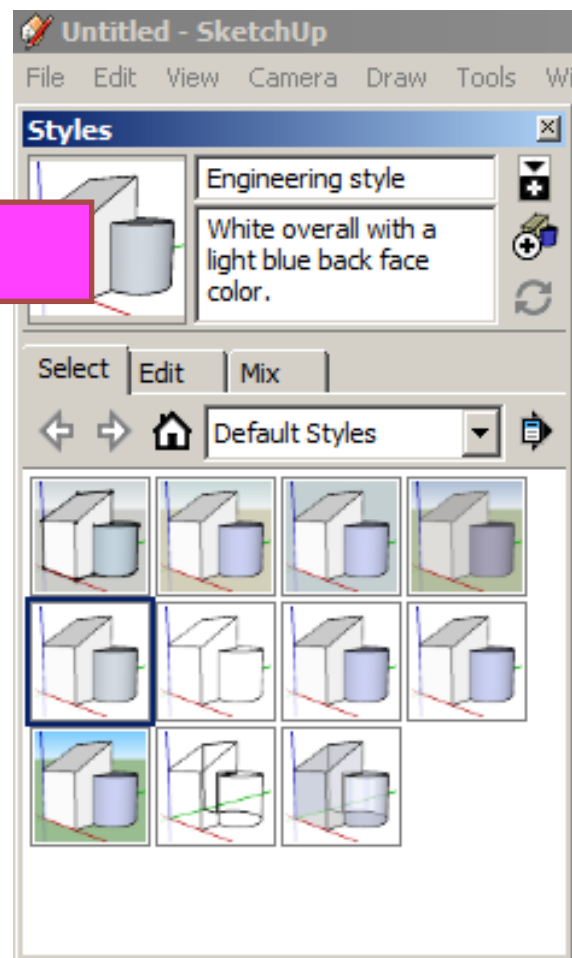
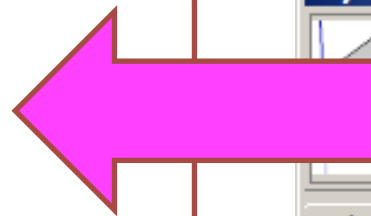
Select engineering Style allows me to use the following equipment in school

- CNC router
- CNC laser cutter
- CNC 3D Printer

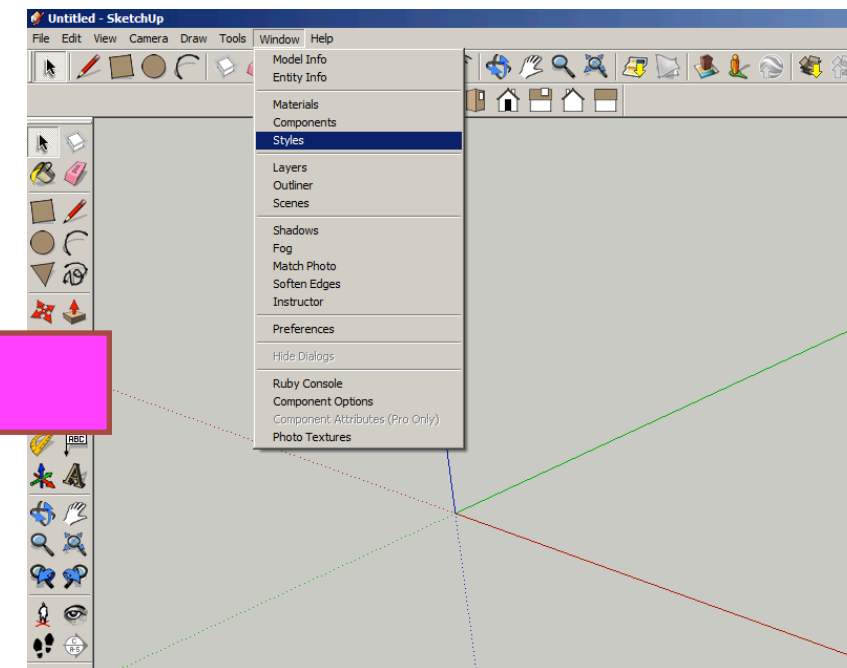
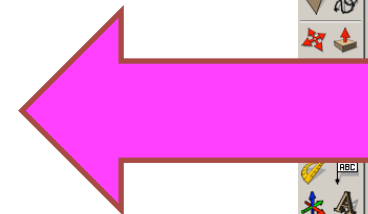
CNC means computer numerically controlled and converts CAD drawings to co-ordinates and codes to be cut out by a machine.

### **3D printers**

3D printers print 3D models, using a process called additive manufacturing or AM. This process uses computer control to lay successive layers of material to build a 3D model.



Select *engineering* Style



Select *Window-Styles*

# Computer Aided Design: Big Ben Lamp

## Computer Aided Engineering: Step by Step Guide to Lamp Construction

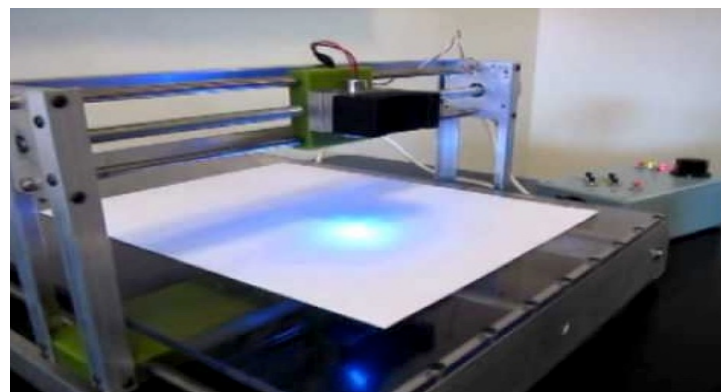
### CNC Router

A **CNC router** is a computer controlled cutting machine related to the hand held **router** used for cutting various hard materials, such as wood, composites, aluminium, steel, plastics, and foams. **CNC** stands for computer numerical control.



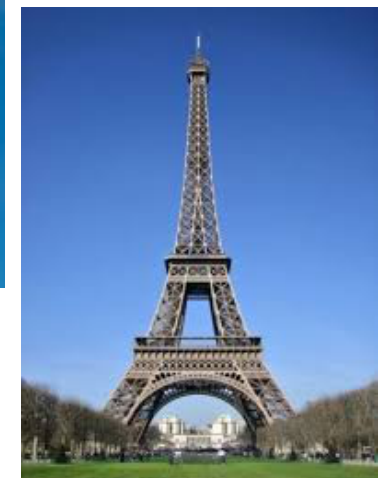
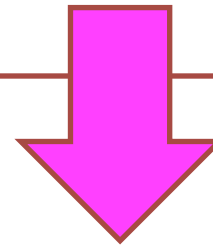
### CNC Laser cutter

**Laser cutting** is a technology that uses a **laser** to **cut** materials, and is typically used for industrial manufacturing applications, but is also starting to be used by schools, small businesses, and hobbyists. **Laser cutting** works by directing the output of a high-power **laser** most commonly through optics



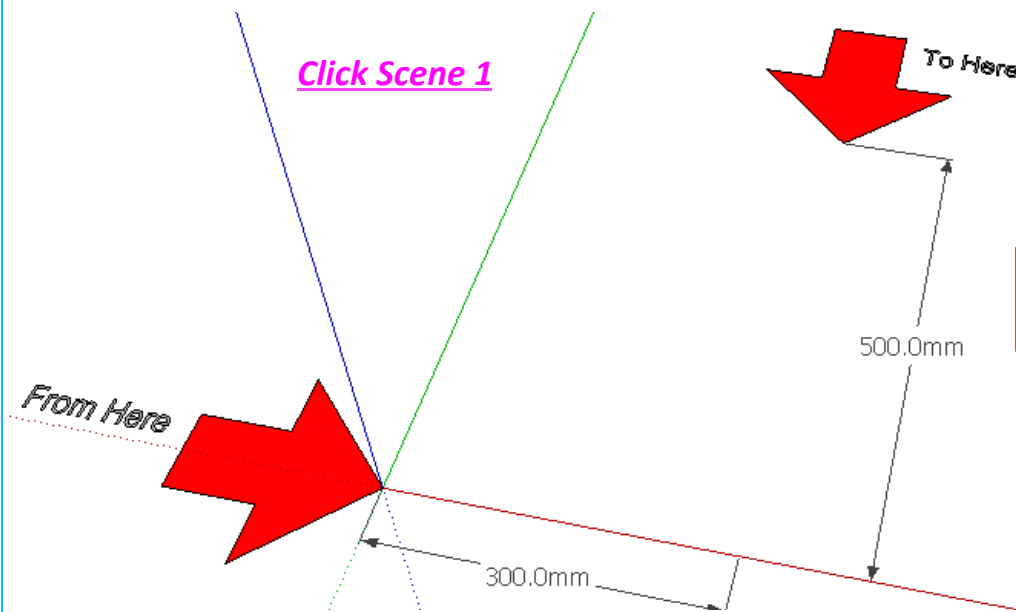
Products which are designed for self-assembly are popular for many reasons and help to keep costs as low as possible. An international furniture warehouse chain is constantly on the look-out for fresh ideas for their lighting sections. They are particularly interested in cutting edge designs which allow the customer to assemble the products in a variety of ways.

*Design and make a lamp based around a famous buildings, structures or a retro theme . The product will need to be manufactured in full-scale and will need assembly instructions which do not rely upon text. The use of commercial knock-down fittings and/or standard components might be a key feature of the product. Accuracy will be a vital requirement and manufacturing aids such as drilling jigs or the use of CAM should be regarded as essential.*



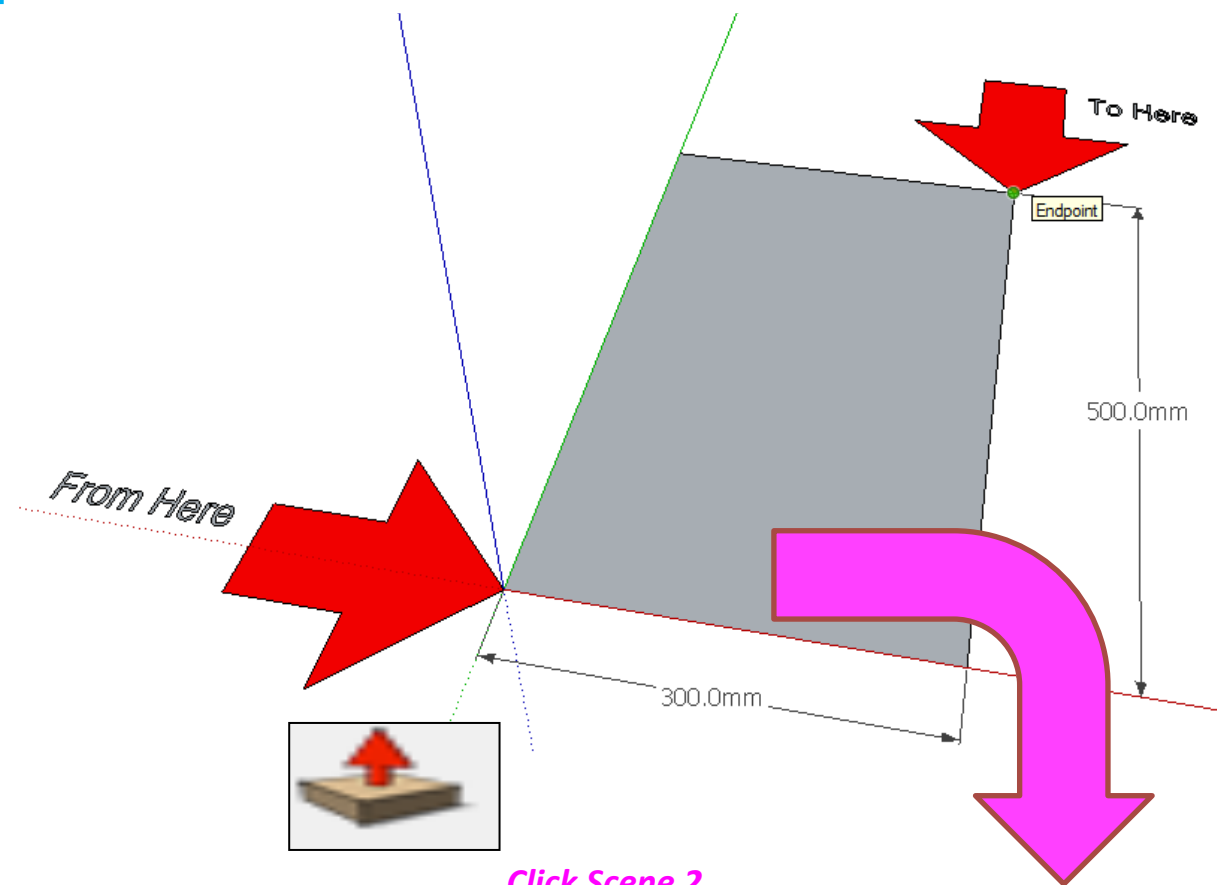
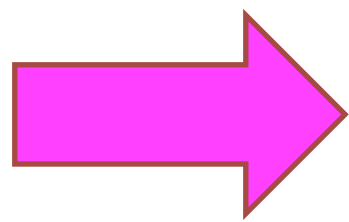
# Computer Aided Design: Big Ben Lamp

## Computer Aided Engineering: Step by Step Guide to Lamp Construction



[Click Scene 1](#)

Use the **square tool** to draw a rectangle measuring 300mm by 500mm. Use the guide arrows to assist.



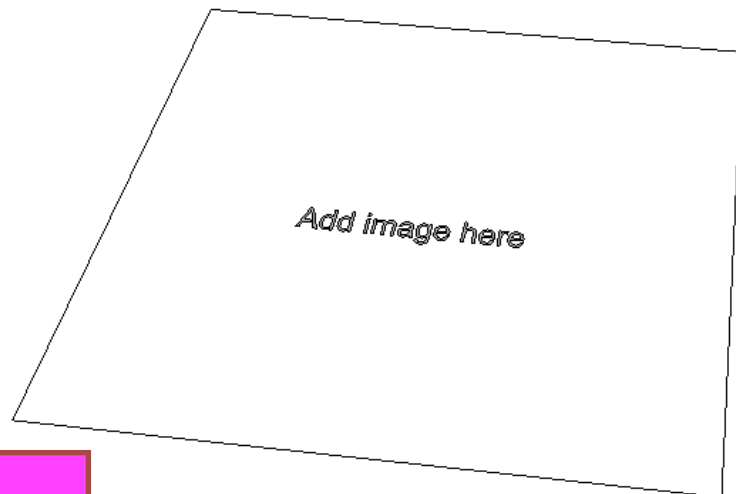
[Click Scene 2](#)

**Push/pull** tool used to turn solid objects into 3D objects instantaneously. Typing a size allows a user to extrude or pull an object to a certain size or height

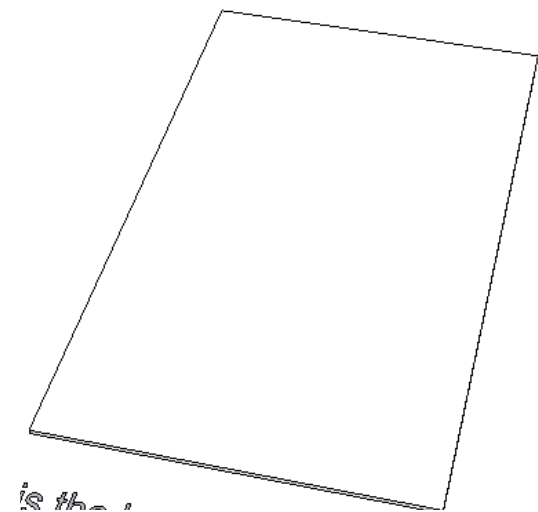
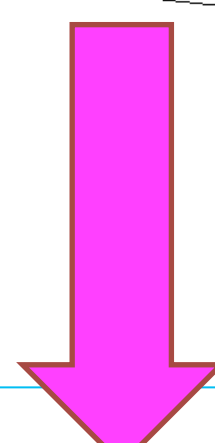
**Advantages:**

*Allows user to draw or modify 3D shapes very quickly faster than traditional hand drawings. You can click on a face (plane) and adjust. Can be used to extrude shapes on 3D objects already drawn.*

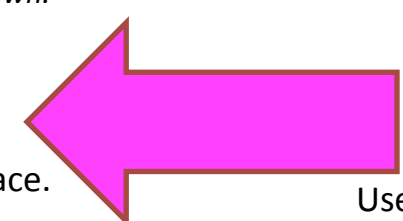
[Click Scene 3](#)



Follow the next steps to get an image of Big Ben to trace.



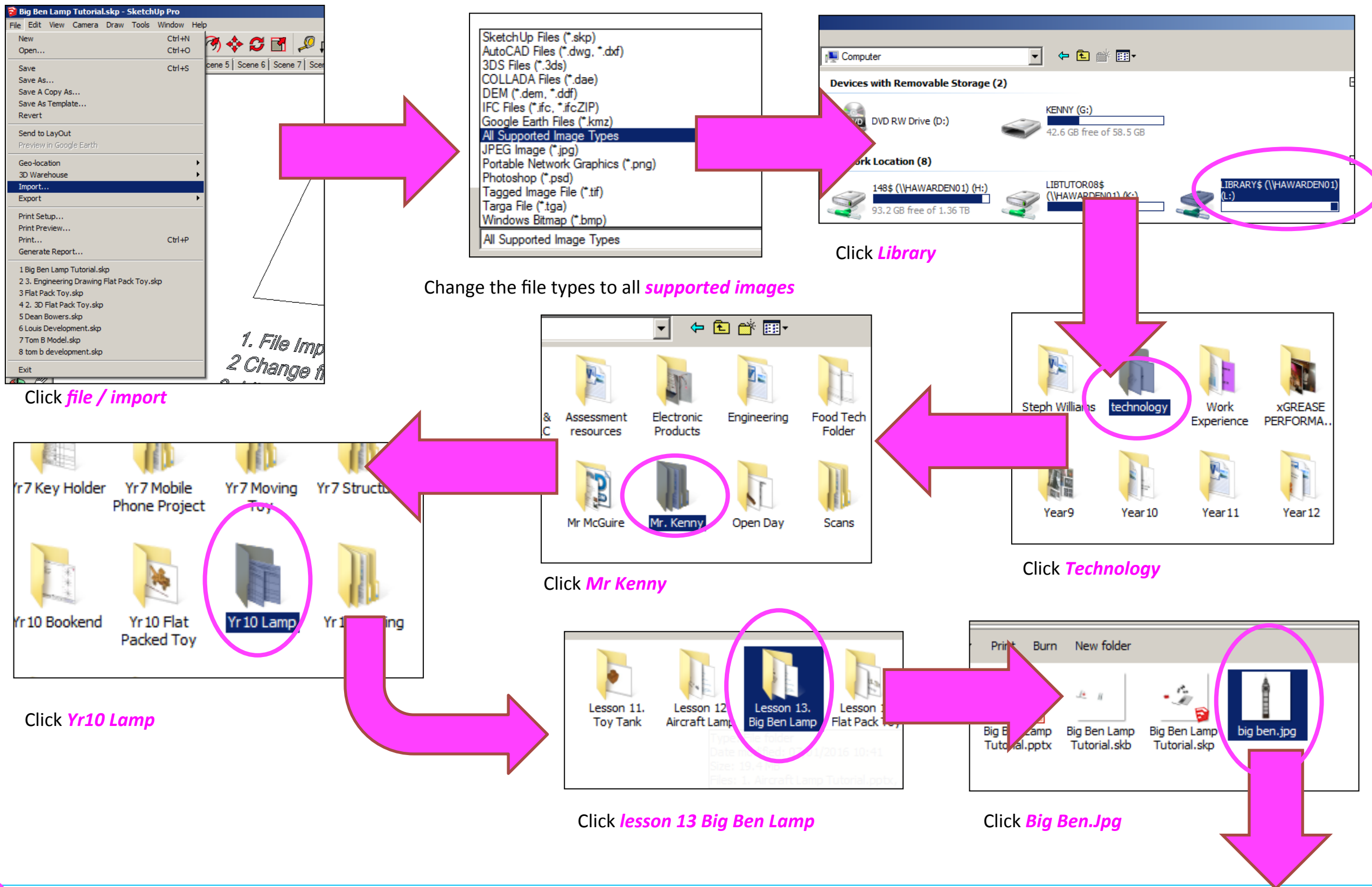
Use the **push/pull tool** and pull upwards. Type in 4 and press enter. For this product we will be using 4mm laser ply





# Computer Aided Design: Big Ben Lamp

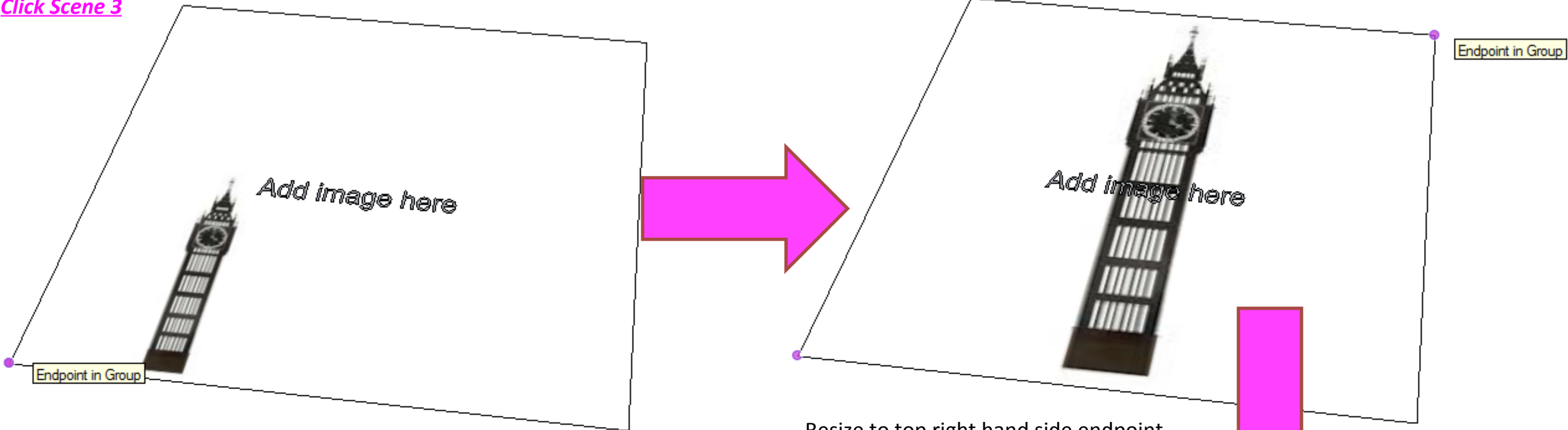
## Computer Aided Engineering: Step by Step Guide to Lamp Construction



# Computer Aided Design: Big Ben Lamp

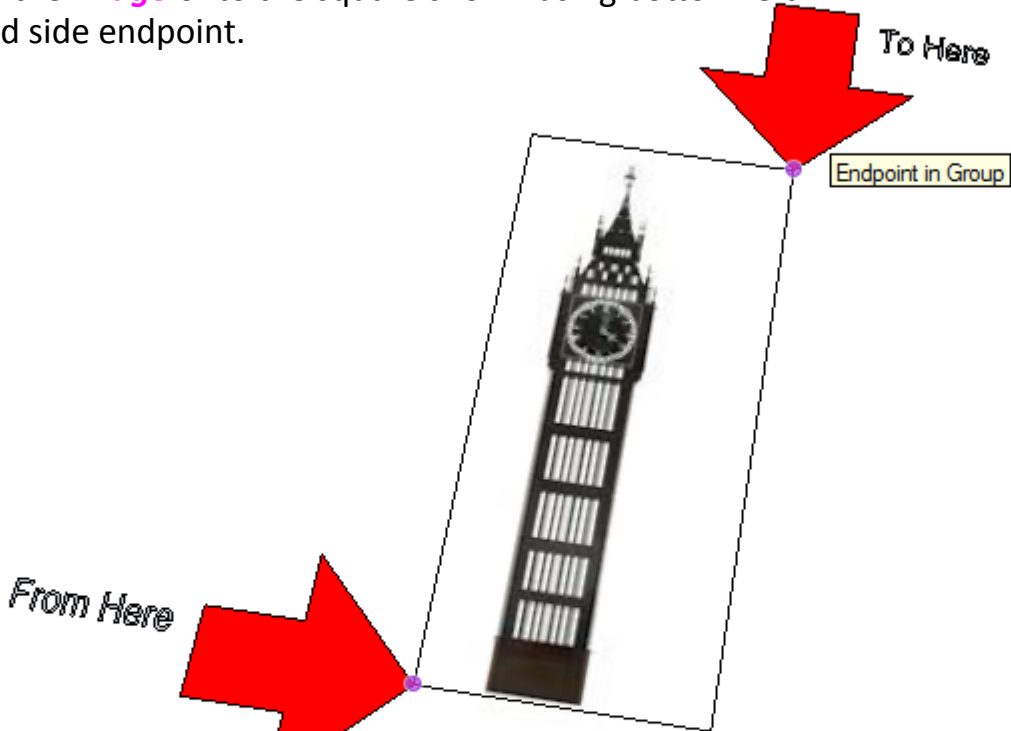
## Computer Aided Engineering: Step by Step Guide to Lamp Construction

[Click Scene 3](#)

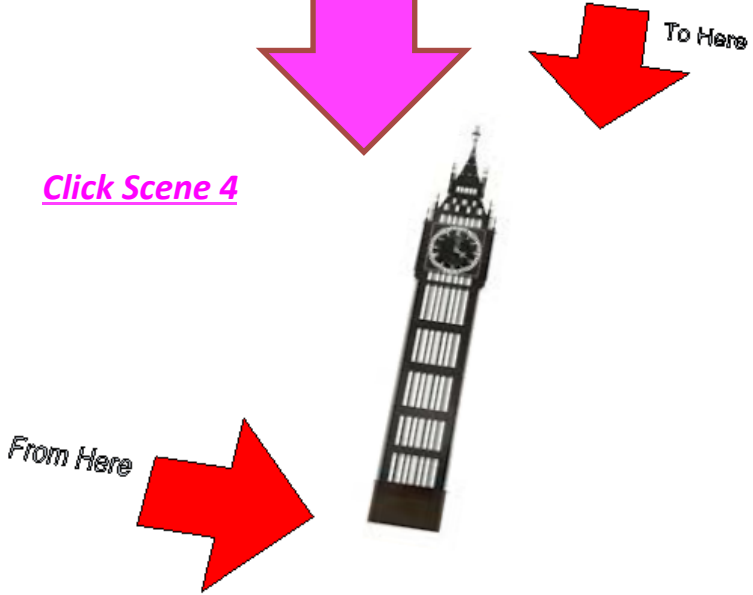


Add the *image* onto the square shown using bottom left hand side endpoint.

