Design out the box

# By the end of this tutorial you will be able to…

- Link basic shapes
- Use the Arc tool
- Use the Follow Me tool to produce a rounded edge
- Use construction lines/points
- Colour/render your finished toy boat

Skills to be used in this project…

Basic Skills	New and Higher Skills
Zoom tool	Construction lines and points
Orbit tool	Tape Measure tool
Pan tool	Arc tool
Line tool	Follow Me tool
Rectangle tool	Loading new toolbars
Circle tool	Paint Bucket tool
Eraser tool	
Push/Pull tool	

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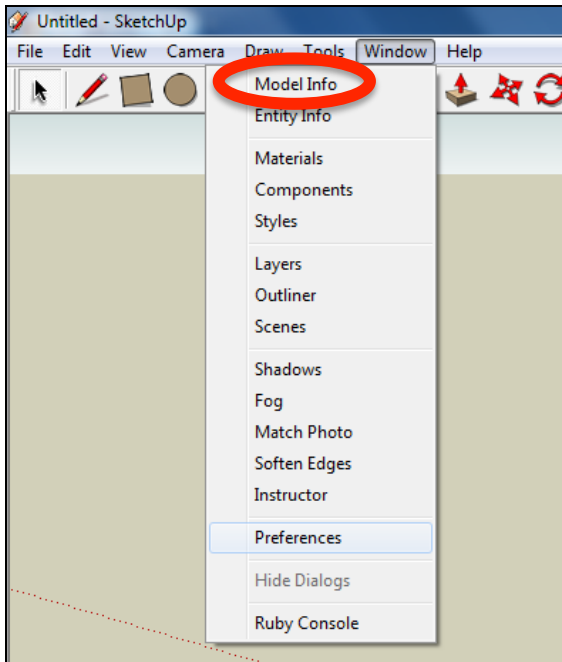
1. Open the sketch up drawing. Once you have opened SketchUp, go to **Window** and select **Model Info**

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**.*

4
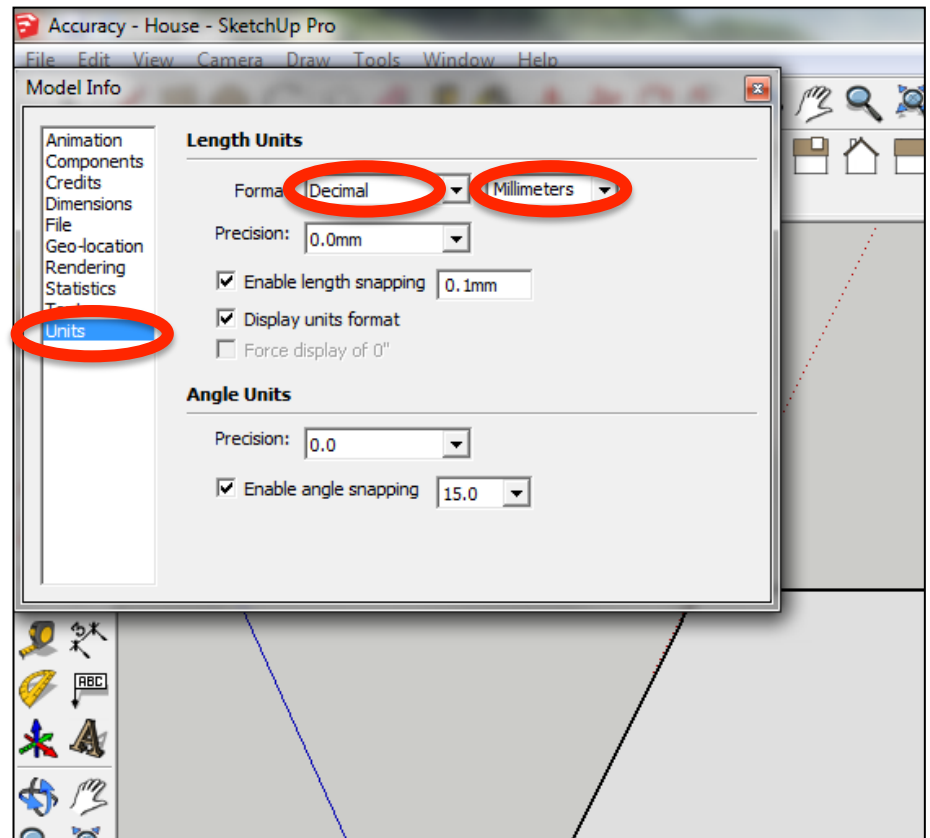
3. Now select the **View** then **toolbars** and ensure **Getting