Resize to top right hand side endpoint.



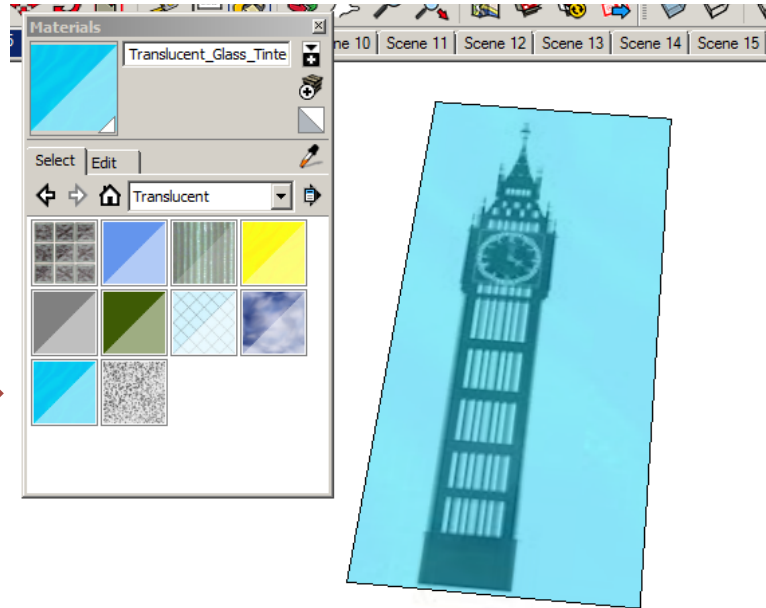
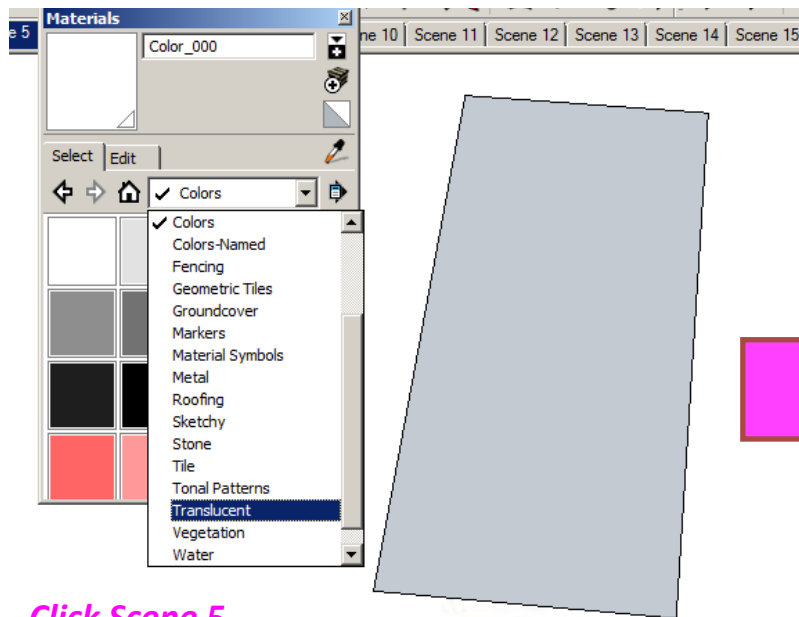
[Click Scene 4](#)



Use the *square tool* to draw a rectangle. Use the guide arrows to assist.

# Computer Aided Design: Big Ben Lamp

## Computer Aided Engineering: Step by Step Guide to Lamp Construction



[Click Scene 5](#)

Use the **colour bucket tool** to colour the square in translucent.

Use the **colour bucket tool** to colour the square in translucent.

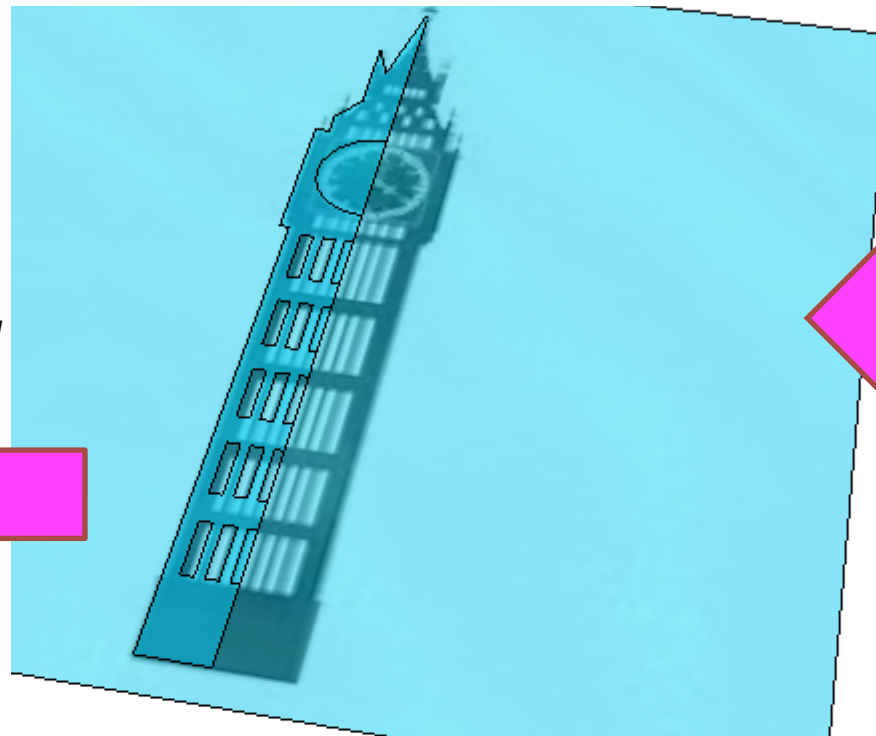


**Trim tool** allows the user to remove overlapping elements.

### **Advantages:**

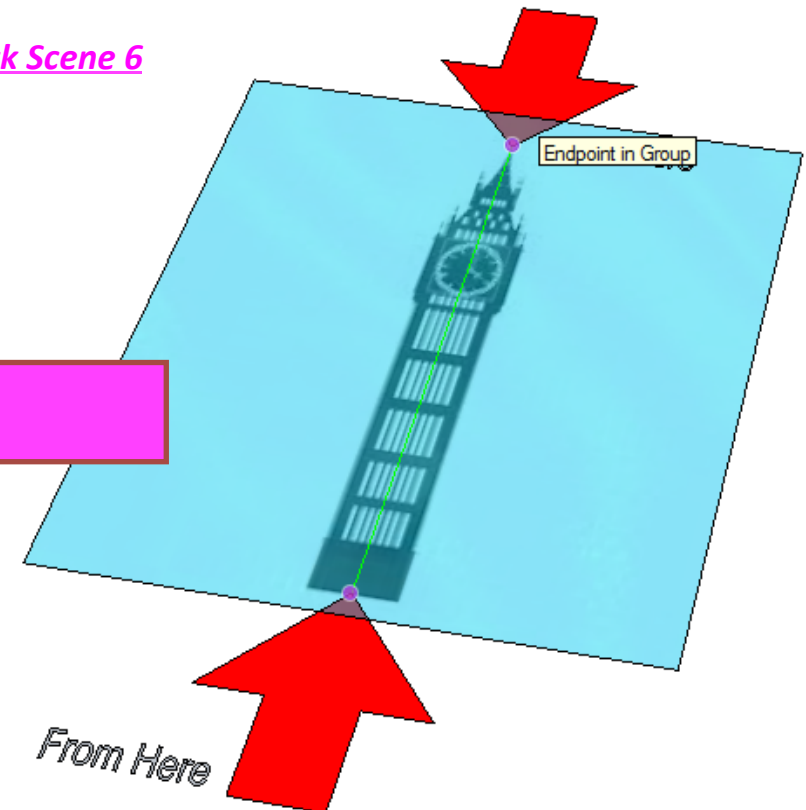
*Allows user to erase overlapping lines and edges to draw complex 3D shapes very quickly.*

[Click Scene 7](#)



Use the **pencil tool and circle tool** to trace half of Big Ben. Use the rubber tool to delete any lines that go over the centre line.

[Click Scene 6](#)



Use the **pencil tool** to add a centre line from the two guide arrows. You may need to adjust this if your Big Ben is not sized correctly

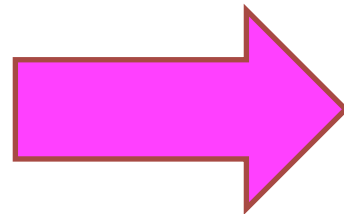
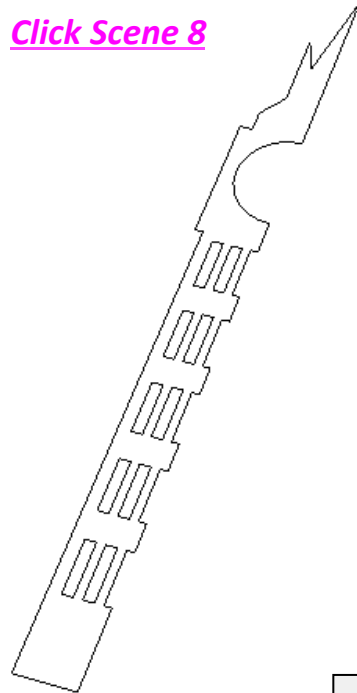
# Computer Aided Design: Big Ben Lamp

## Computer Aided Engineering: Step by Step Guide to Lamp Construction

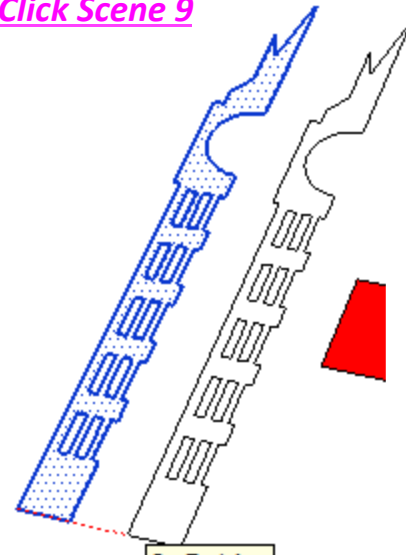


[Click Scene 10](#)

[Click Scene 8](#)



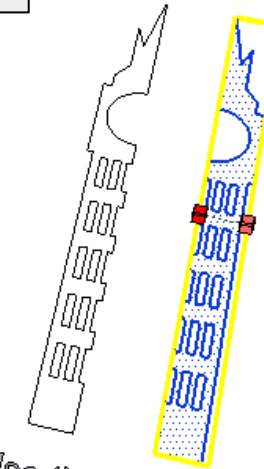
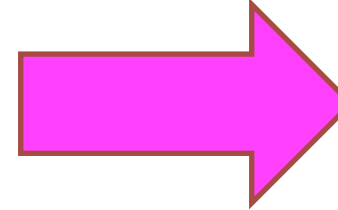
[Click Scene 9](#)



**Move Tool** used to move entire shapes or pull lines on a drawing.

**Advantages:**

Allows user to draw or modify shapes very quickly and can be used to construct unusual 3D shapes quickly



Use the scale tool to reverse the image  
The red scale measurement should read 1 or -1

Use the **rubber tool** to delete the box and the rest of the Big Ben details as shown above

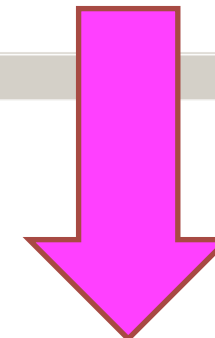


Highlight Big Ben.  
Click **edit / Copy** and then **edit / paste**

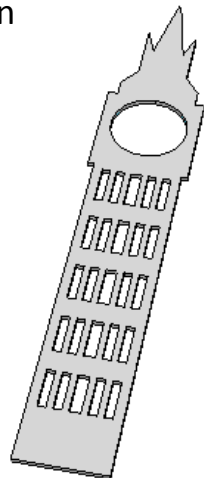
[Click Scene 12](#)



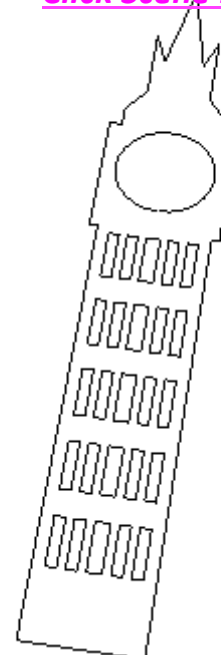
[Click Scene 11](#)



[Click Scene 13](#)



1. Highlight entire object
2. Right Click
3. Make component
4. Copy and paste two Big Ben's



Use the **push/pull tool** and pull upwards. Type in 4 and press enter. For this product we will be using 4mm laser ply



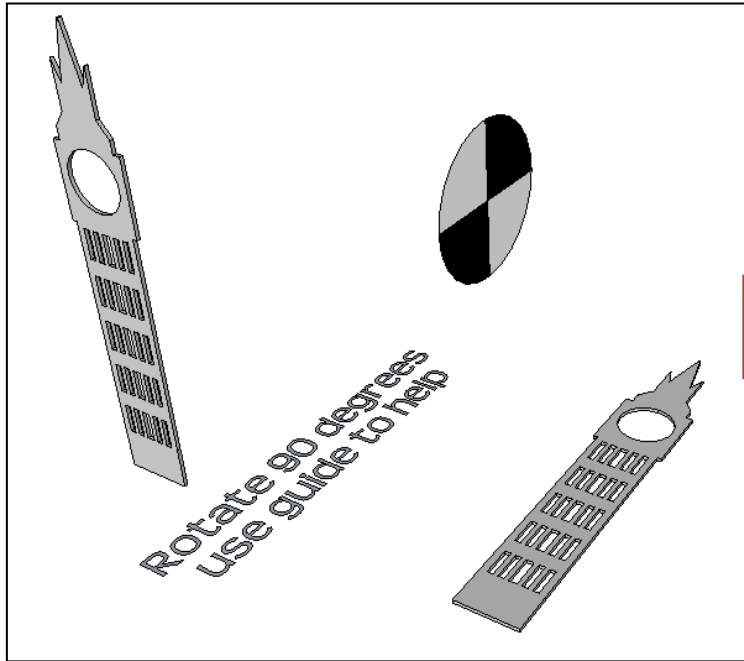
Highlight one half of Big Ben and then click the **move tool** grab the bottom right hand corner and join with the opposite bottom left hand side

On Red Axis



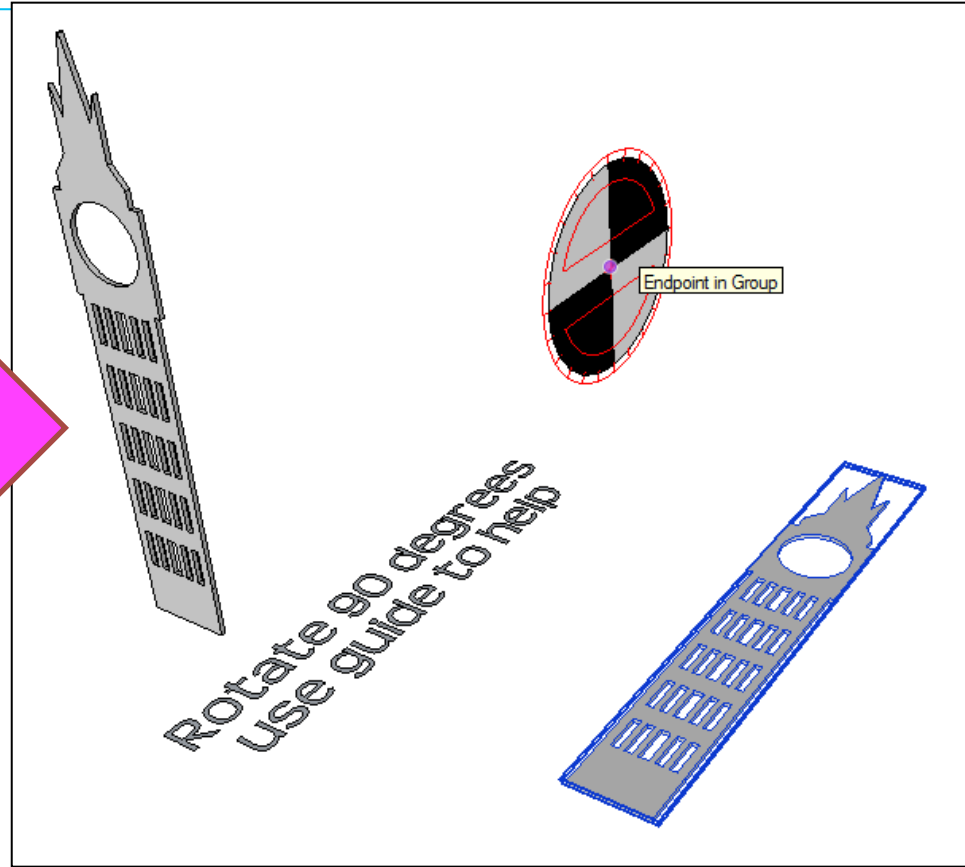
# Computer Aided Design: Big Ben Lamp

## Computer Aided Engineering: Step by Step

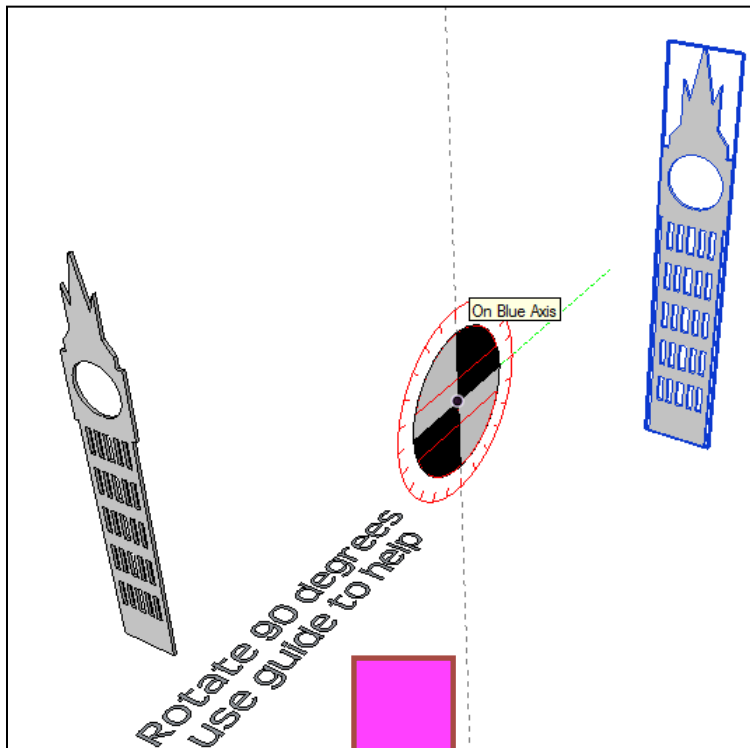


[Click Scene 14](#)

Click the **Big Ben on the floor**.