Started** and **Large Tool Set** are ticked
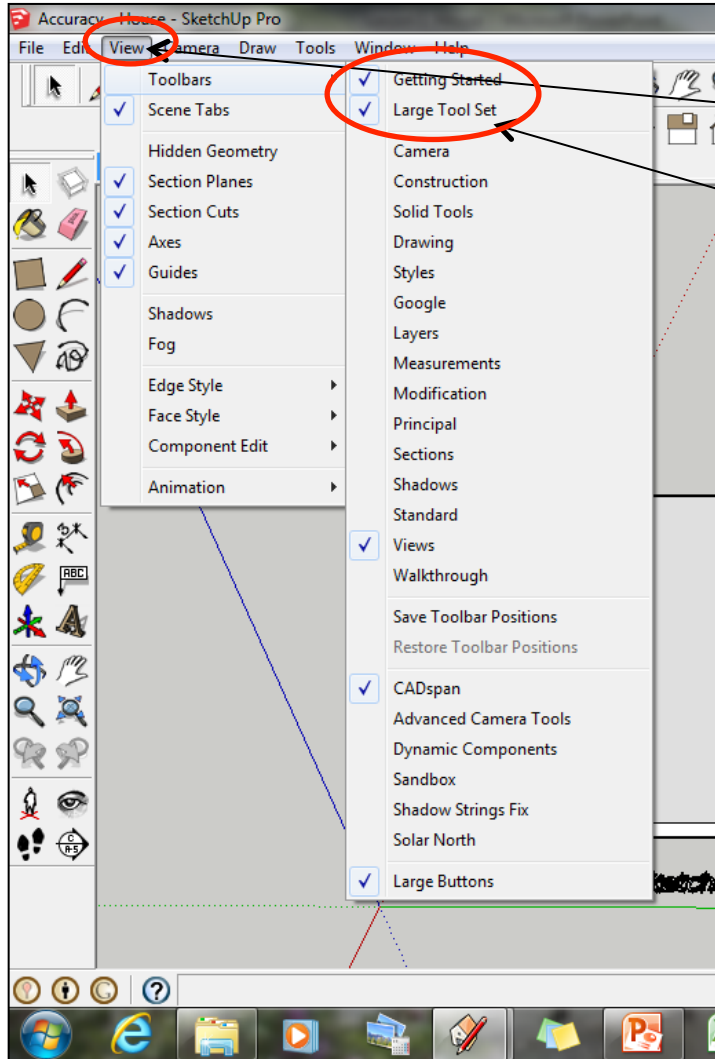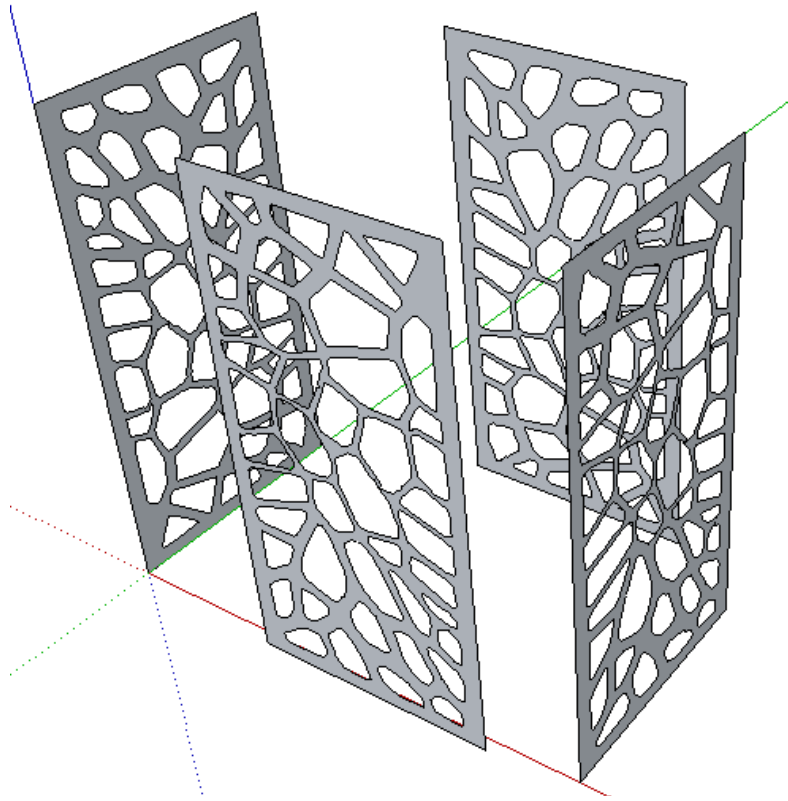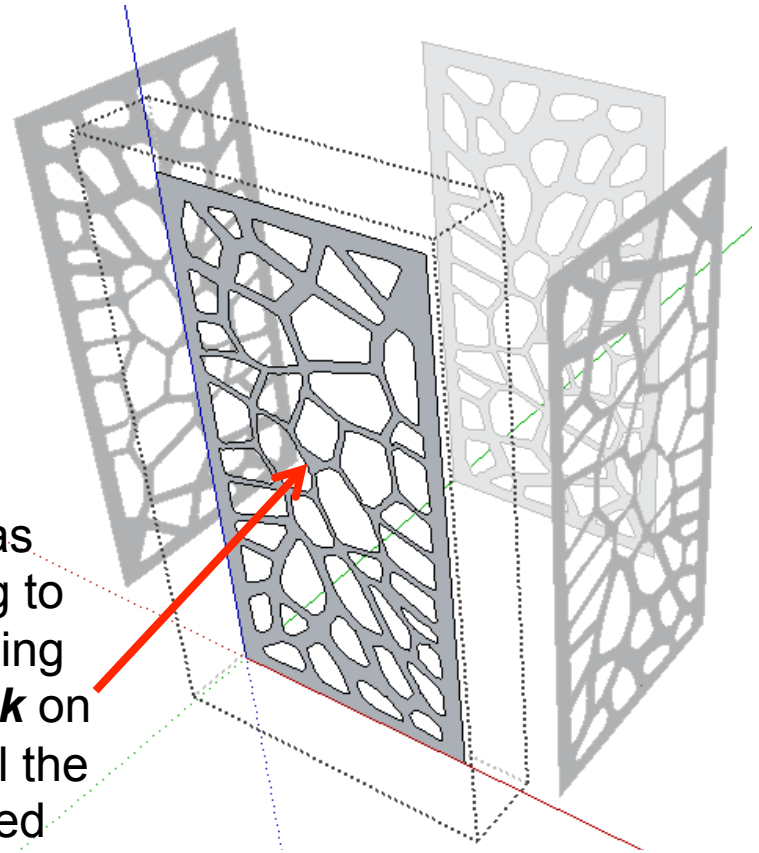