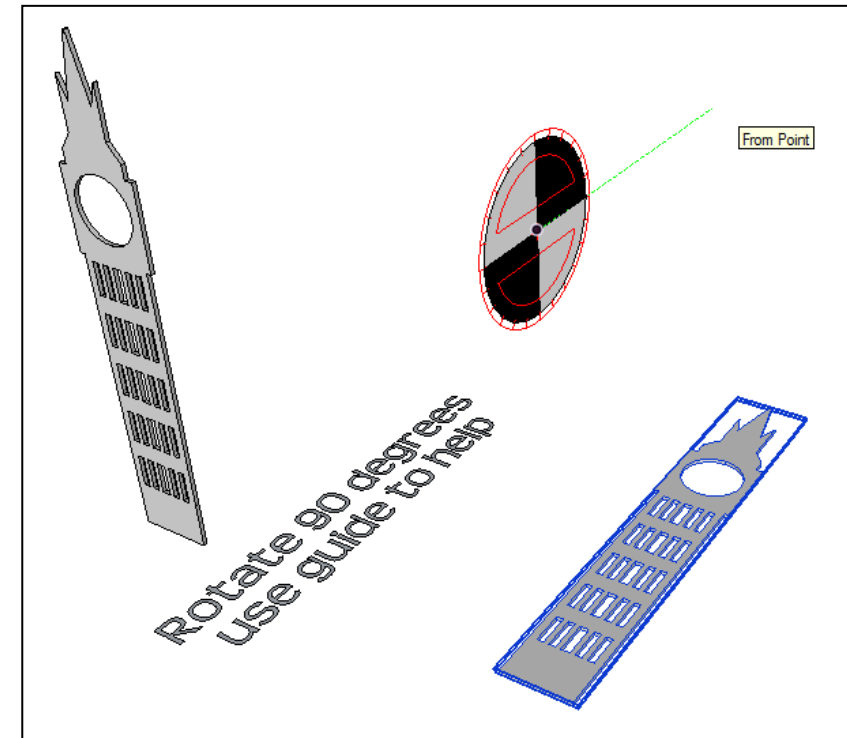
Use the **rotate tool** and position on red axis in the centre of the black and white target by clicking once to set it in place



**Rotate** Big Ben upwards on blue axis or type in 90 and press enter



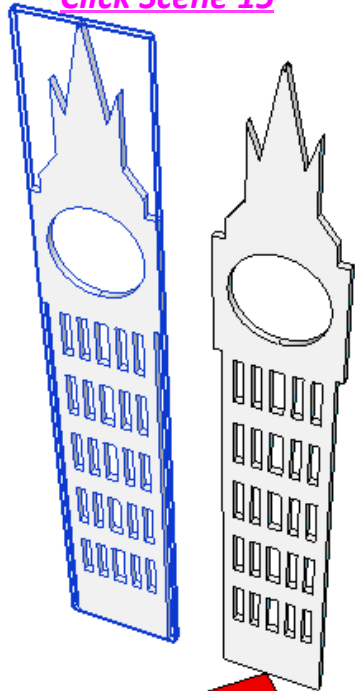
Pull line out on **green axis**. Click once to set it



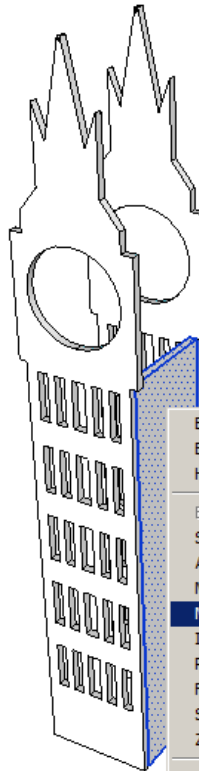
# Computer Aided Design: Big Ben Lamp

## Computer Aided Engineering: Step by Step Guide to Lamp Construction

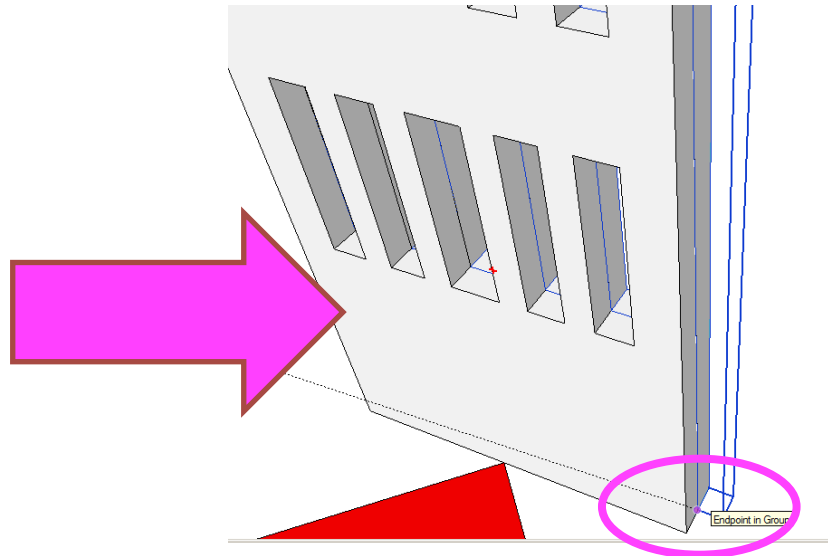
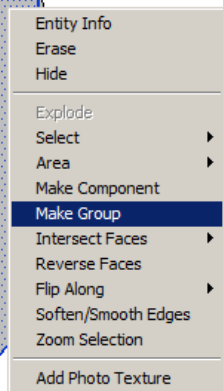
Click Scene 15



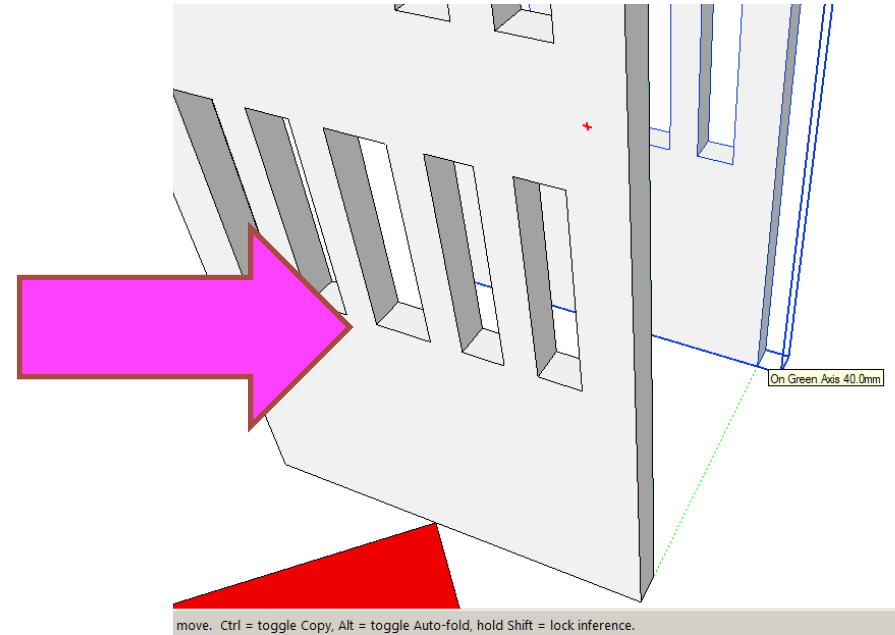
Click the **Big Ben highlighted in blue**.



Click the side piece **three times**. Right click and group.

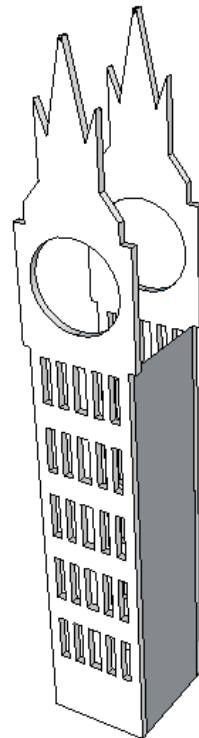


Click the **move tool**. Click bottom right hand corner and line up the two pieces as shown above

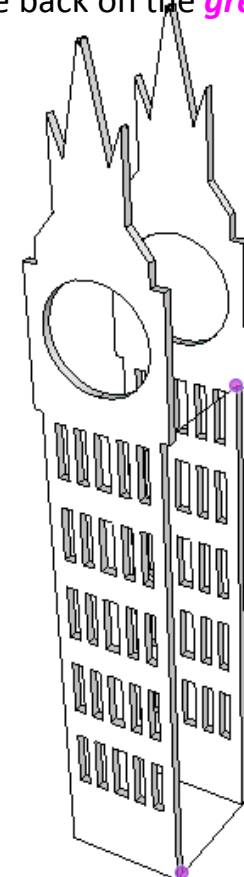
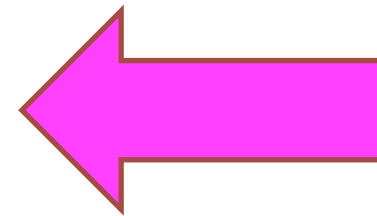


Move the piece back on the **green axis**. Type 40 and press enter

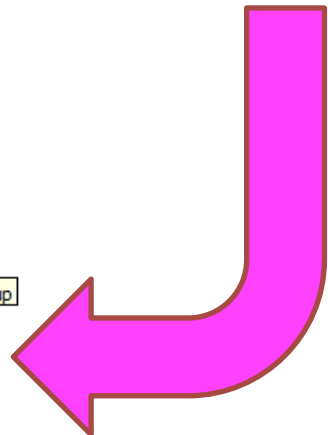
Click Scene 16



Click the **push pull tool**. Pull out and type in 4 and press enter.

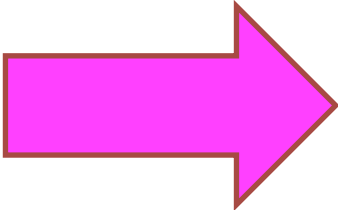
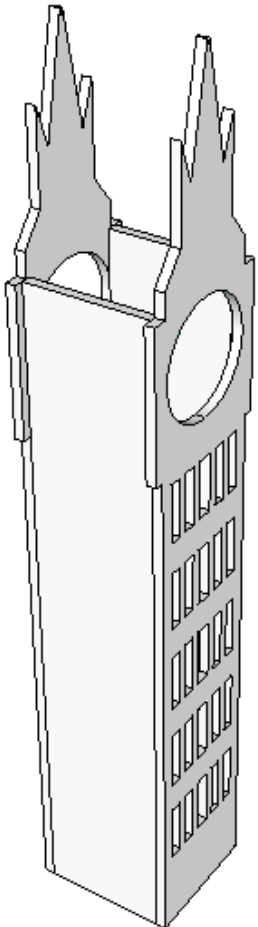


Click the **square tool**. Click bottom left hand corner and top right hand corner as shown



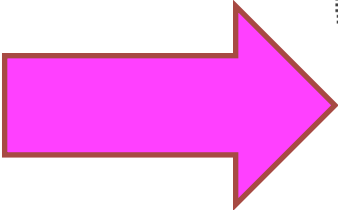
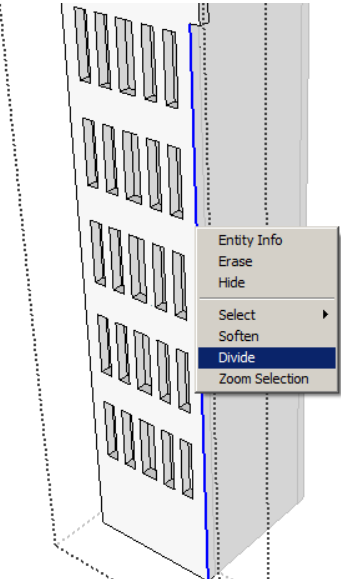
# Computer Aided Design: Big Ben Lamp

## Computer Aided Engineering: Step by Step Guide to Lamp Construction

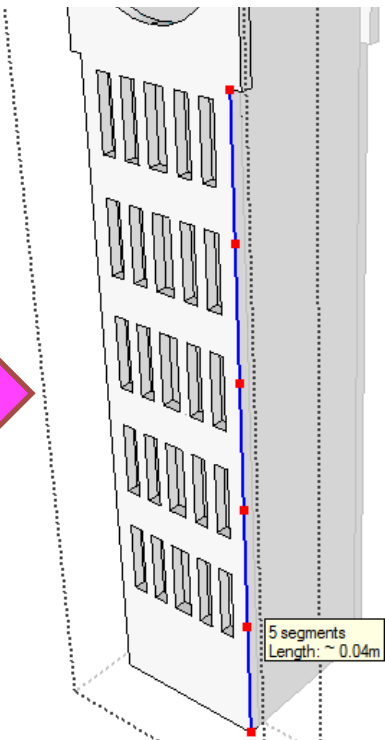


Repeat process on opposite side.

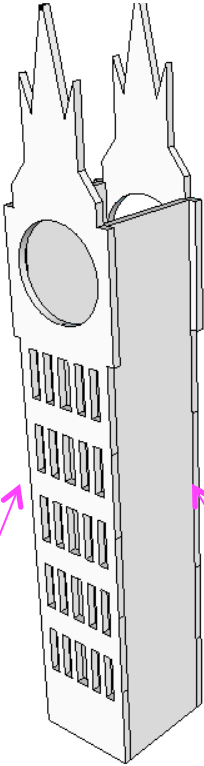
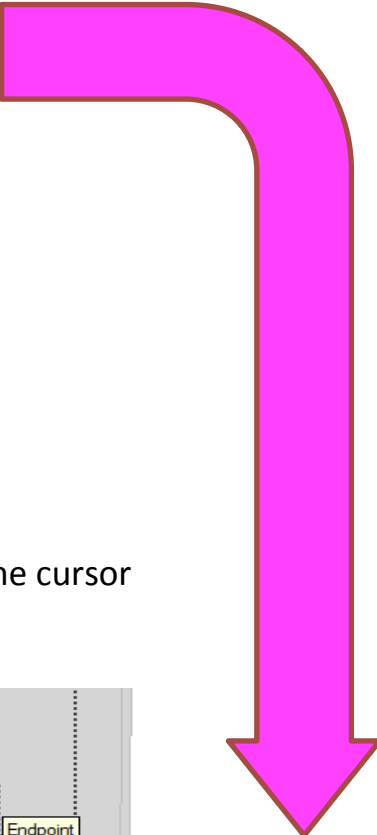
*Click Scene 17*



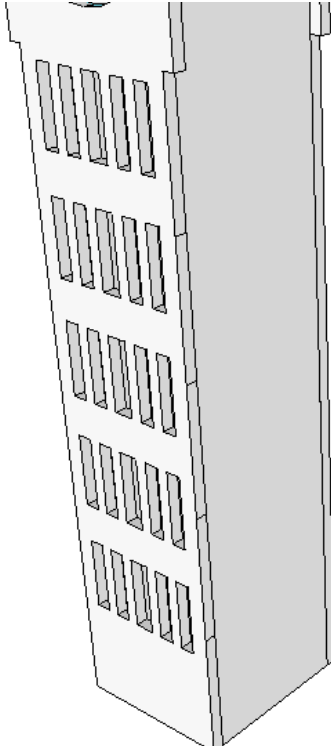
Click the *front piece twice to edit*. Click the line shown. Right click and divide



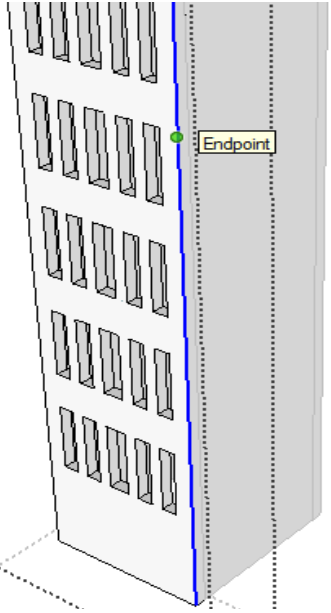
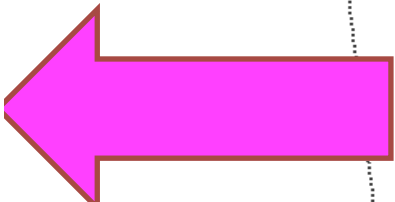
*Type 5 and enter* or move the cursor until 5 segments appear.



Repeat process on opposite sides. Remember to double click the piece your working on as its grouped.



You should have 5 lines across

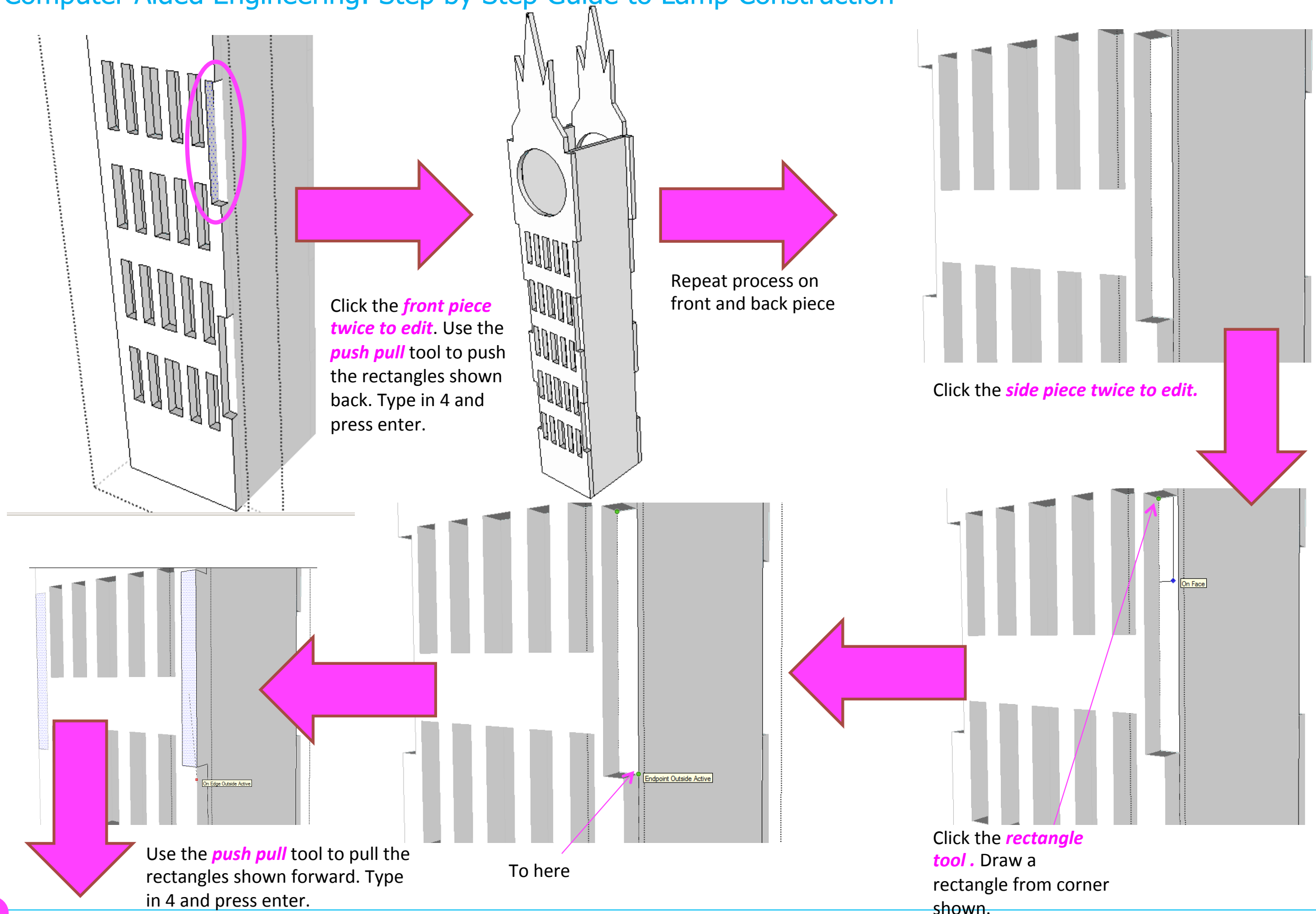


Click the *pencil tool*. Move down the line you have just divide. When you come to and endpoint draw a line across to the opposite edge.



# Computer Aided Design: Big Ben Lamp

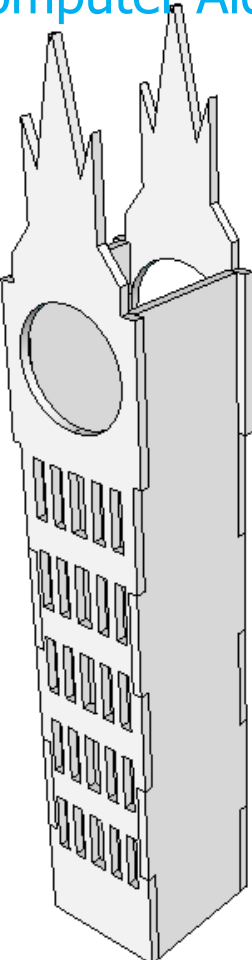
## Computer Aided Engineering: Step by Step Guide to Lamp Construction



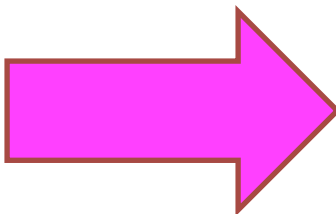


# Computer Aided Design: Big Ben Lamp

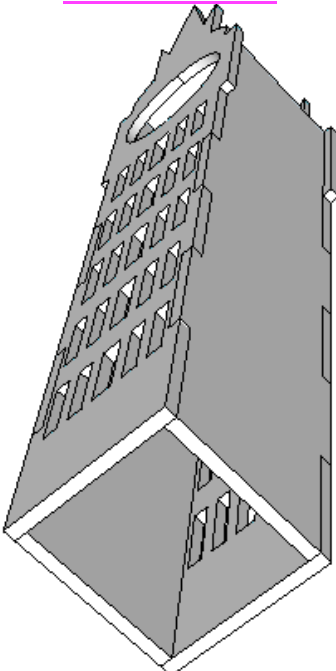
## Computer Aided Engineering: Step by Step Guide to Lamp Construction



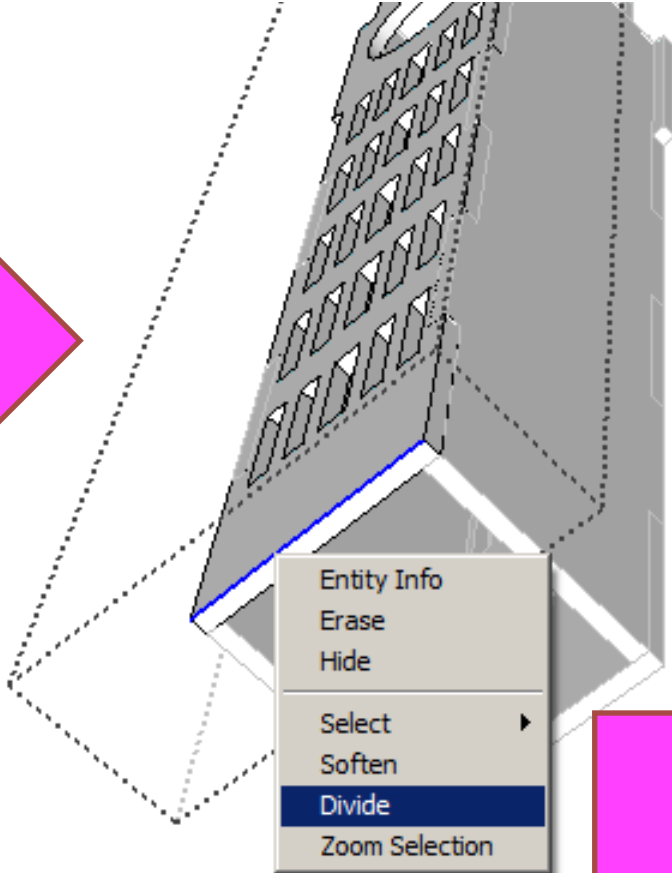
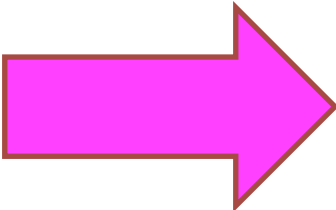
Repeat the process on all the side pieces



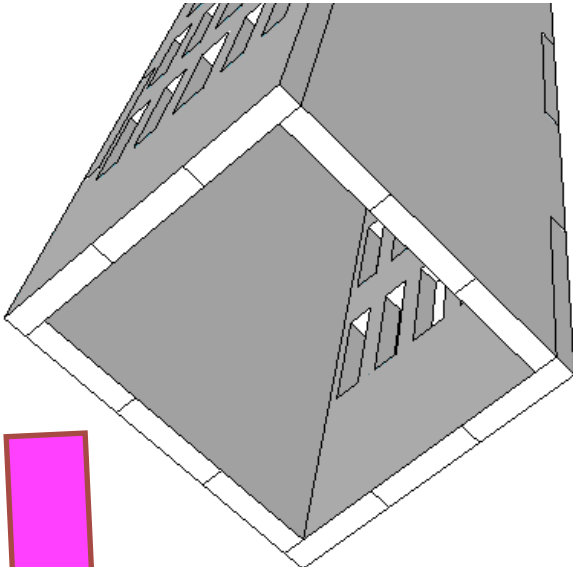
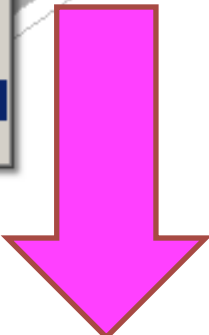
*Click Scene 18*



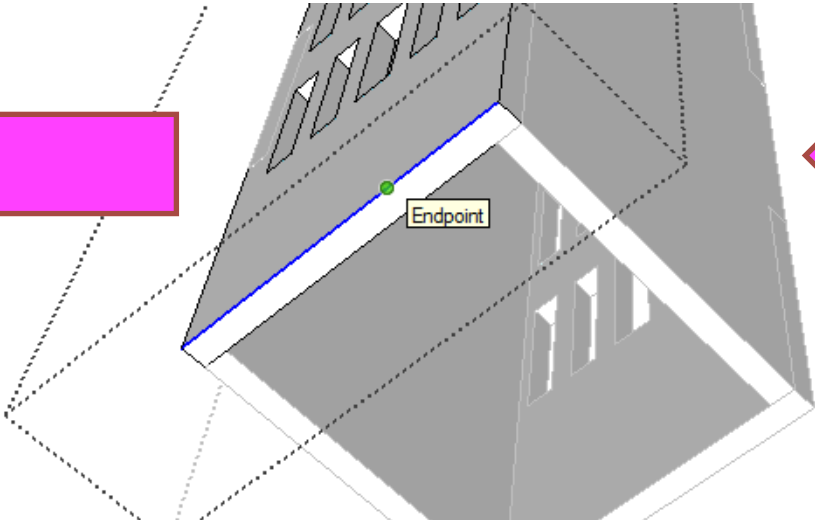
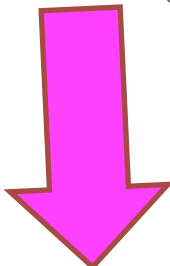
Use the *orbit tool* to see the underneath of the lamp



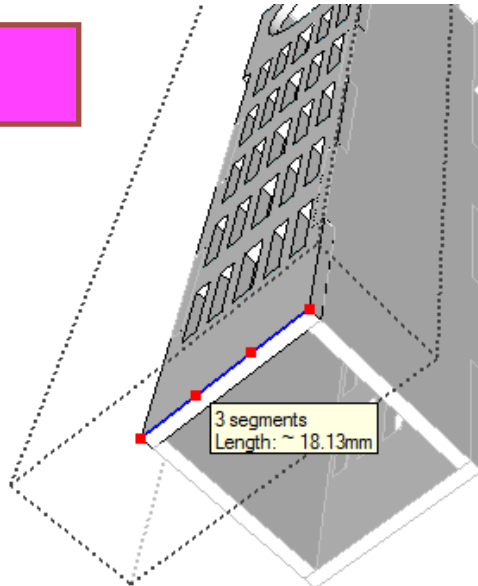
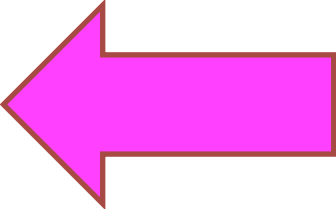
*Double click* on the front piece and the line shown.