3a Select **View**

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)***

4. Open Library *Designoutthebox.com*/ CAD Skills/ Lesson 18 / Nature Inspired lamp

5. Each one of these pieces has been grouped. We are going to give each one thickness. Using the *select tool, double click* on the piece shown to edit it. All the other pieces should be greyed out.
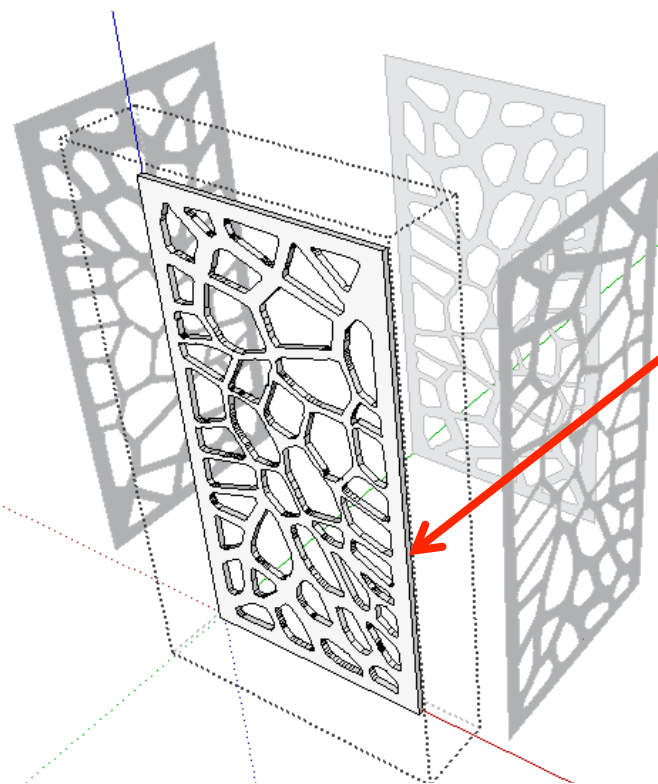
6. Using the *push pull tool.* Hover over the shape indicated. It will go *dotted* as you hover over it. Pull the shape outwards. Type in *4 and press enter.*