Repeat the process on all the side pieces



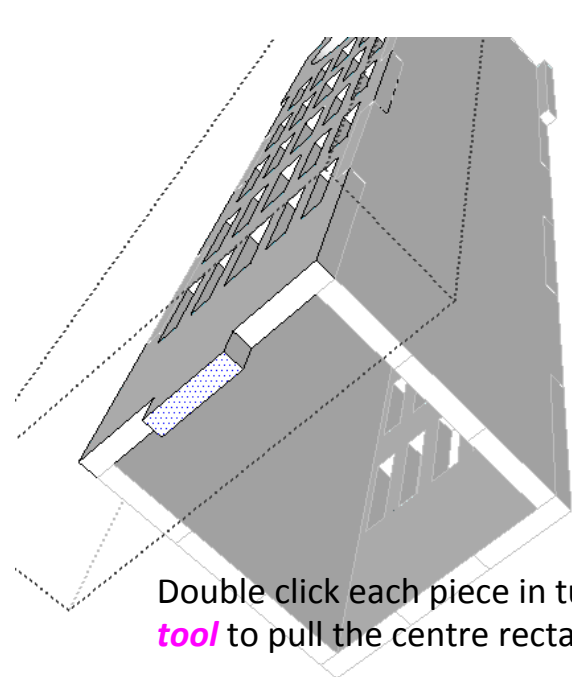
Click the *pencil tool*. Move down the line you have just divide. When you come to an endpoint draw a line across to the opposite edge.



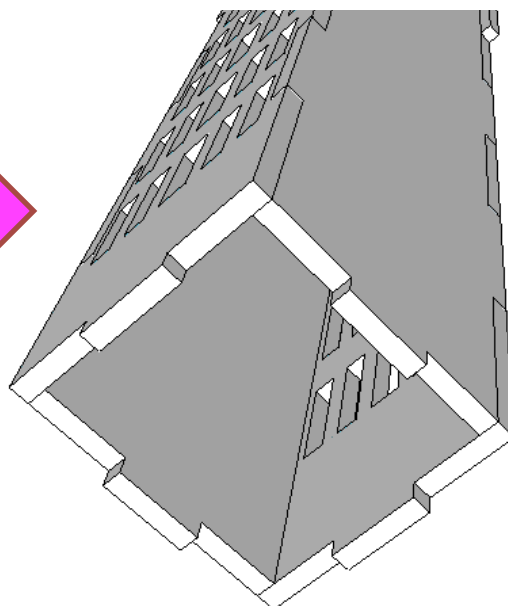
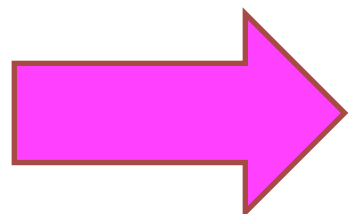
*Right click* and divide by 3.

# Computer Aided Design: Big Ben Lamp

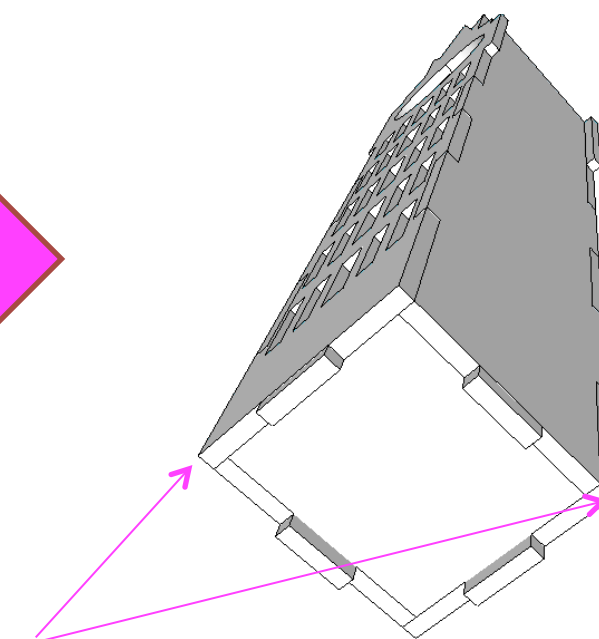
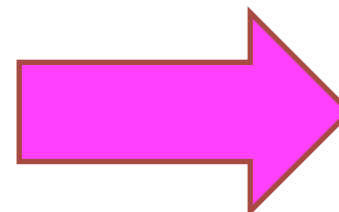
## Computer Aided Engineering: Step by Step Guide to Lamp Construction



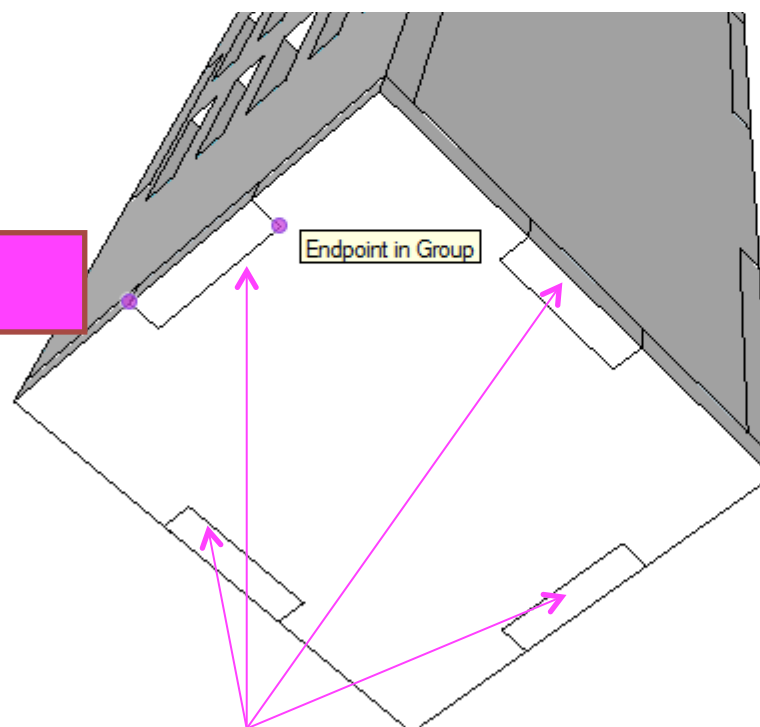
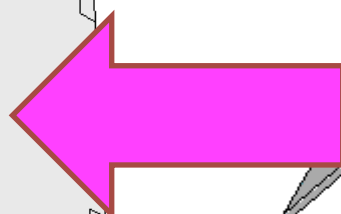
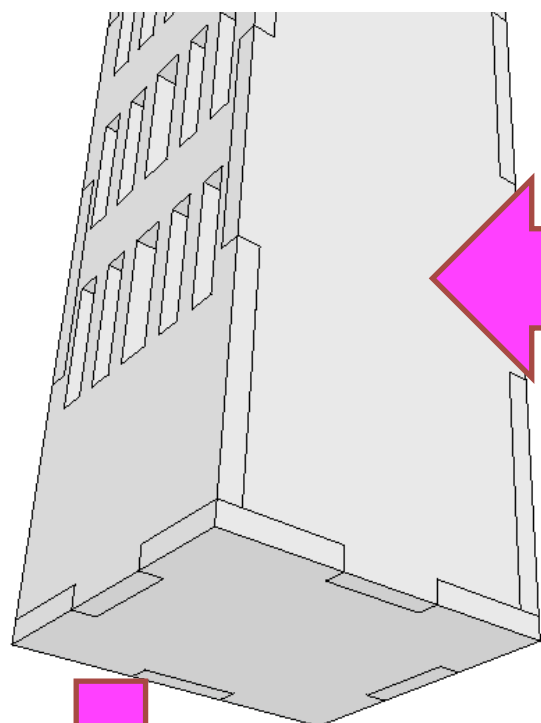
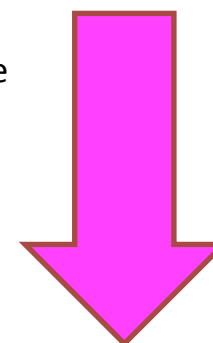
Double click each piece in turn and use the *push tool* to pull the centre rectangle down by 4



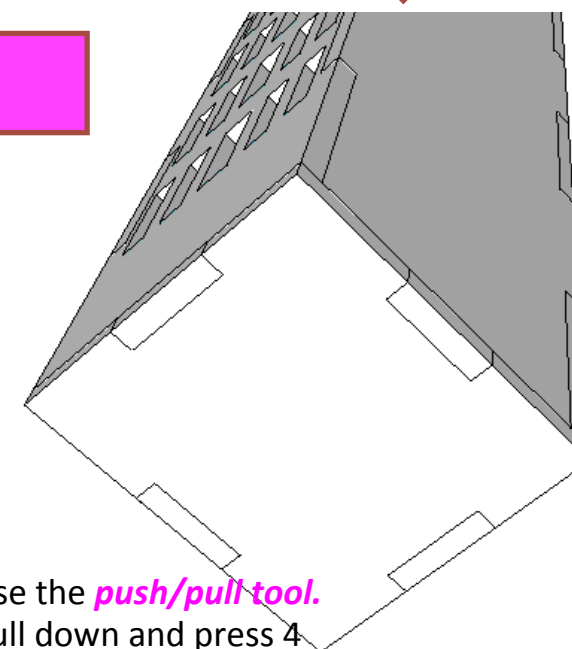
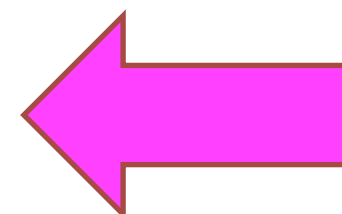
Repeat on all sides



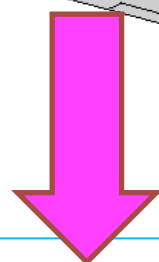
Use the *square tool*. Draw a square from the two endpoints shown



Use the *square tool*. Draw a square over each of the squares shown on the base. Use the push pull tool to push these squares up. Type 4 and enter

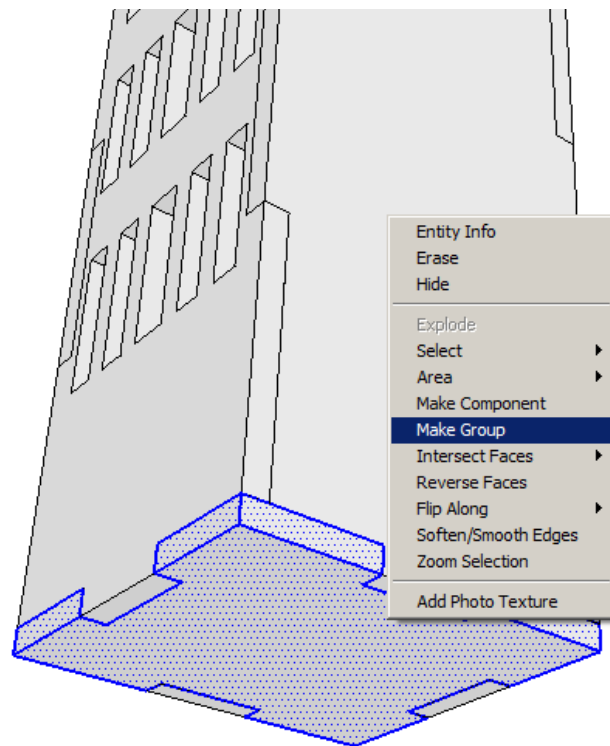


Use the *push/pull tool*. Pull down and press 4 and enter

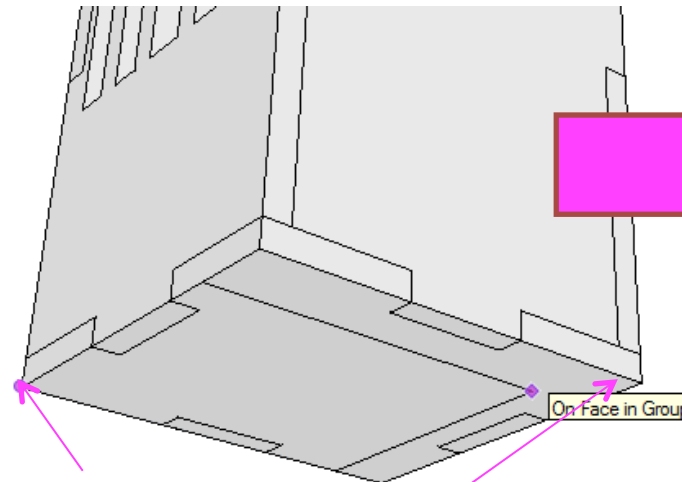
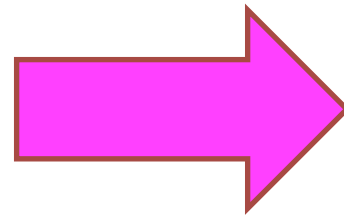


# Computer Aided Design: Big Ben Lamp

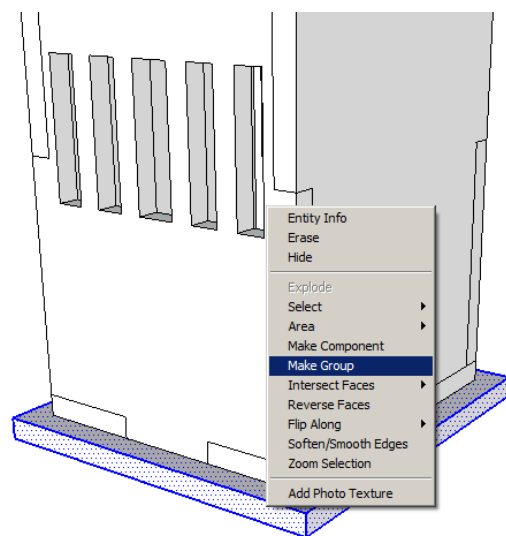
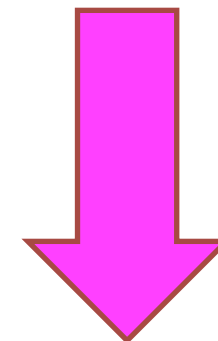
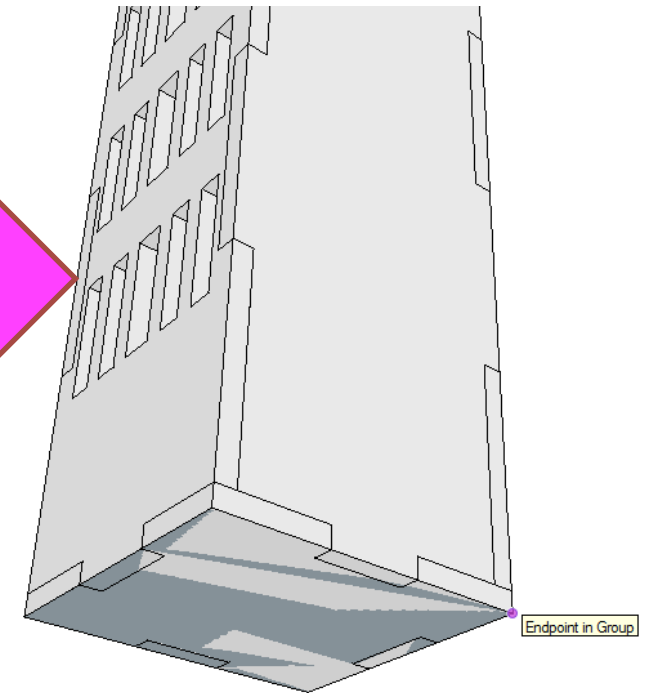
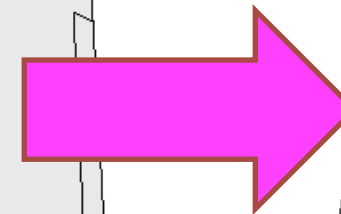
## Computer Aided Engineering: Step by Step Guide to Lamp Construction



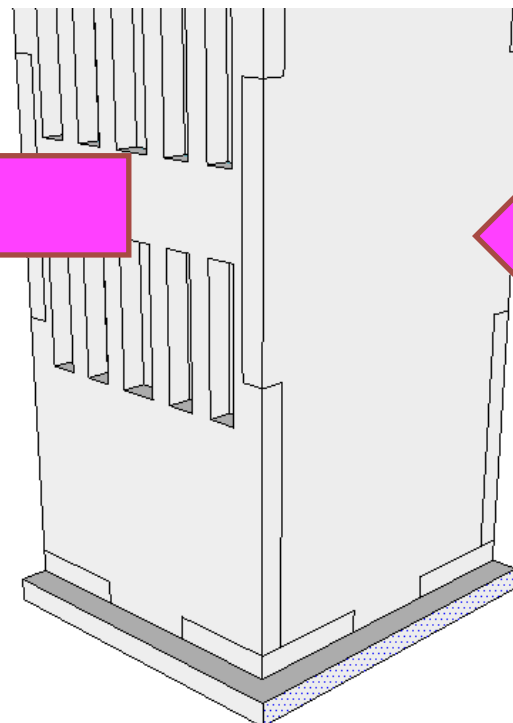
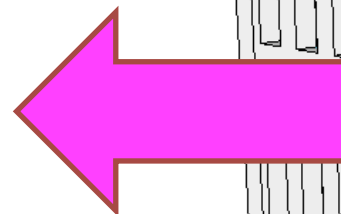
The base should look like above. Click three times and make group.



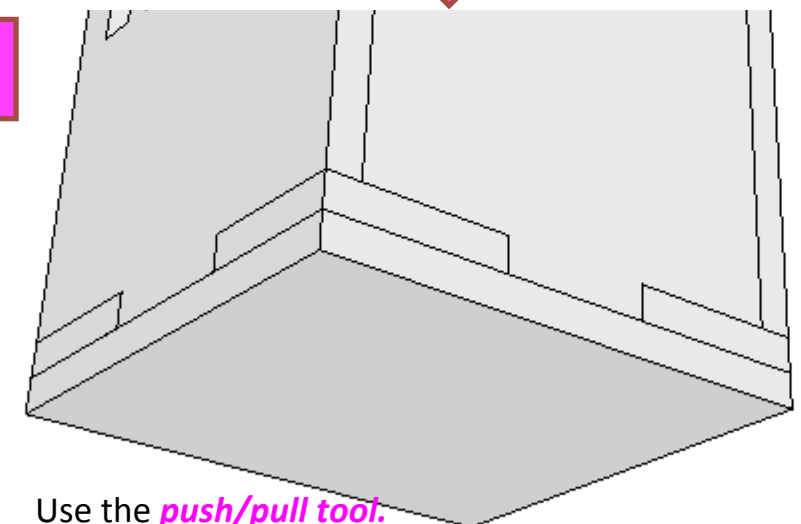
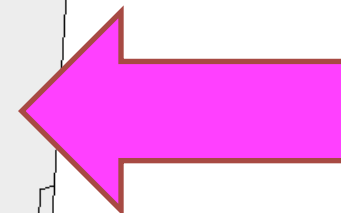
Use the *square tool*. Draw a square from the two endpoints shown



The base should look like above. Click three times and make group.



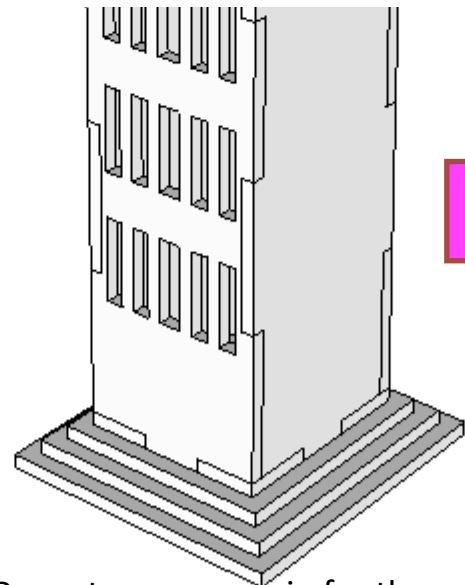
Use the *push/pull tool*. Pull all four sides out. On each side type 5 and enter



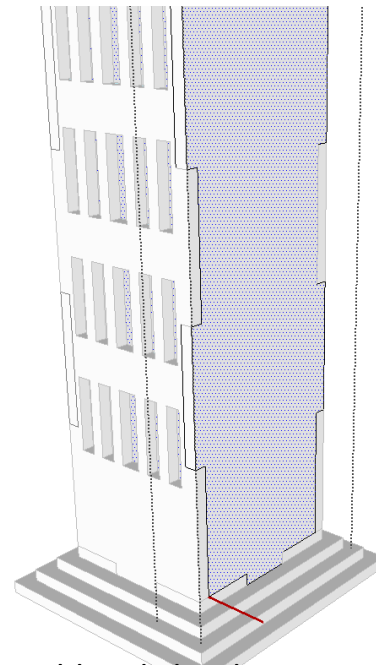
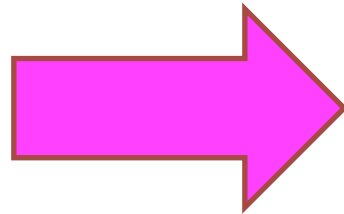
Use the *push/pull tool*. Pull down and press 4 and enter

# Computer Aided Design: Big Ben Lamp

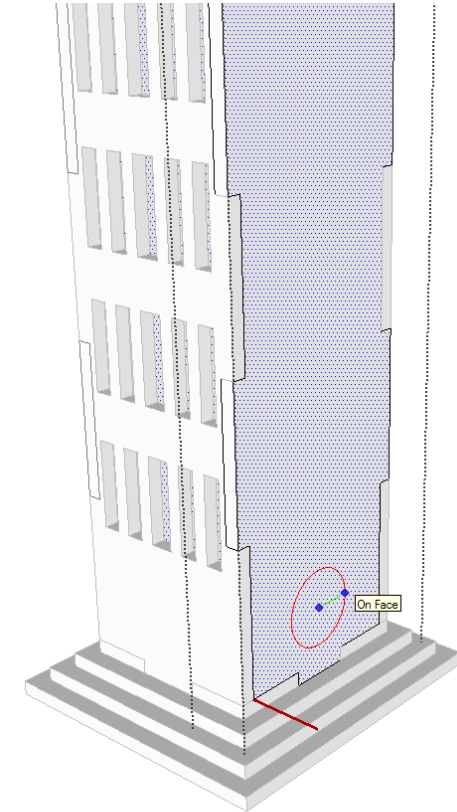
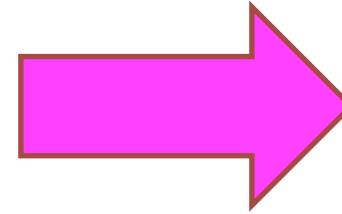
## Computer Aided Engineering: Step by Step Guide to Lamp Construction



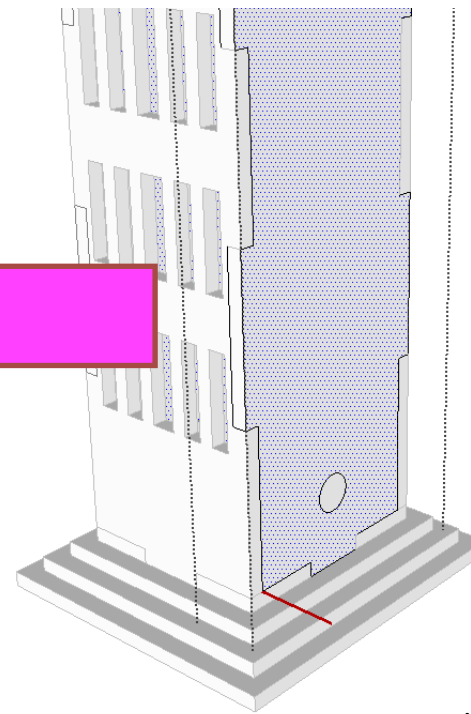
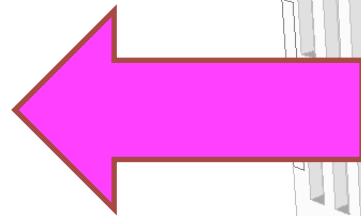
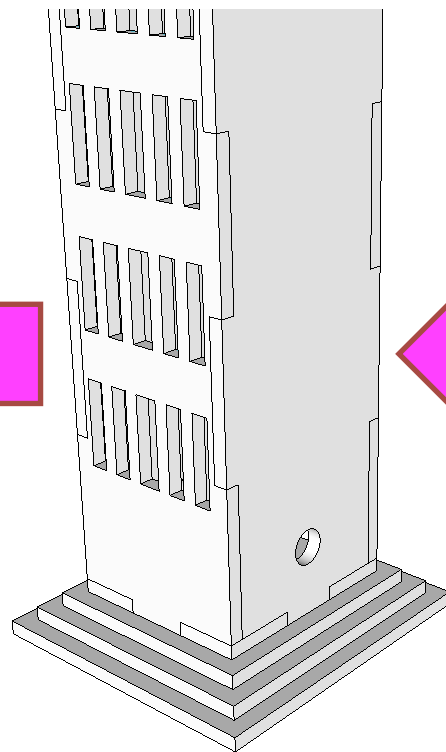
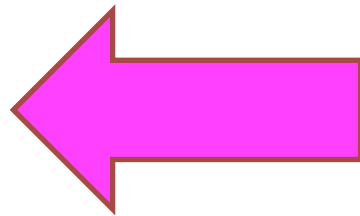
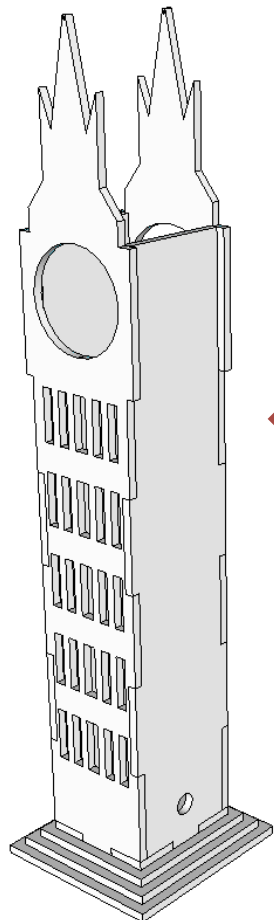
Repeat process again for the amount of bases you want underneath.



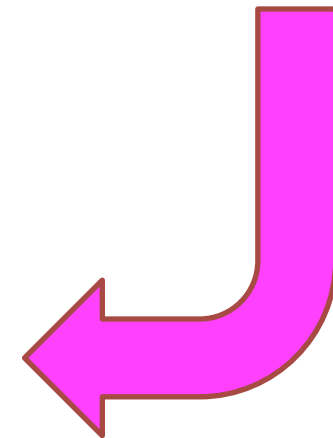
Doublor click side piece



Use the *circle tool*. Draw circle and type in 5 and press enter



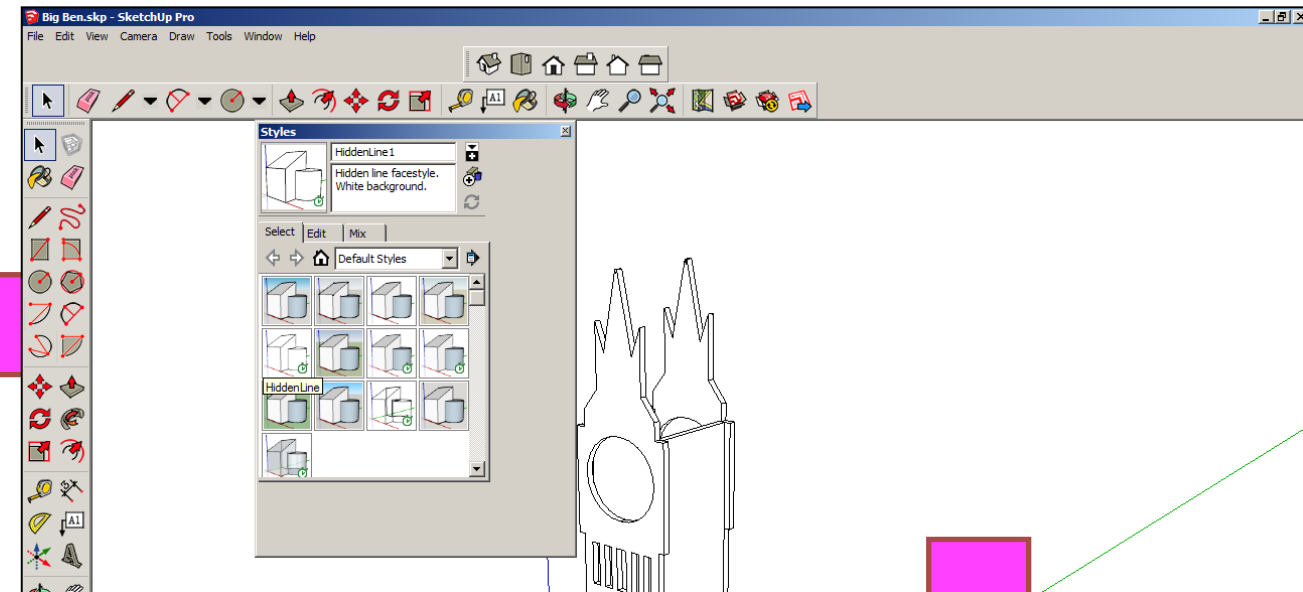
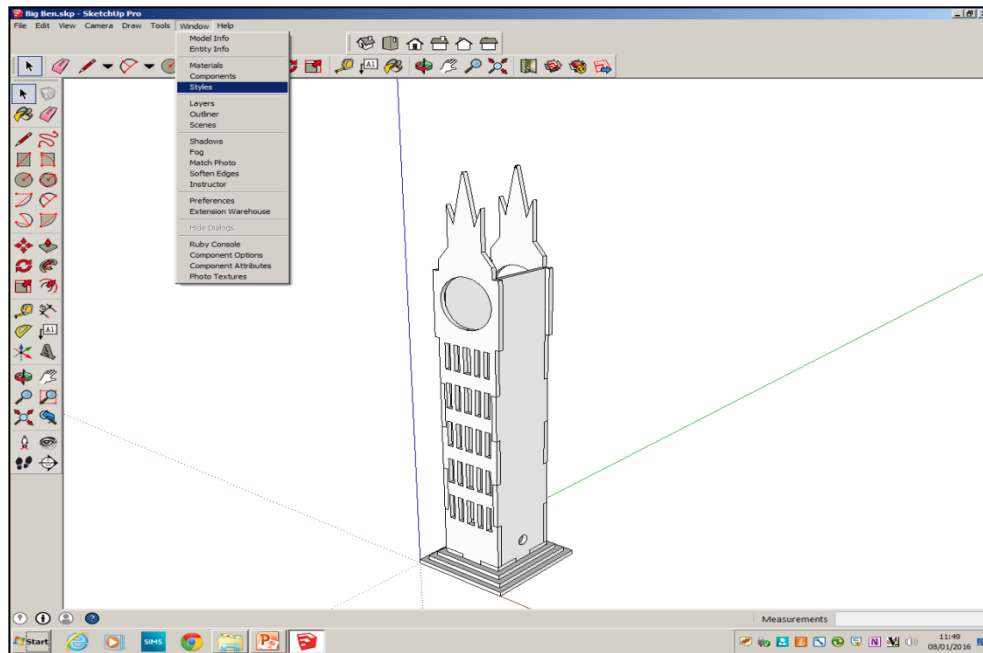
Use the *push/pull tool*. Pull the circle in and type 4 and enter





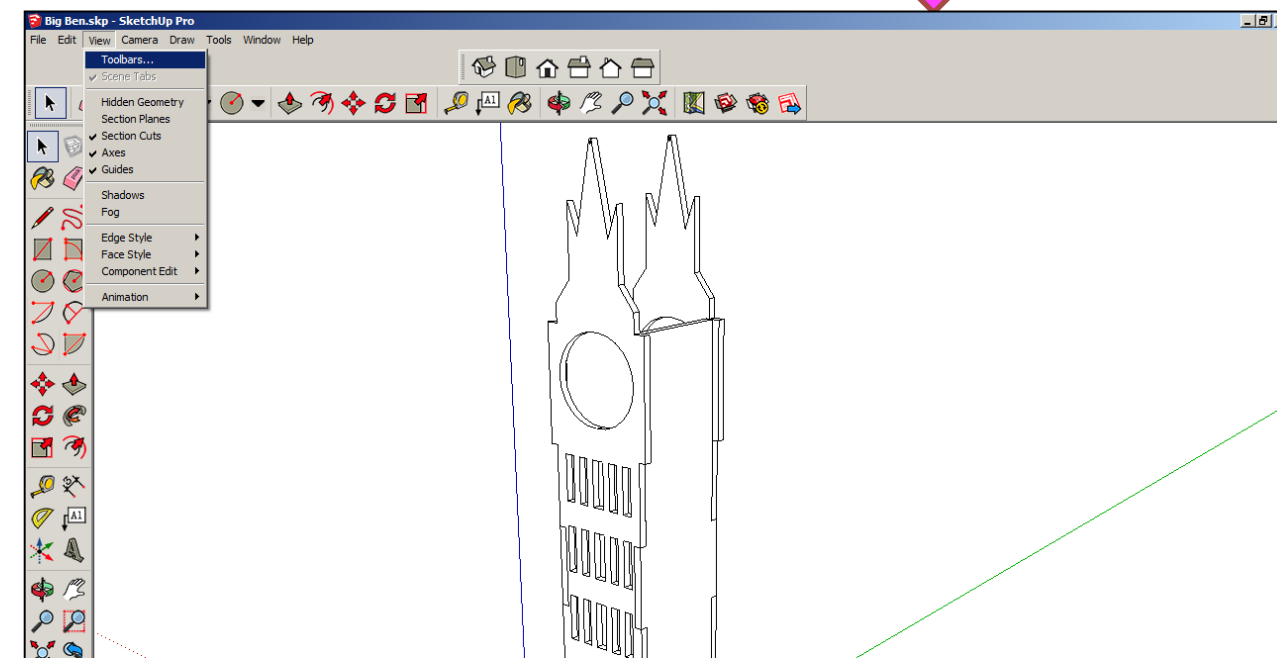
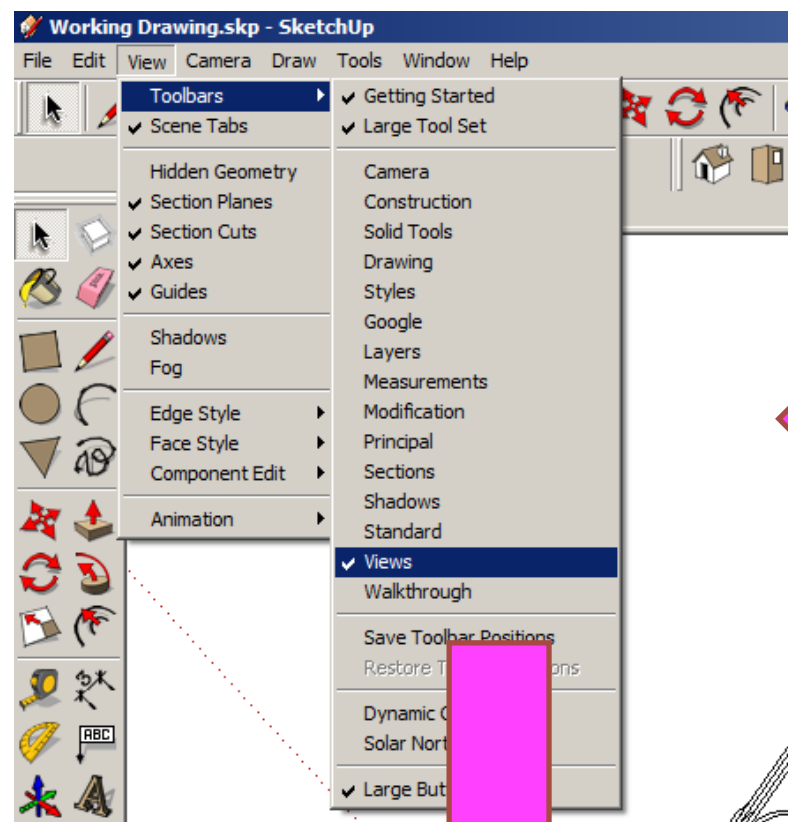
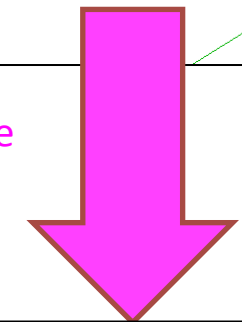
# Computer Aided Design: Aircraft Lamp Working Drawing

## Computer Aided Engineering: 1. Working Drawing Instructions (Setting up Correct Format)



Click on **Windows / Default / hidden line**

Now its time to convert your drawing into a working drawing (NB this **must be exact** to achieve a level 2. **Click windows / styles**)

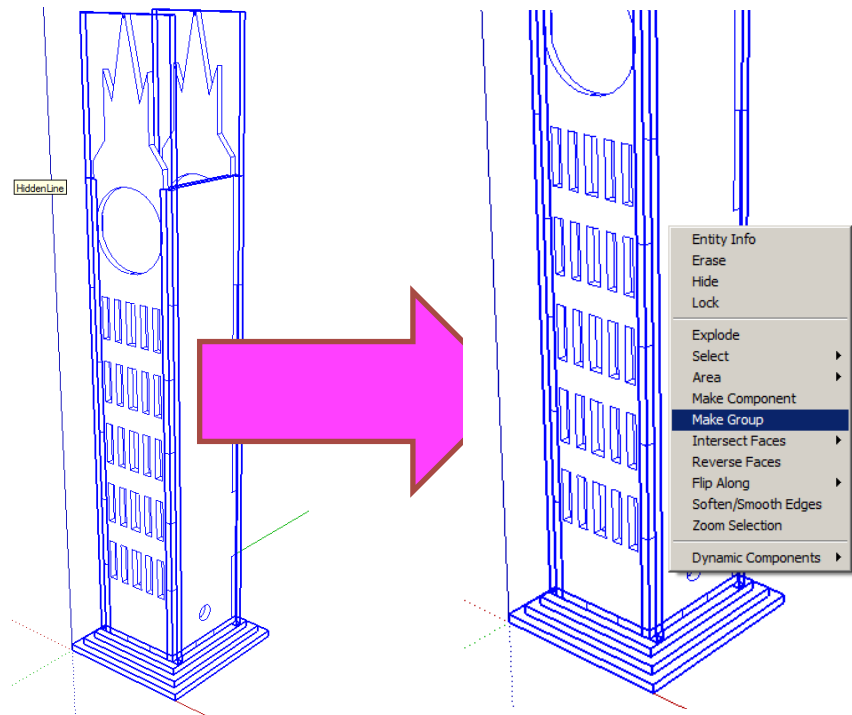


Click on **Toolbars / Views**

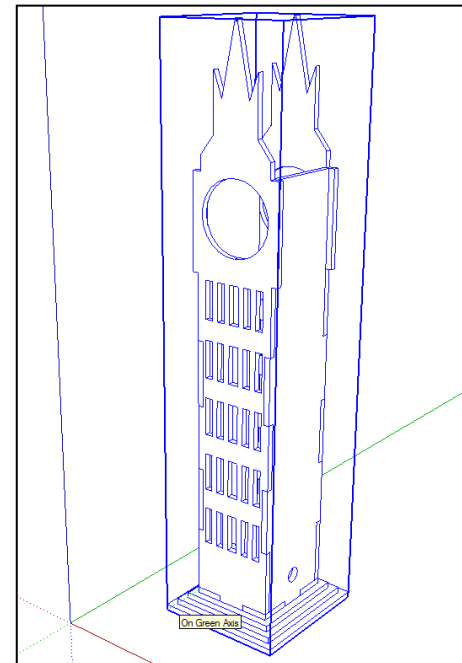


# Computer Aided Design: Aircraft Lamp Working Drawing

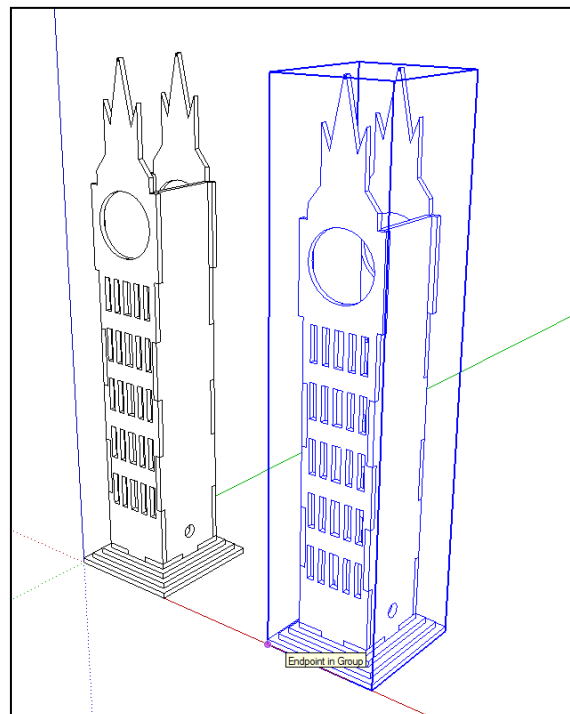
## Computer Aided Engineering: 1. Working Drawing Instructions (Setting up Correct Format)



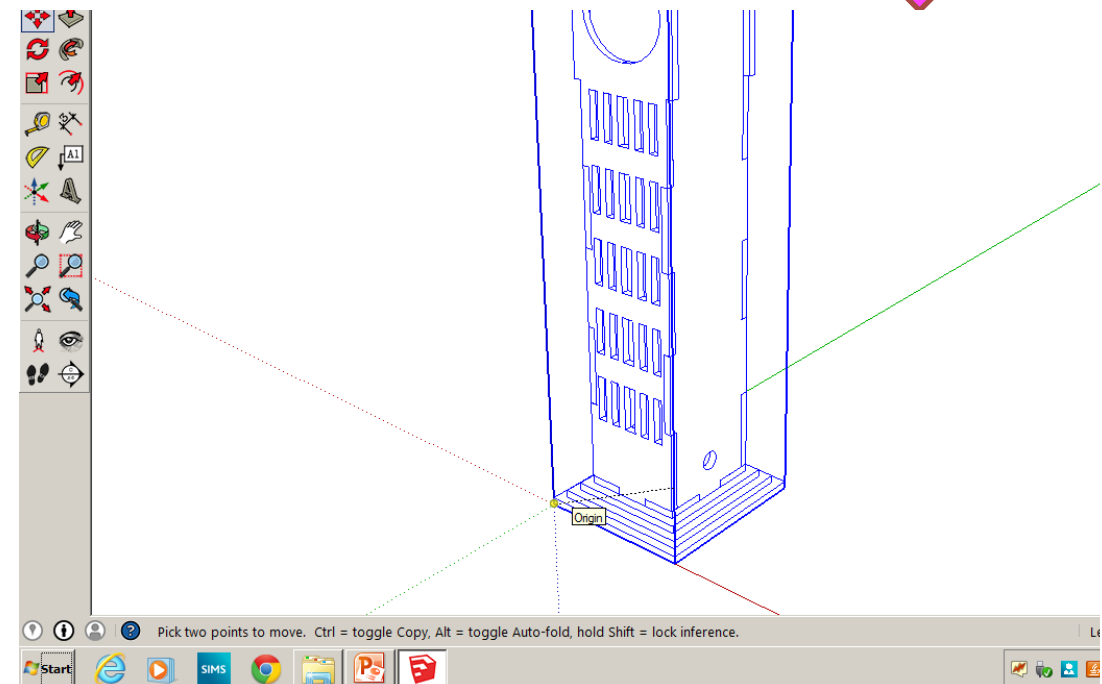
Highlight the entire lamp and right click **make group**



Click on bottom left **corner of lamp using the move tool**



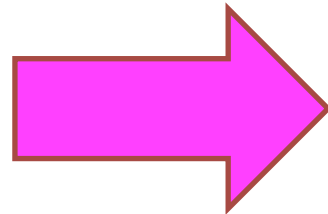
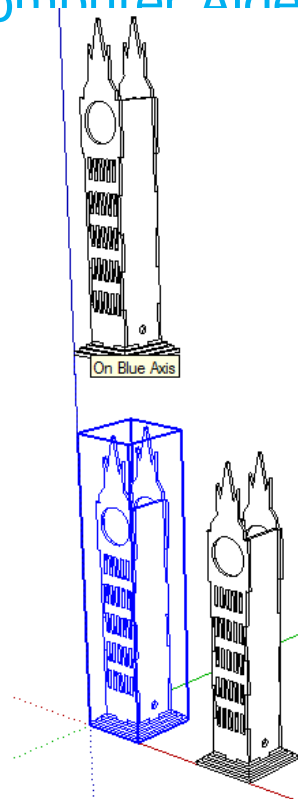
Copy and move a second lamp along the **red axis**



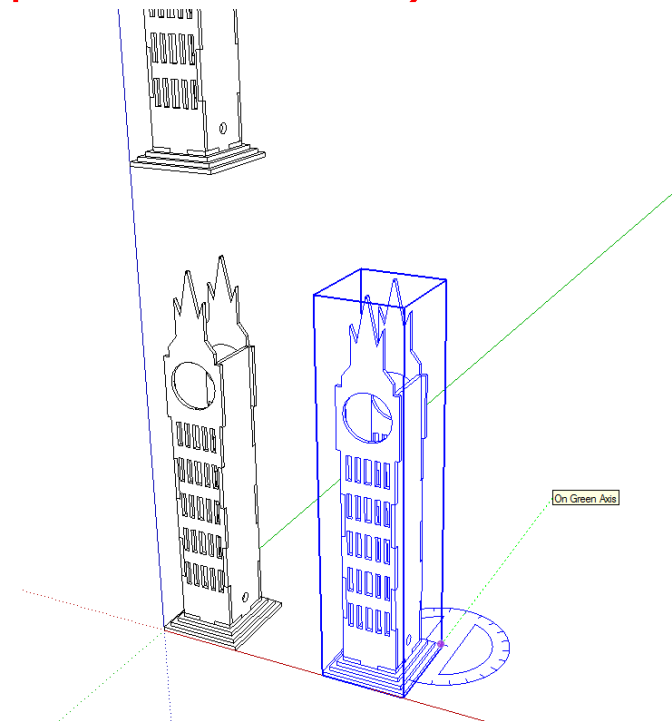
Click on the **move tool** and move the lamp so the corner is on the origin

# Computer Aided Design: Aircraft Lamp Working Drawing

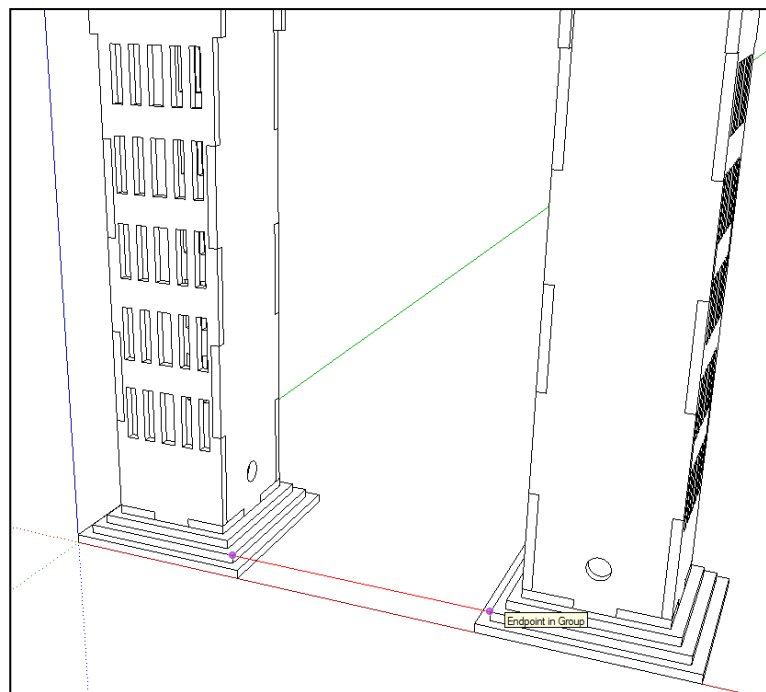
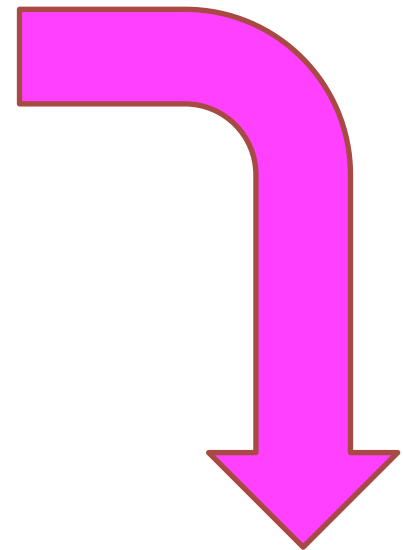
## Computer Aided Engineering: 2. Working Drawing (Setting up Correct Format)