7. Repeat steps *4 and 5* on the other three sides so they are all 4mm thick*.*
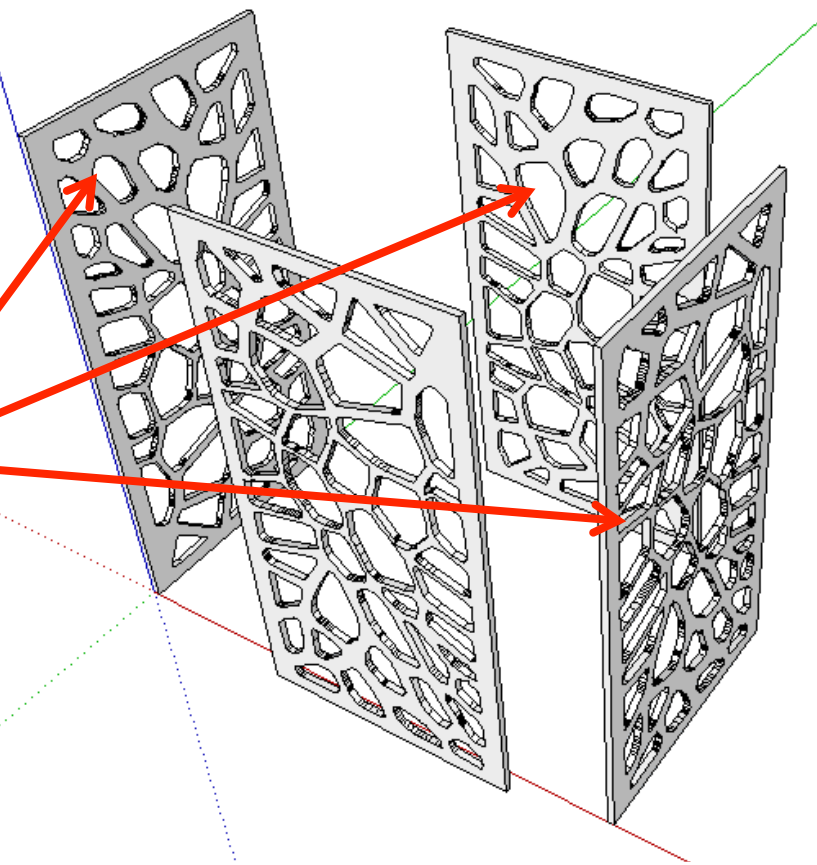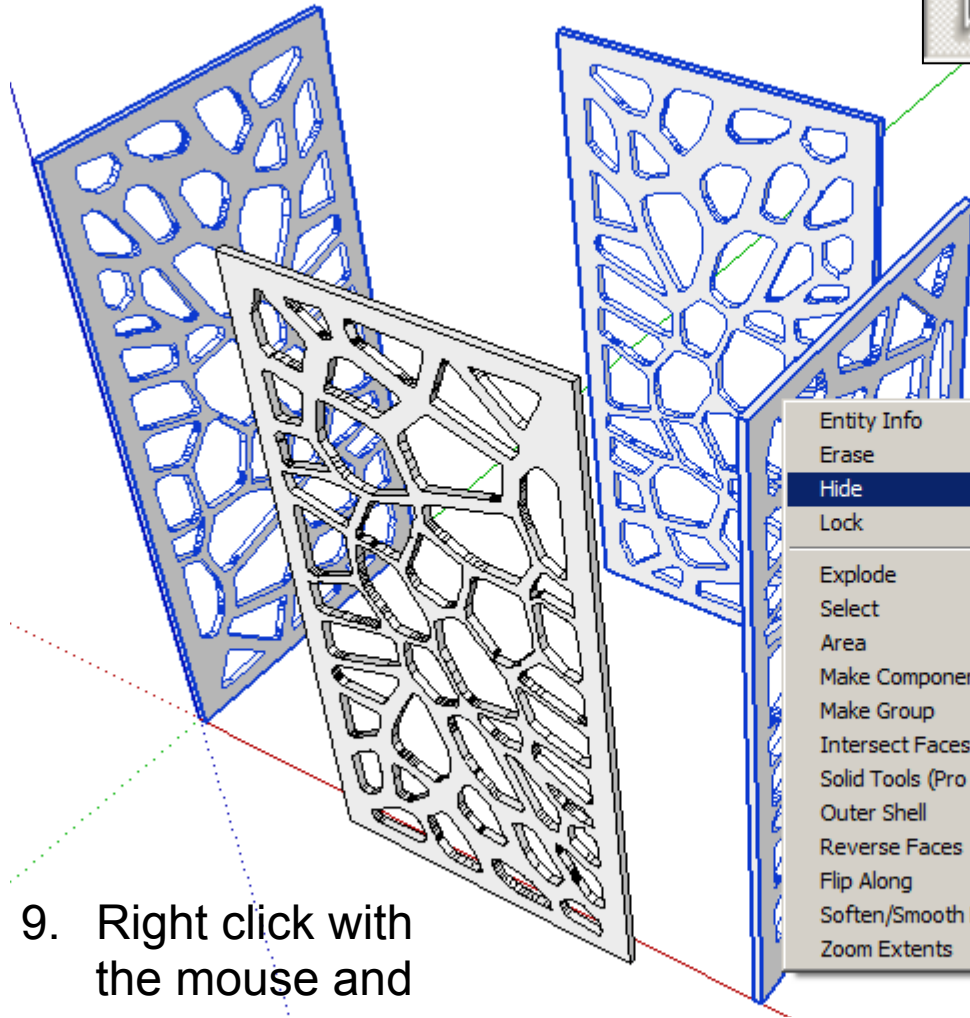
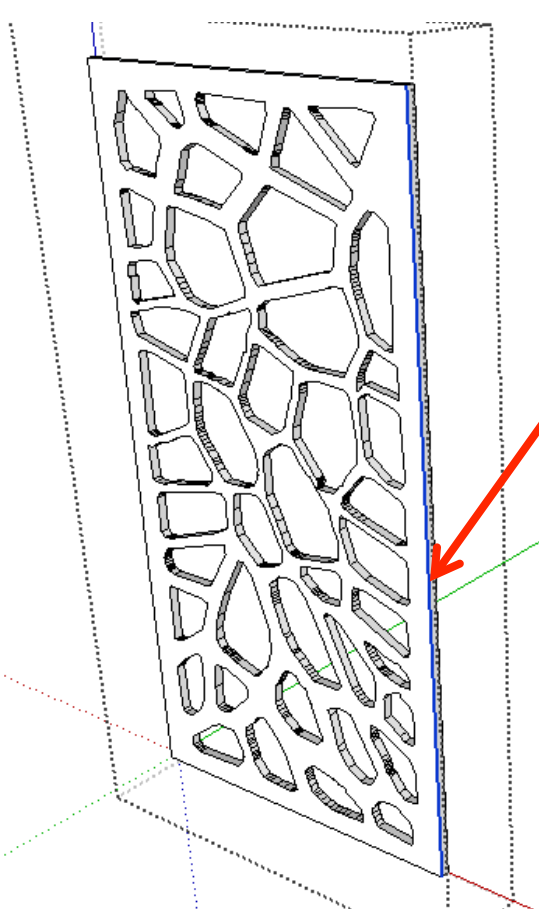8. Using the *select tool,* click on the one of the side pieces.

   Hold the shift key down

   (arrow pointing up found u...

Entity Info
Erase
Hide
Lock

Explode
Select ▶
Area ▶
Make Component
Make Group
Intersect Faces ▶
Solid Tools (Pro Only) ▶
Outer Shell
Reverse Faces
Flip Along ▶
Soften/Smooth Edges
Zoom Extents

9. Right click with the mouse and select *hide.*
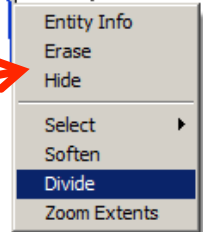
Click on the other two pieces so all three are highlighted
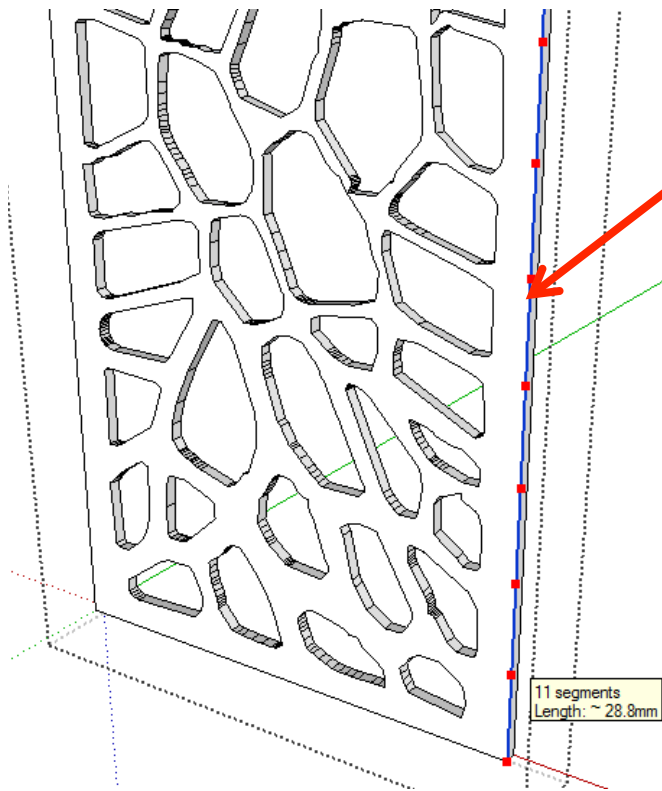
10. Using the *select tool, double click* on the piece shown to edit it. All the other pieces should be greyed out. Then click on the edge shown to highlight it in blue.
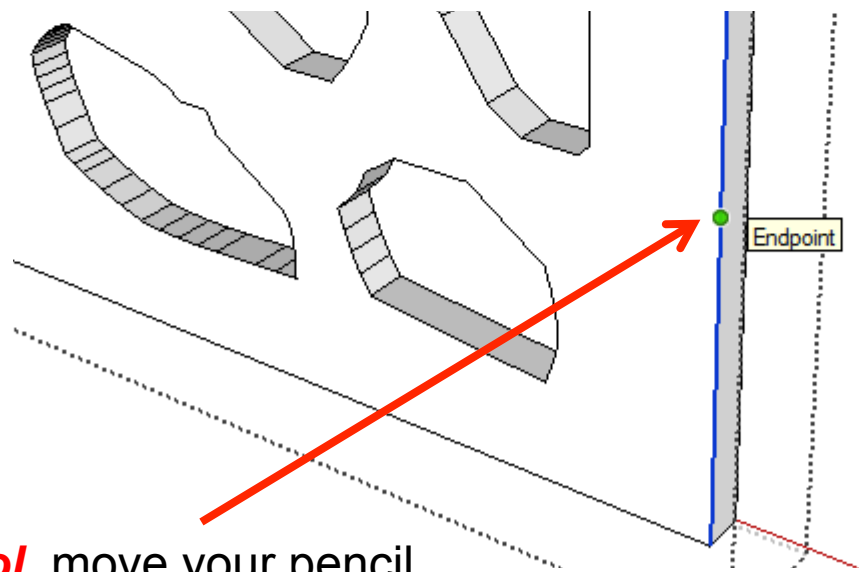
11. Whilst on the selected *blue* line, *right click* with the mouse and select *divide.*