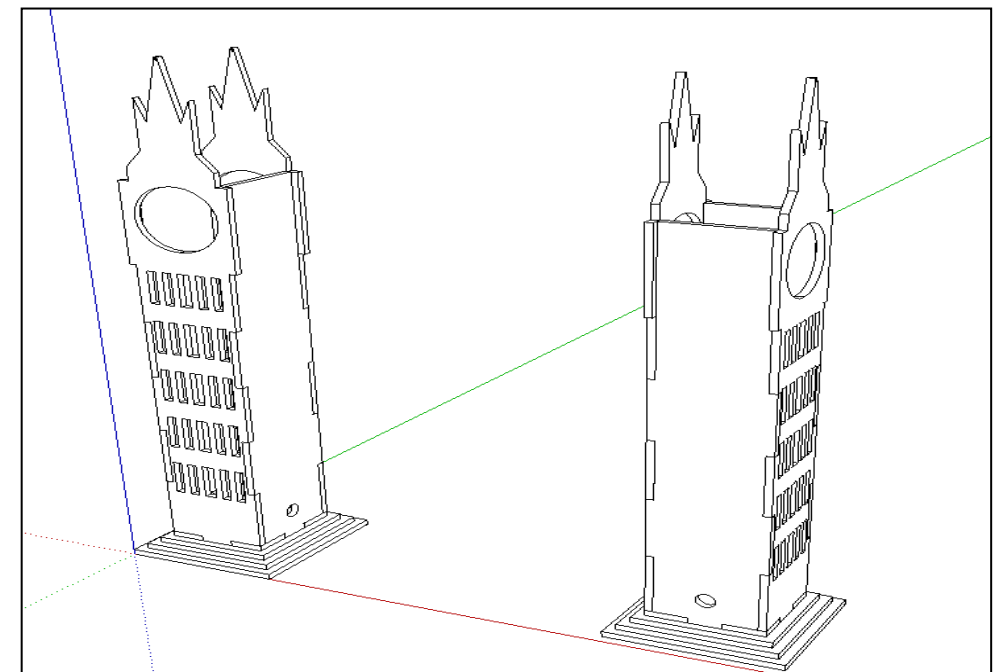
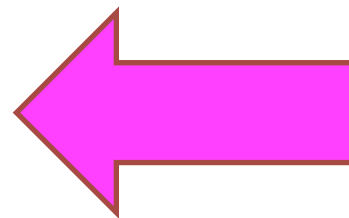
Copy and move a second lamp along the **blue axis**



Click on the rotate tool and turn the lamp around **90 degrees as shown below**



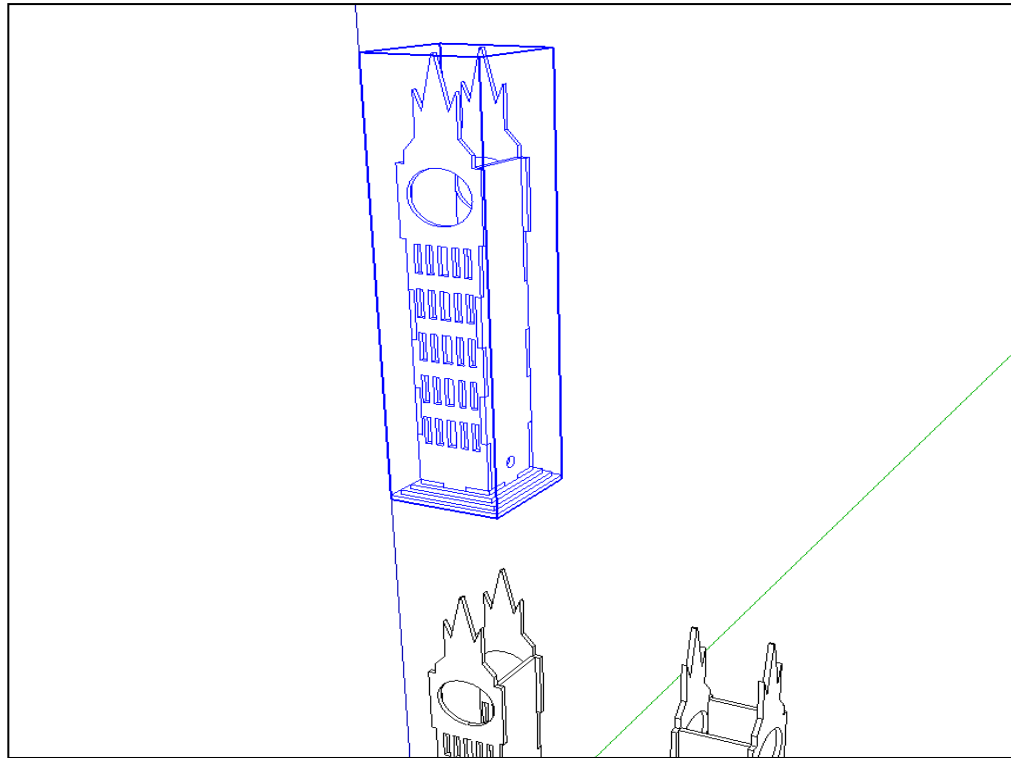
Click on the **move tool** along the red axis. You should be able to draw a line that turns red from corner to corner to indicate it lines up exactly



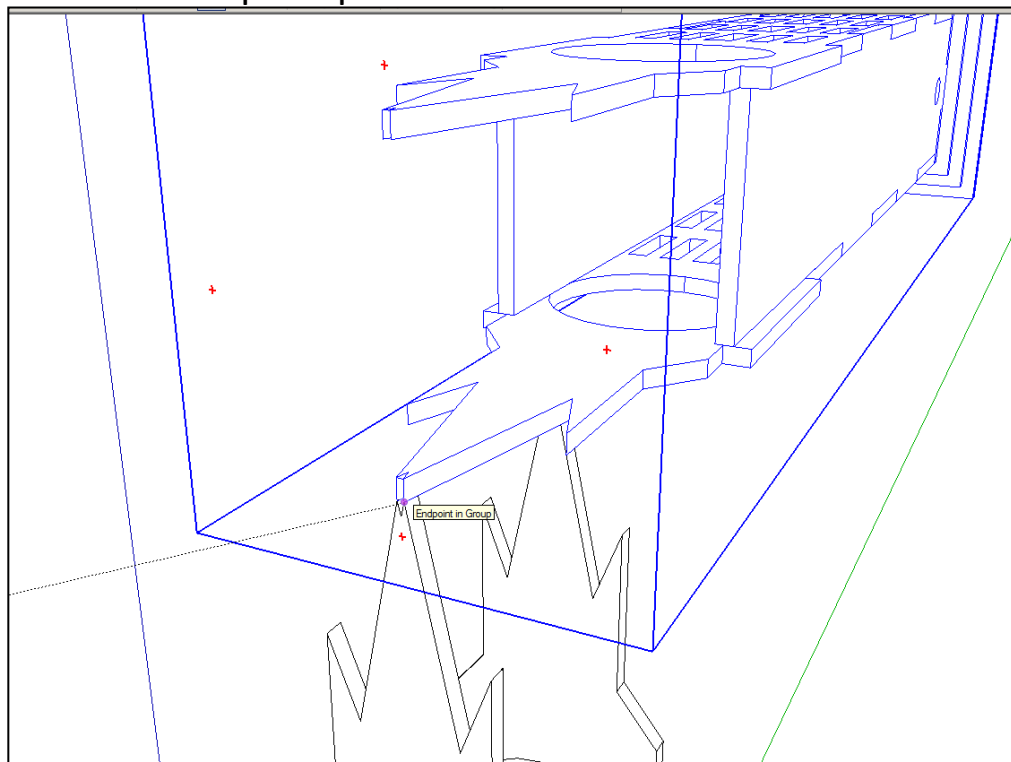
Click on the **move tool** and move the lamp so the corners of the base meet

# Computer Aided Design: Aircraft Lamp Working Drawing

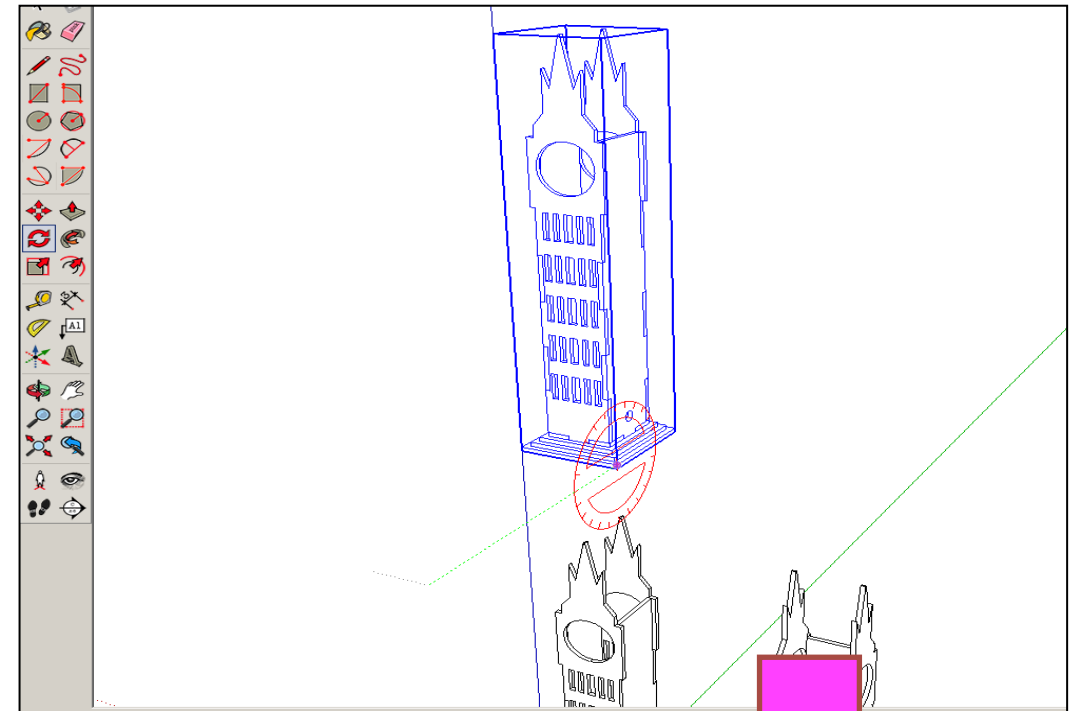
## Computer Aided Engineering: 2. Working Drawing (Setting up Correct Format)



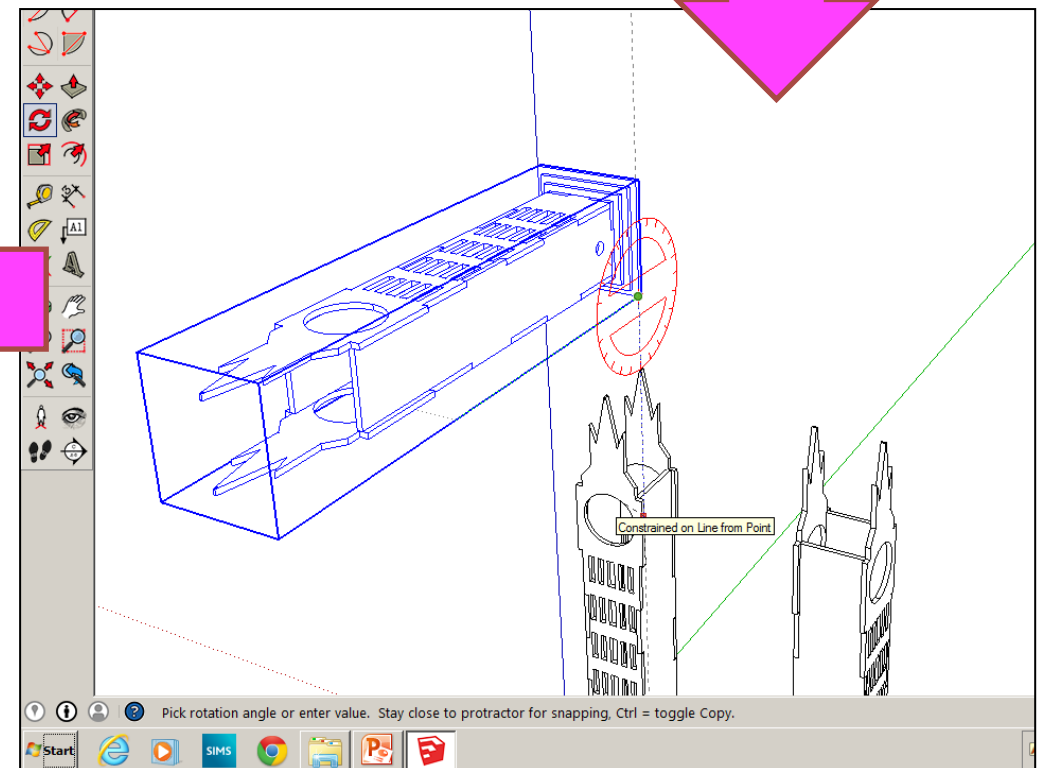
Click on the top lamp



Click on the **move tool** and move the lamp so the corners of the base meet



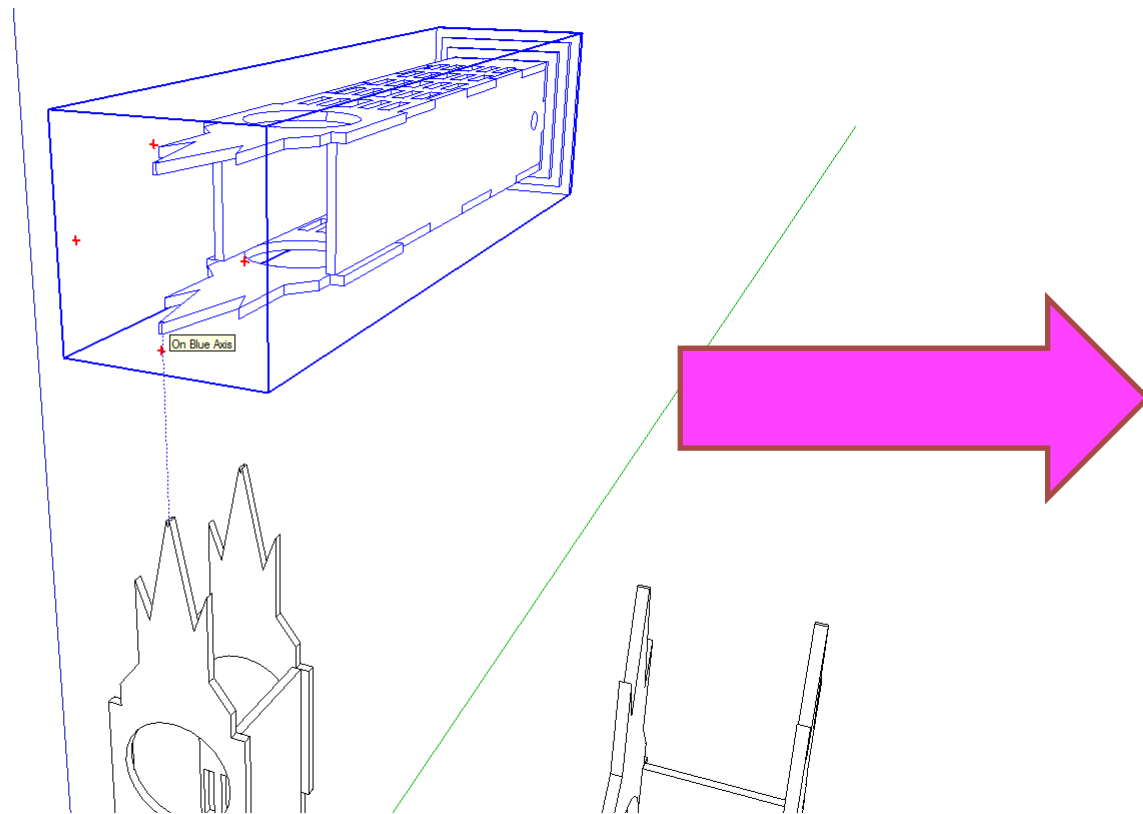
Click on the rotate tool and turn the lamp around 90 degrees as shown below



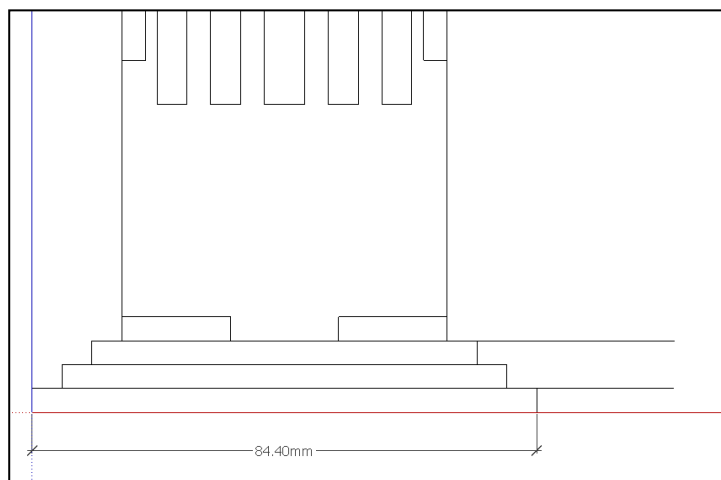


# Computer Aided Design: Aircraft Lamp Working Drawing

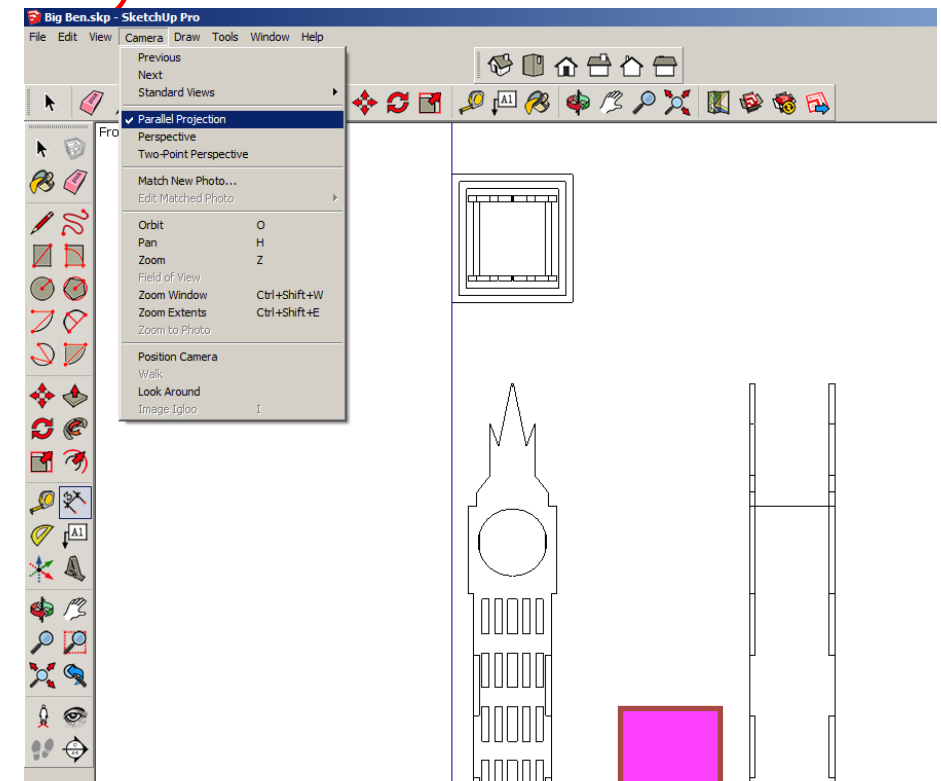
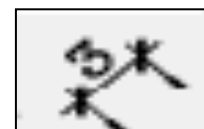
## Computer Aided Engineering: 2. Working Drawing (Adding Dimensions)



Click on the **move tool** and move the lamp so the corners of the base meet and then separate again



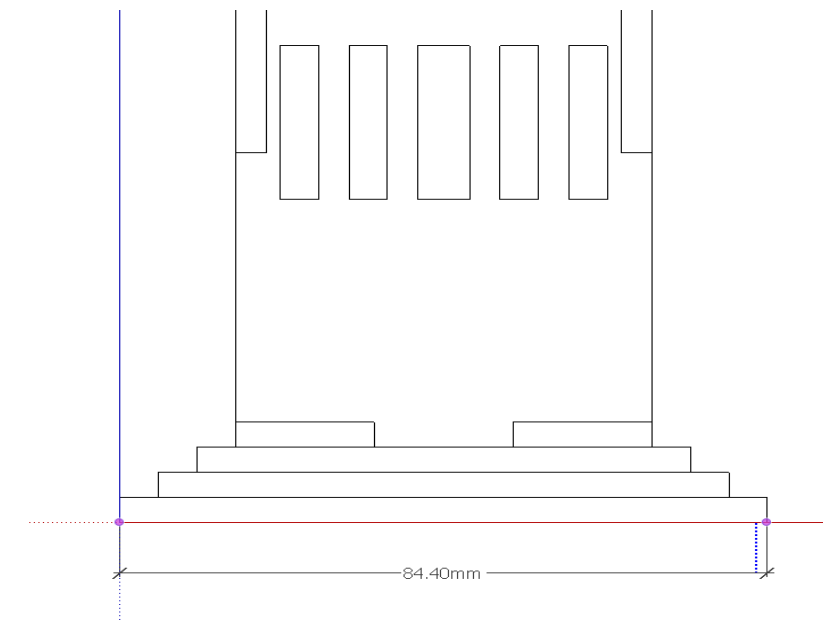
Certain points are difficult to add sizes using the pencil tool to line up edges as shown above.