Entity Info
Erase
Hide
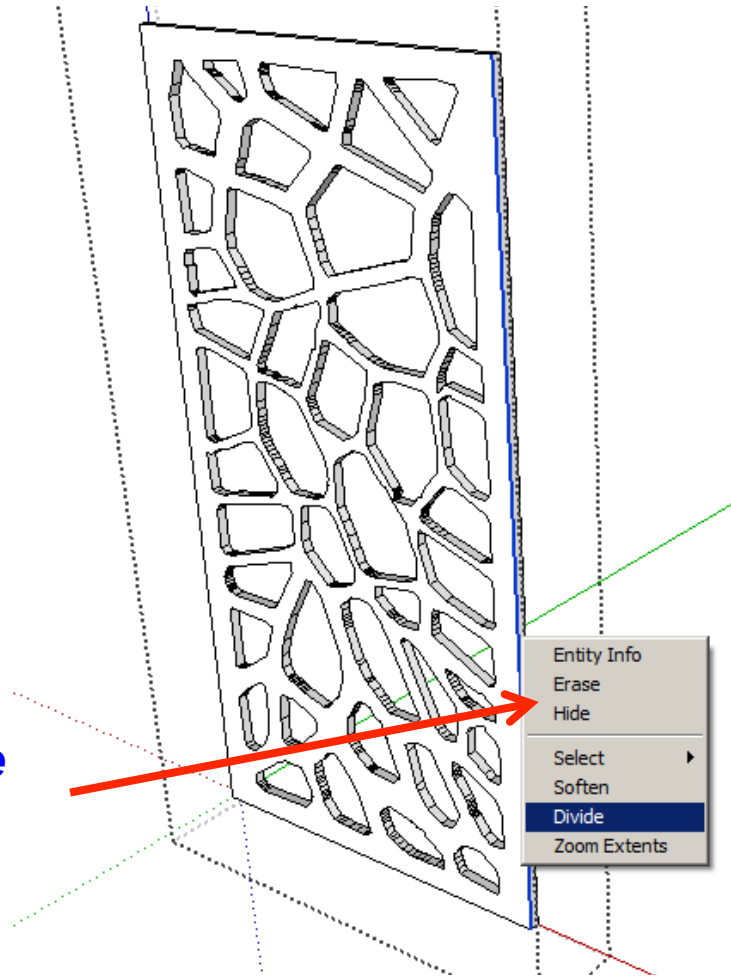
Select
Soften
Divide
Zoom Extents

12. Using the *mouse,* you can move it up and down the blue line to divide it into segments or you can type *11 and press enter.*

NOTE: When drawing finger joints you always use an odd number.