Click on the **front view** using the **view toolbar** and the **camera parallel projection**

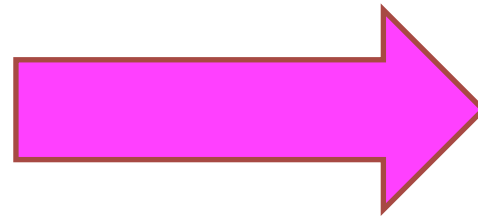
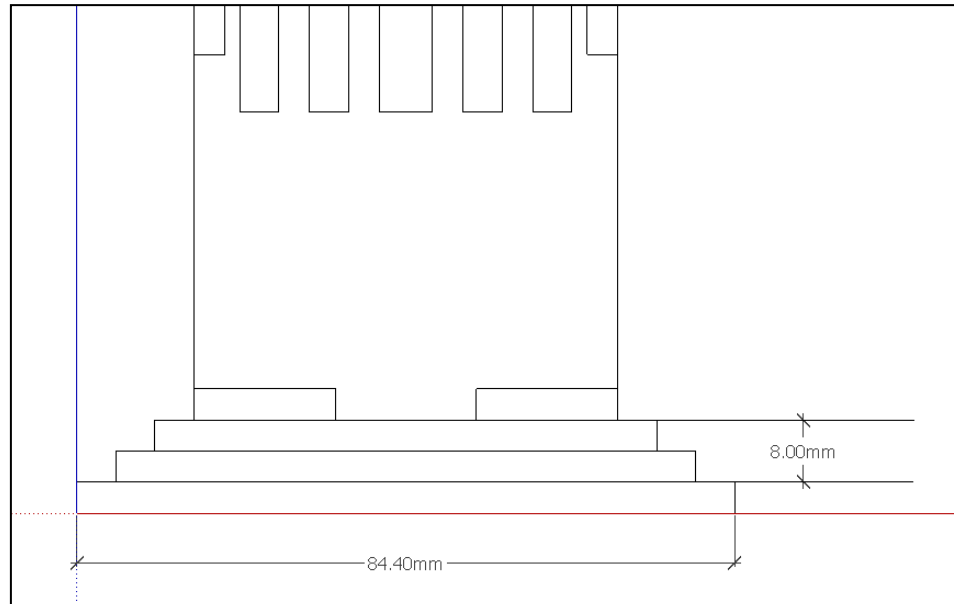


Click on the **dimensions tool bar** and add sizes. All sizes should be below and to the right. Never on the left hand side or on the top

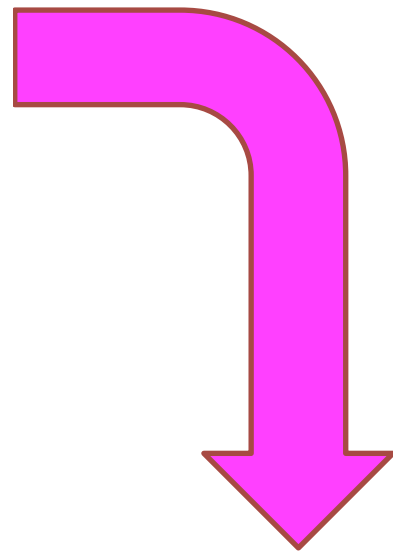
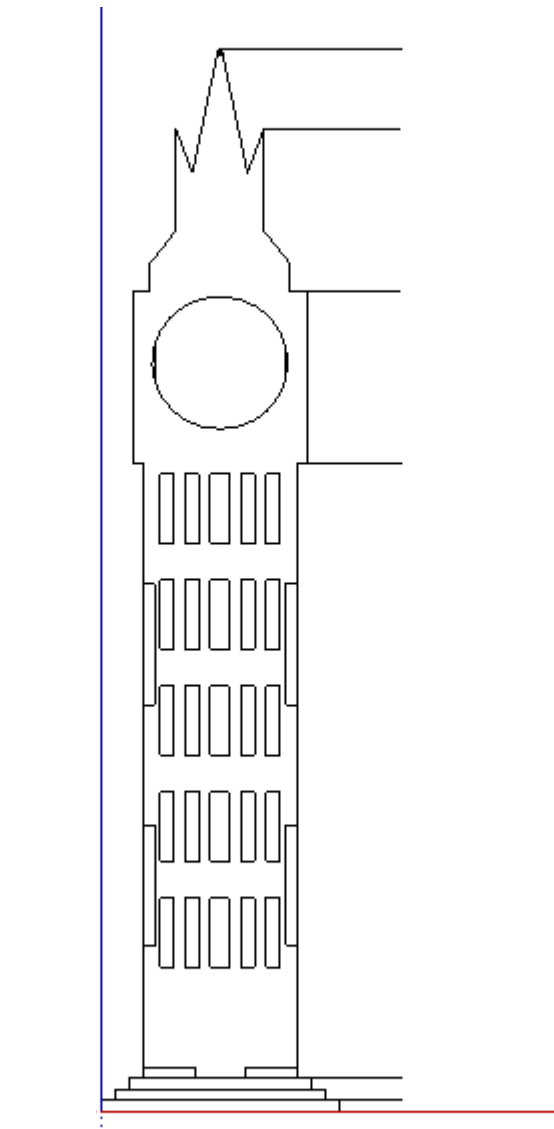
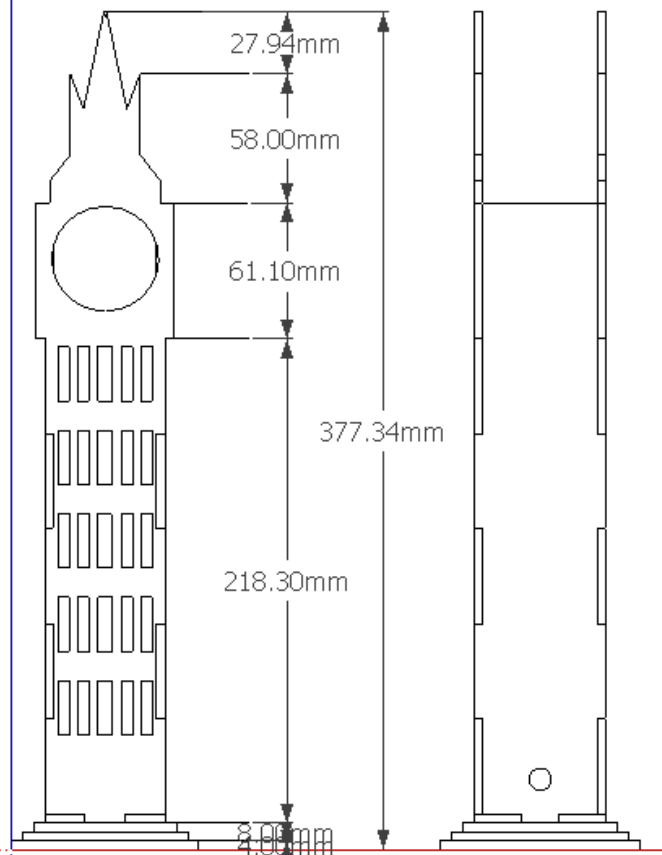
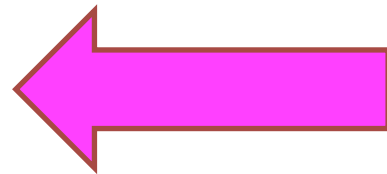
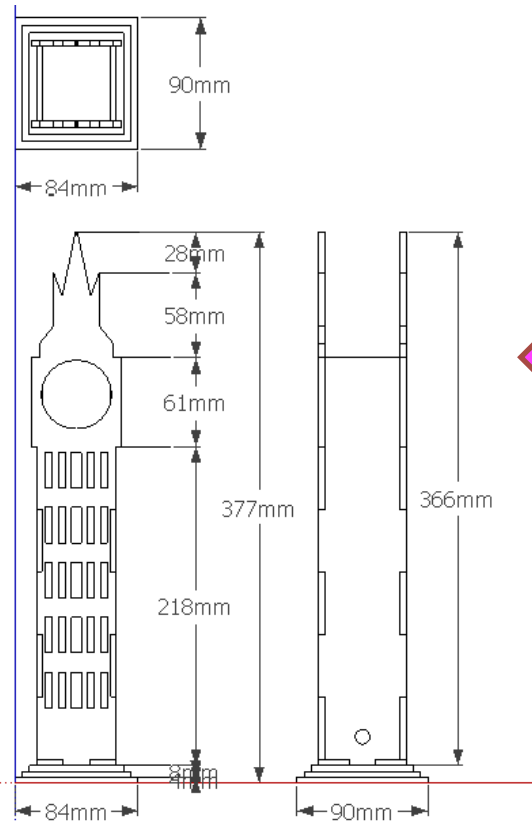


# Computer Aided Design: Aircraft Lamp Working Drawing

## Computer Aided Engineering: 2. Working Drawing (Setting up Correct Format)

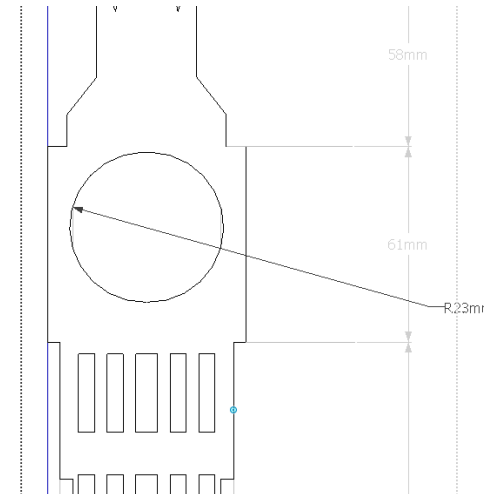
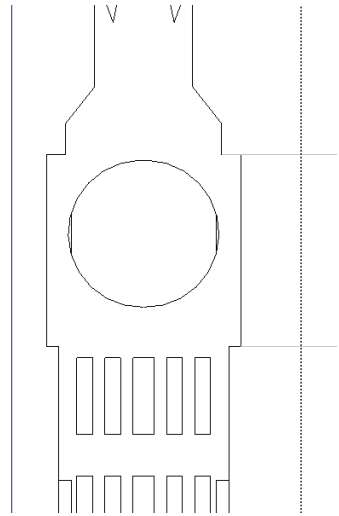


Add sizes to show height, width and any other important sizes. You will compare these to the lamp later on



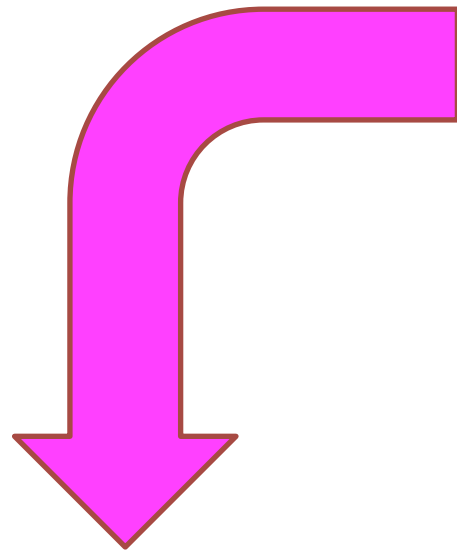
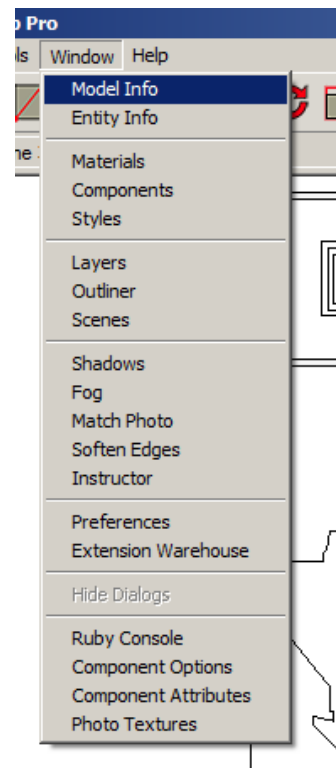
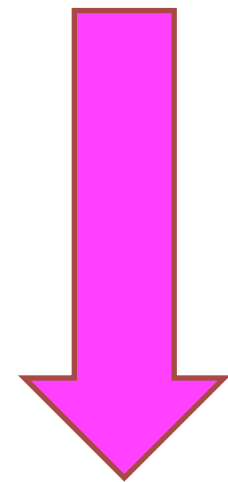
# Computer Aided Design: Aircraft Lamp Working Drawing

## Computer Aided Engineering: 2. Working Drawing (Setting up Correct Format)

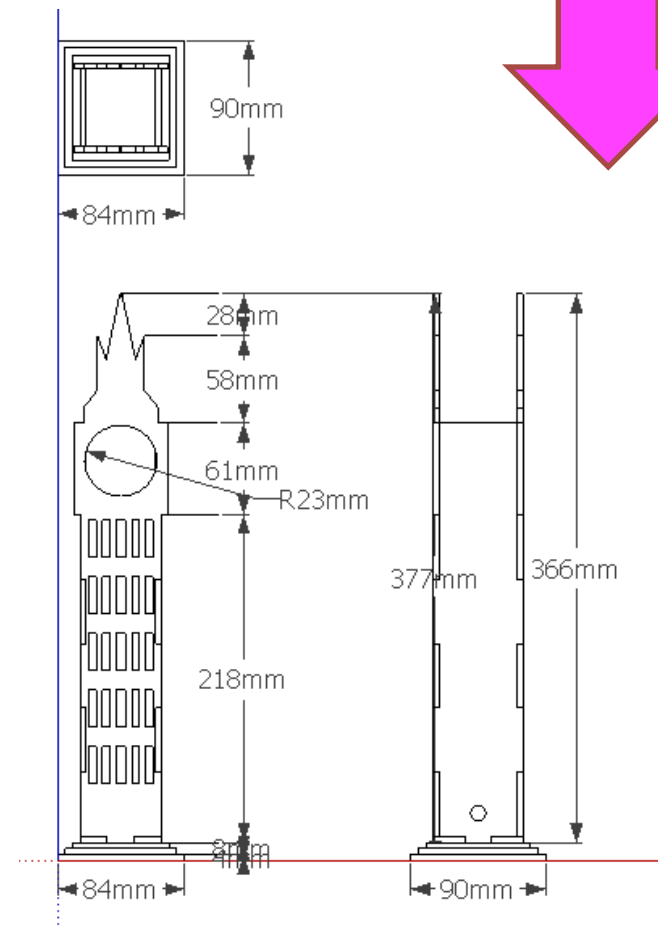


If the object is grouped you may need to double click to add some sizes and radius

Add sizes to the three drawings Front, Side and Plan

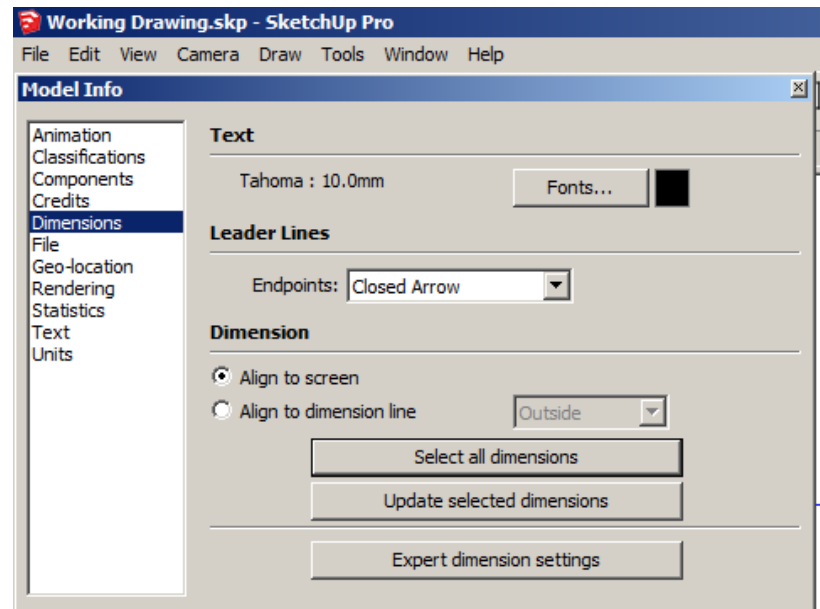


Click on *Window / Model Info*

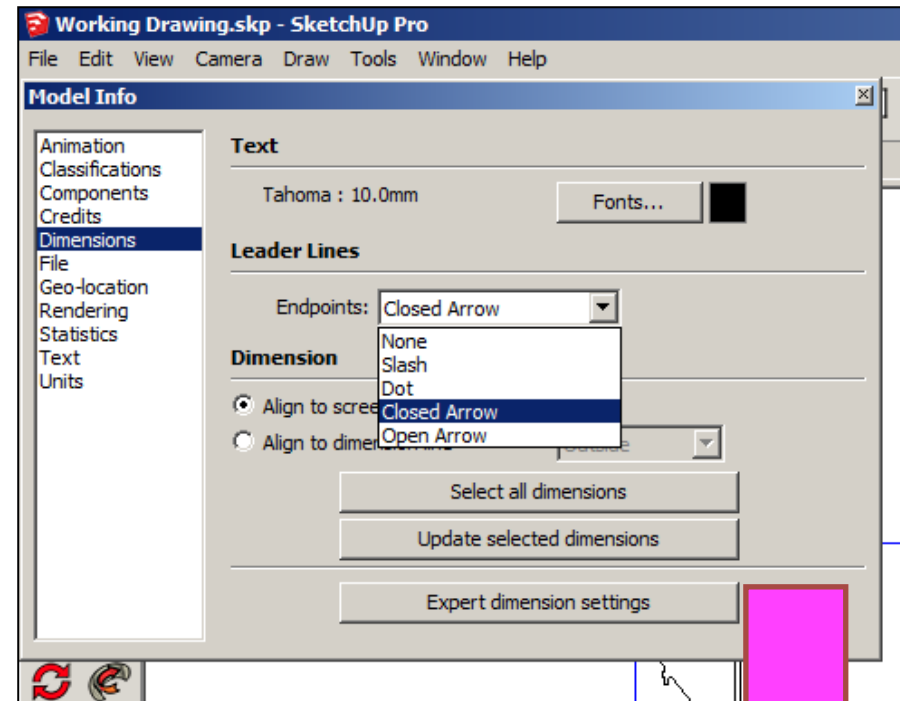


# Computer Aided Design: Aircraft Lamp Working Drawing

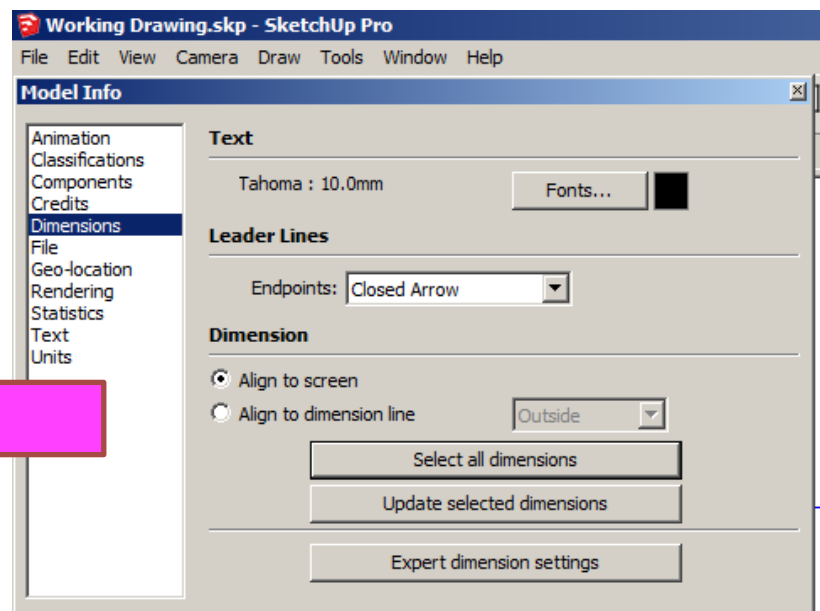
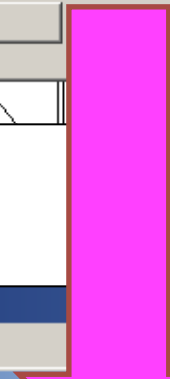
## Computer Aided Engineering: 2. Working Drawing (Setting up Correct Format)



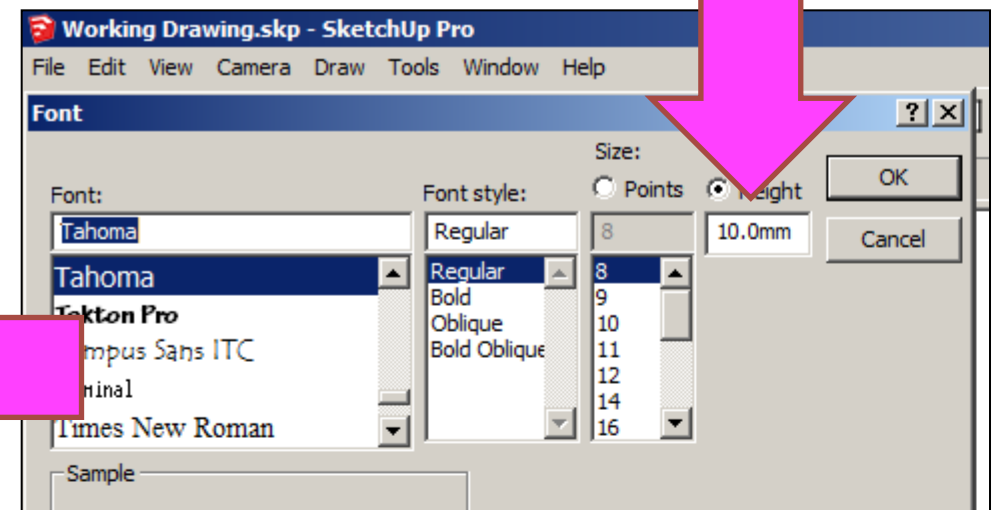
Click on **Dimension** and select all dimensions



Click on **Endpoints** and select closed arrow from the drop down menu



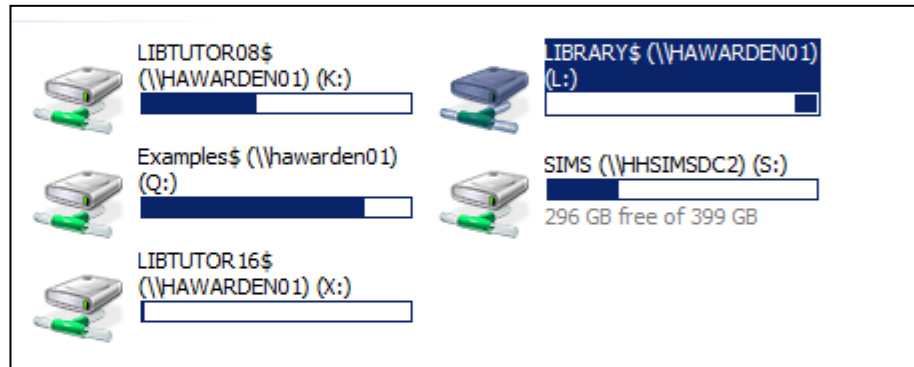
Click on **Update all dimensions**. The dimensions should change on the screen. When your happy close window down.



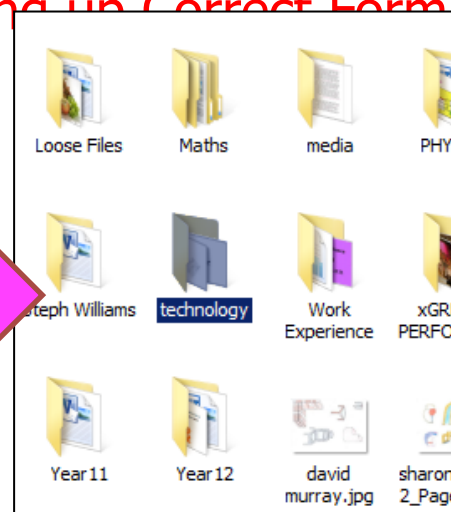
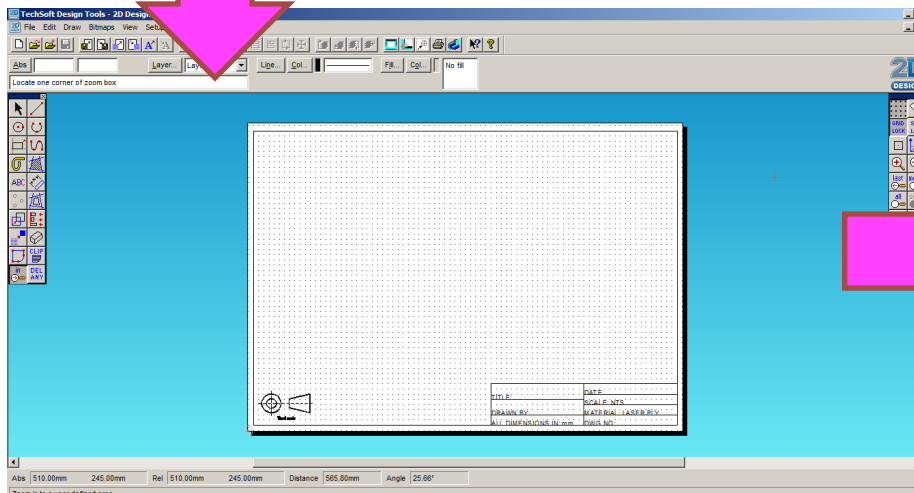
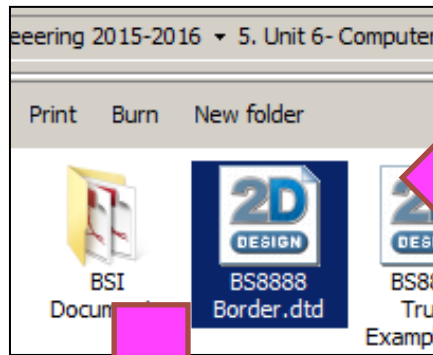
Click on **Fonts** and select a suitable size to be able to read the sizes on your drawing. You may have to repeat the above steps until your happy.

# Computer Aided Design: Aircraft Lamp Working Drawing

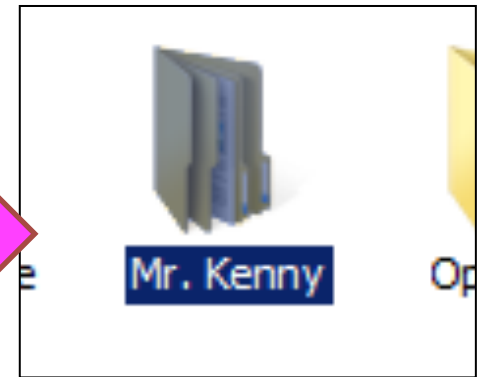
## Computer Aided Engineering: 2. Working Drawing (Setting up Correct Format)



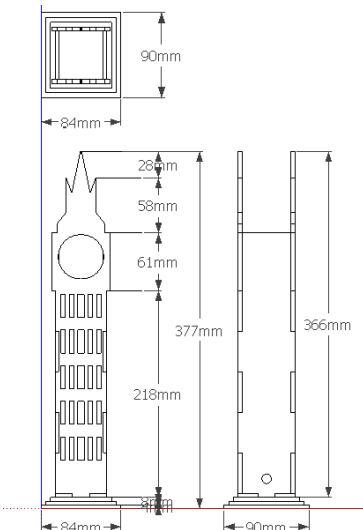
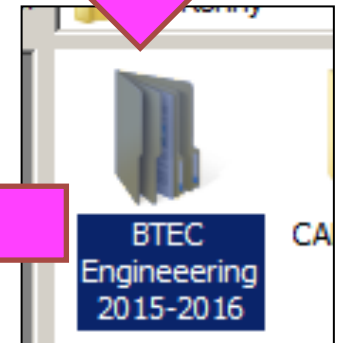
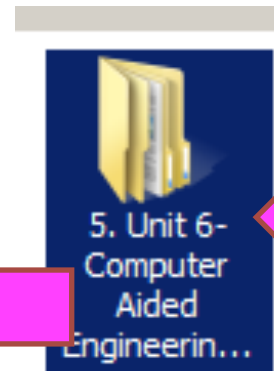
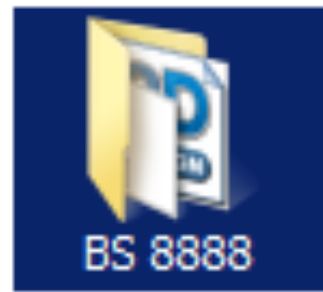
Click on *Library*.



Click on *Technology*.



Click on *Mr Kenny*.

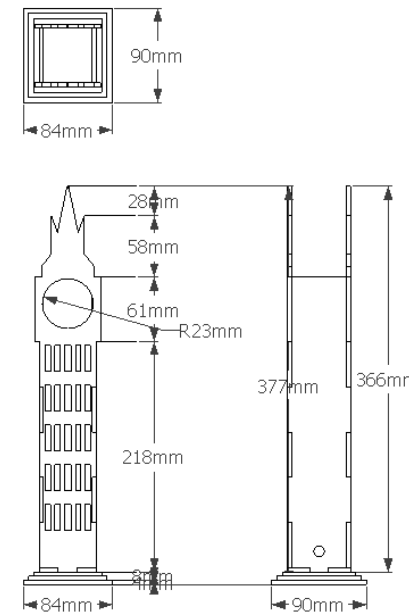
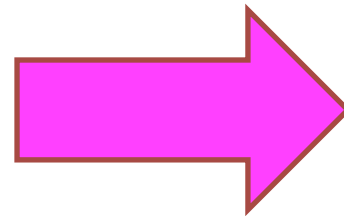
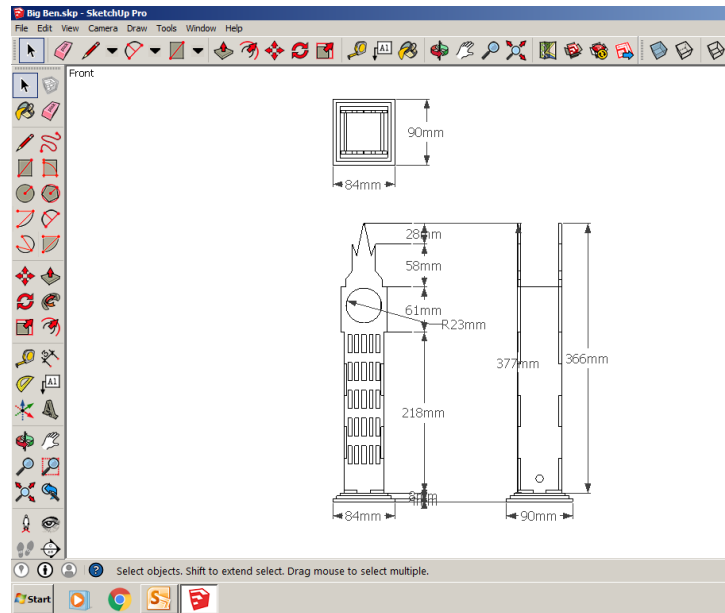


Go back to your working drawing. *Click on camera / Parallel projection, then view and click the axis off and then press print screen*



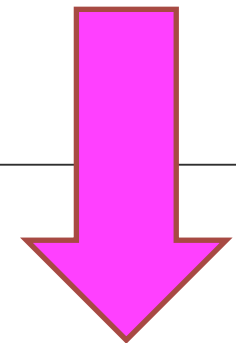
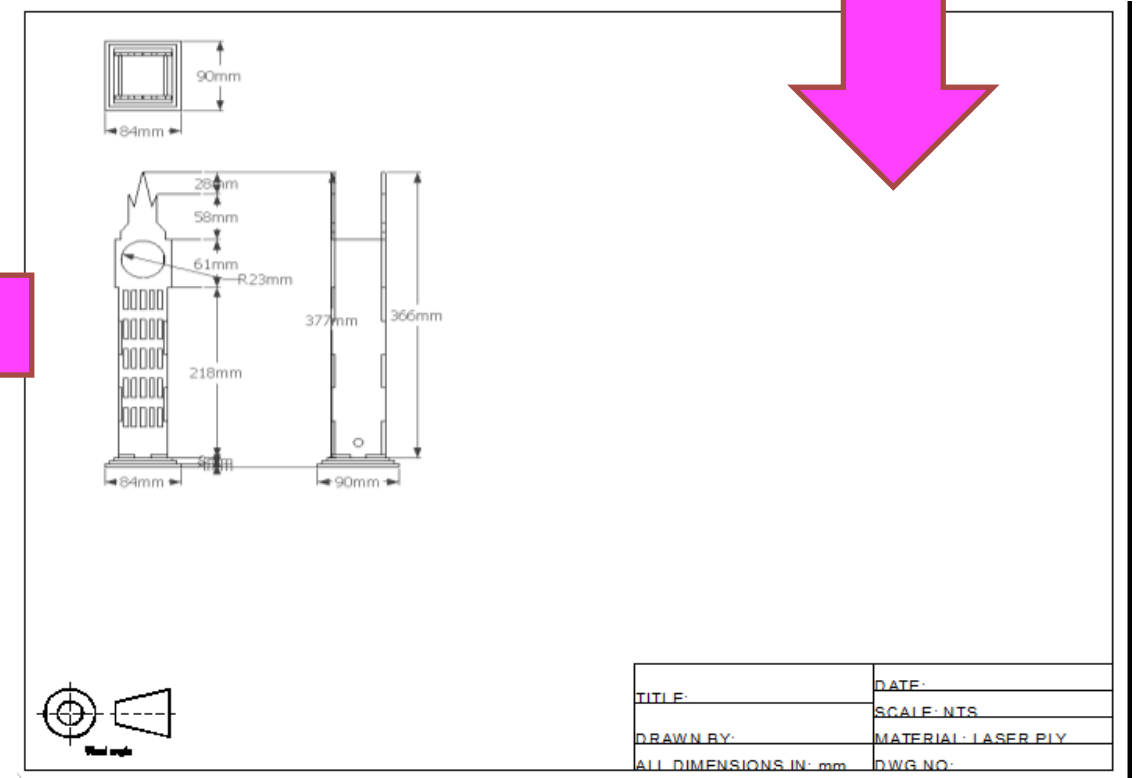
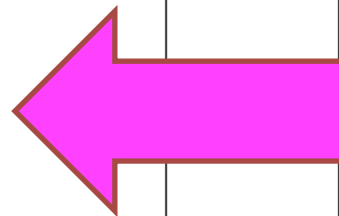
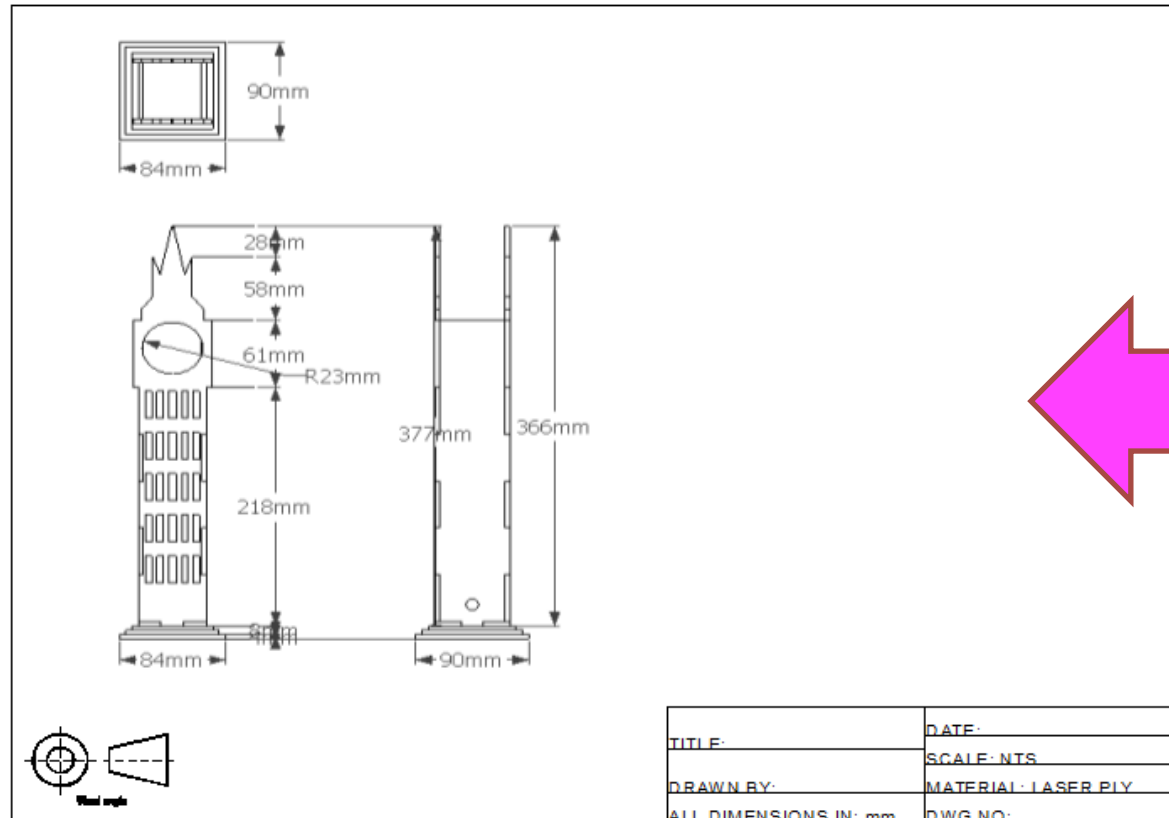
# Computer Aided Design: Aircraft Lamp Working Drawing

## Computer Aided Engineering: 2. Working Drawing (Importing DXF into 2D Design)



Press print screen again.

Paste into Power point first and then crop.

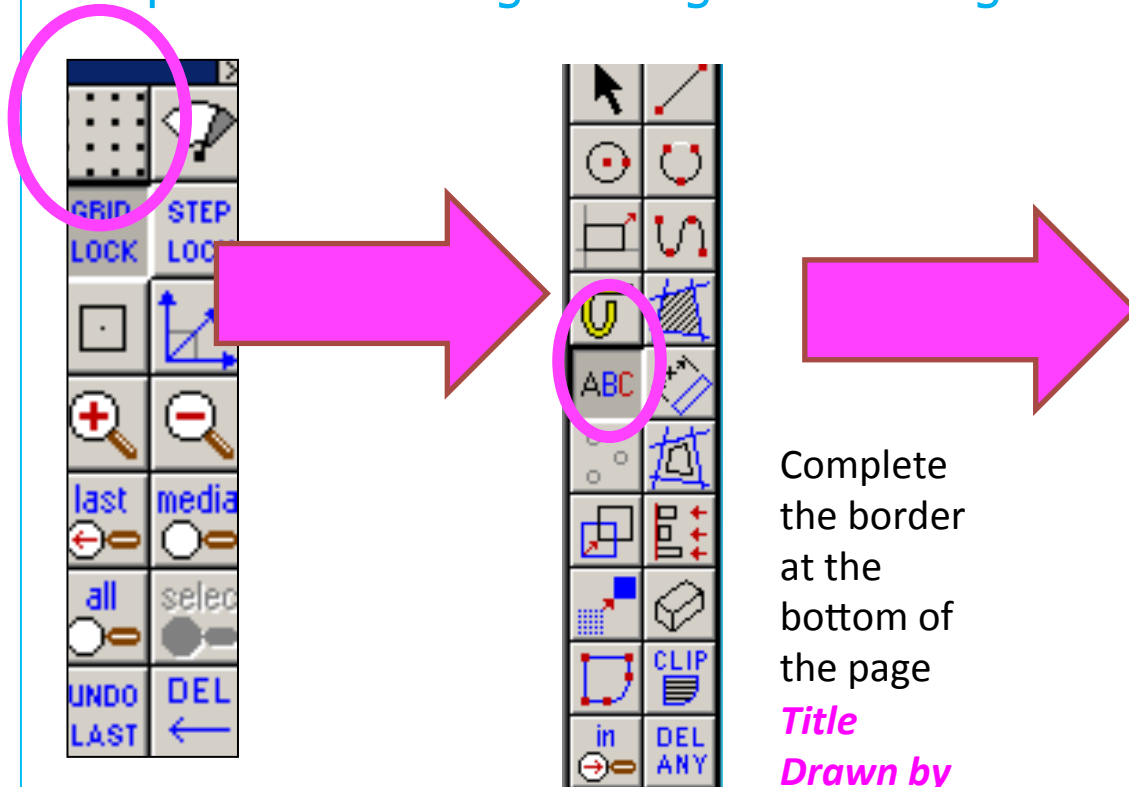


Resize appropriately



# Computer Aided Design: Aircraft Lamp Working Drawing

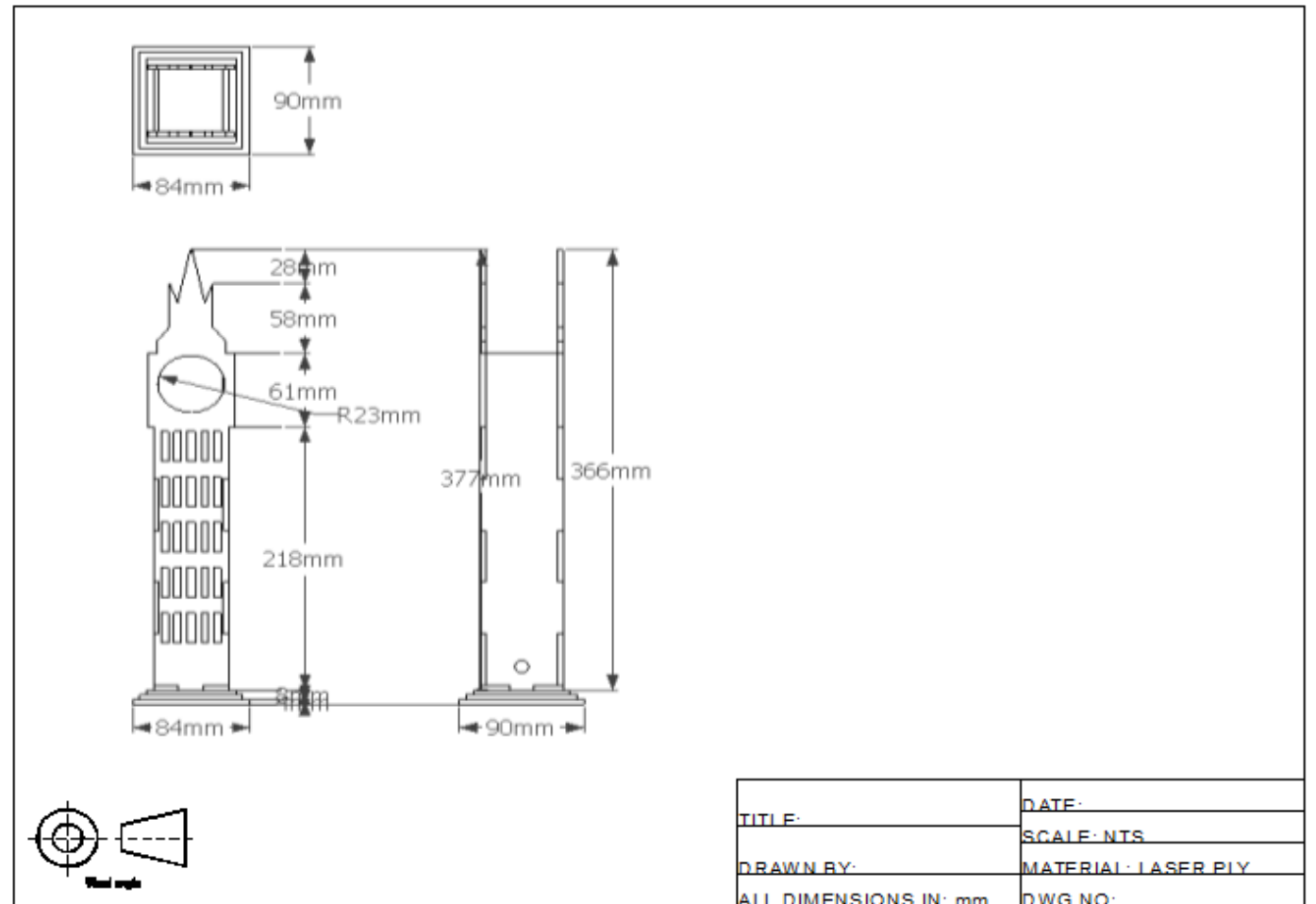
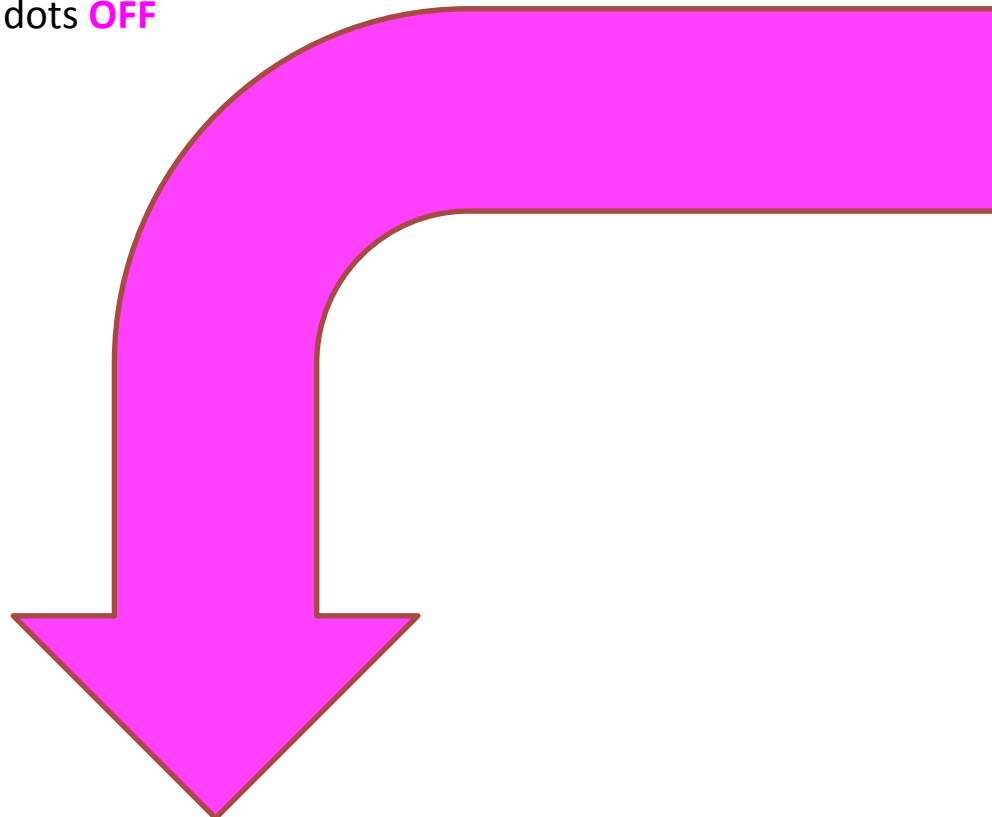
## Computer Aided Engineering: 2. Working Drawing (Importing DXF into 2D Design)



Click the dots OFF

Complete the border at the bottom of the page

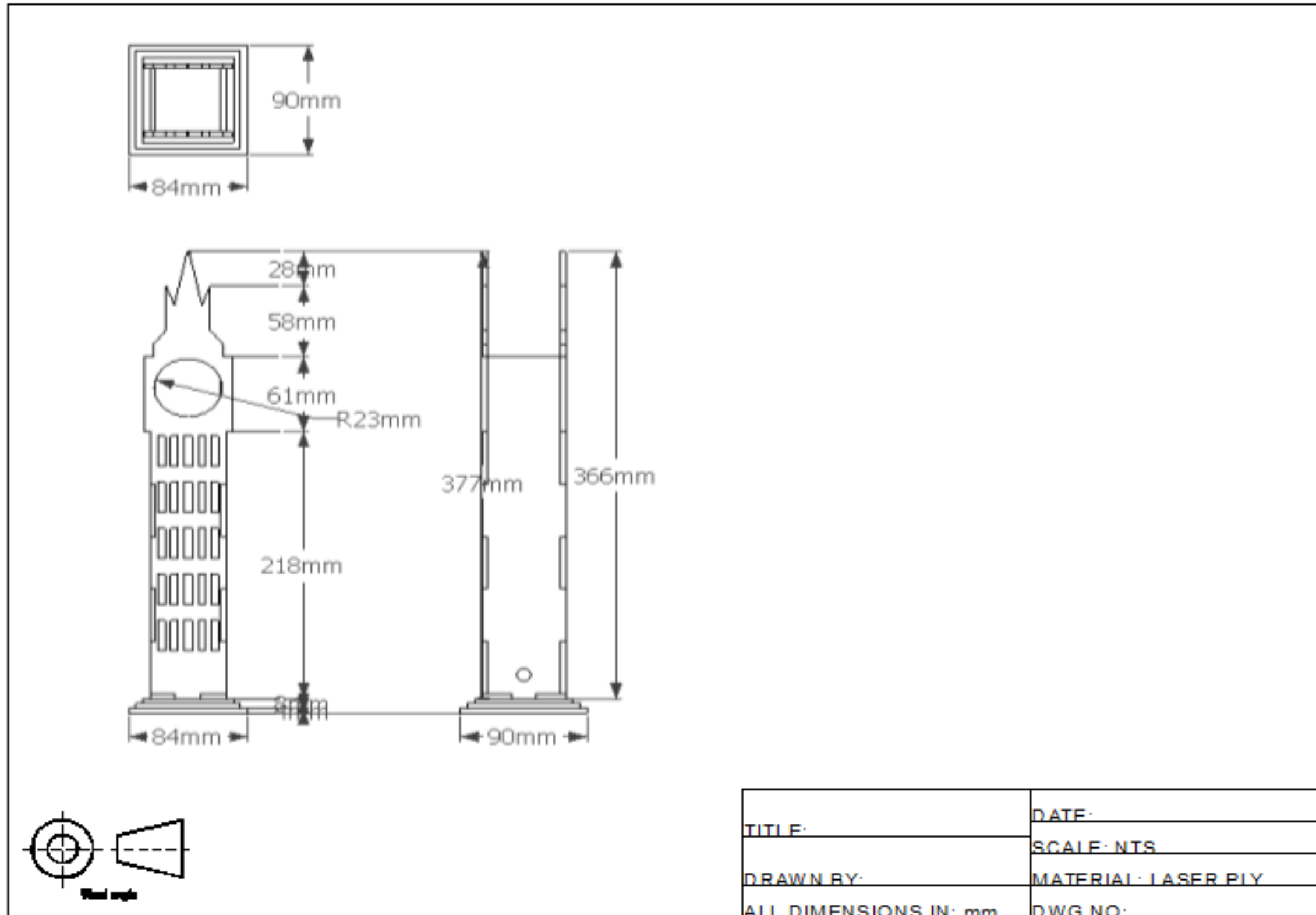
*Title*  
*Drawn by*  
*Date*



Print screen and paste into your folder. Drawing on the next page represents a correct Engineered Lamp drawing. If yours **does not look like this you cannot achieve a level 2**

# Computer Aided Design: Aircraft Lamp Working Drawing

Computer Aided Engineering: 2. Working Drawing (Importing DXF into 2D Design)



# Extension Activity

- Design your own lamp based around a famous building or skyline.....