11 segments
Length: ~ 28.8mm

Endpoint

13. Using the *pencil tool,* move your pencil along the blue line until it snaps to an *endpoint*. Make your you *do not click* on a midpoint otherwise you will have 22 lines instead of 11.
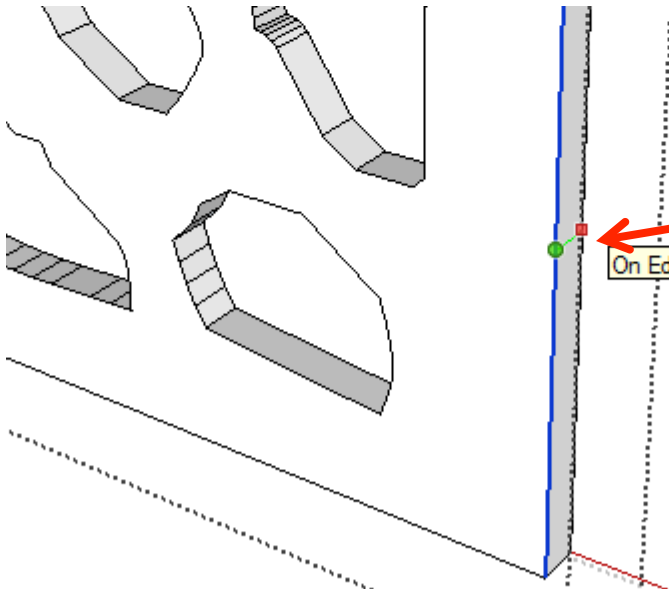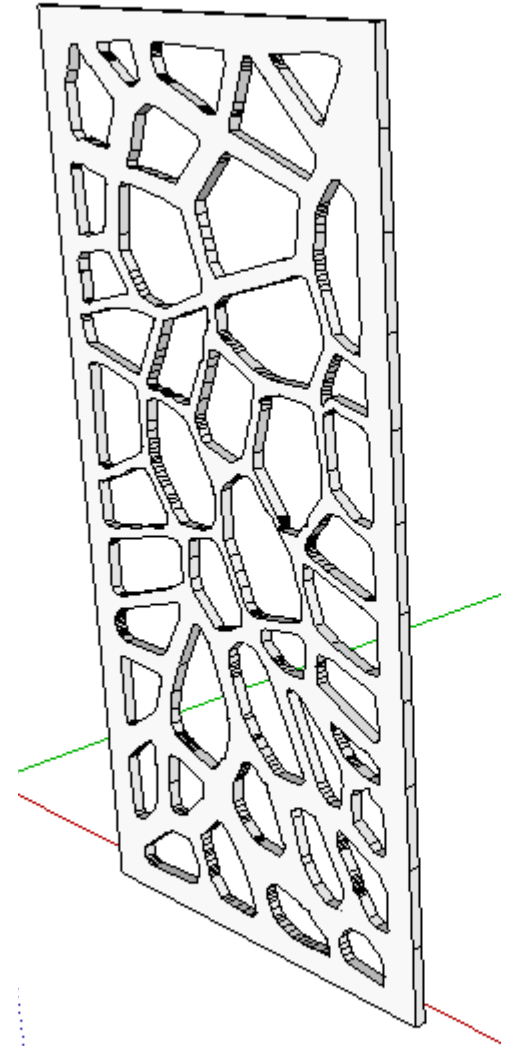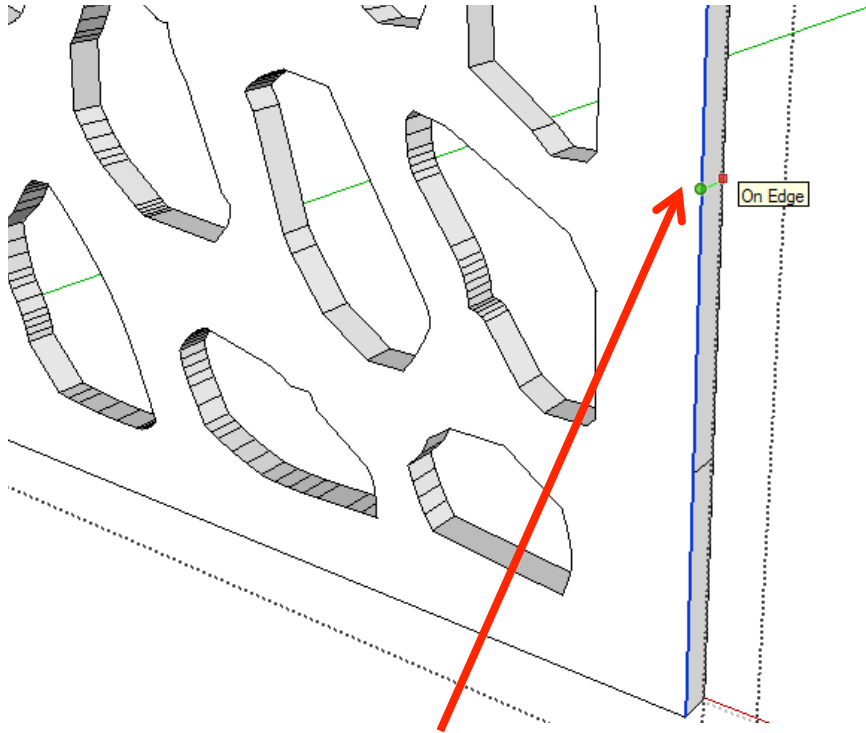
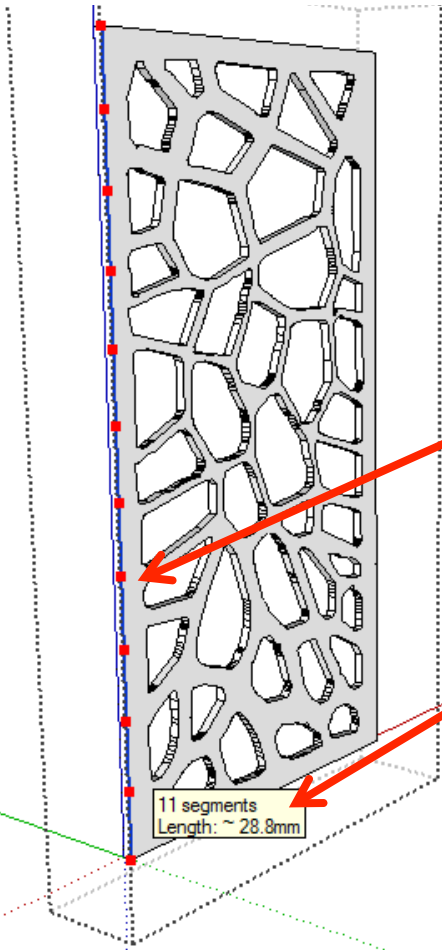14. Using the *pencil tool,* draw a line across the green axis to the other *edge.*

On Edge

Endpoint

15. Using the *pencil tool,* move your pencil along the blue line until it snaps to an *endpoint*. Make your you *do not click* on a midpoint.

On Edge
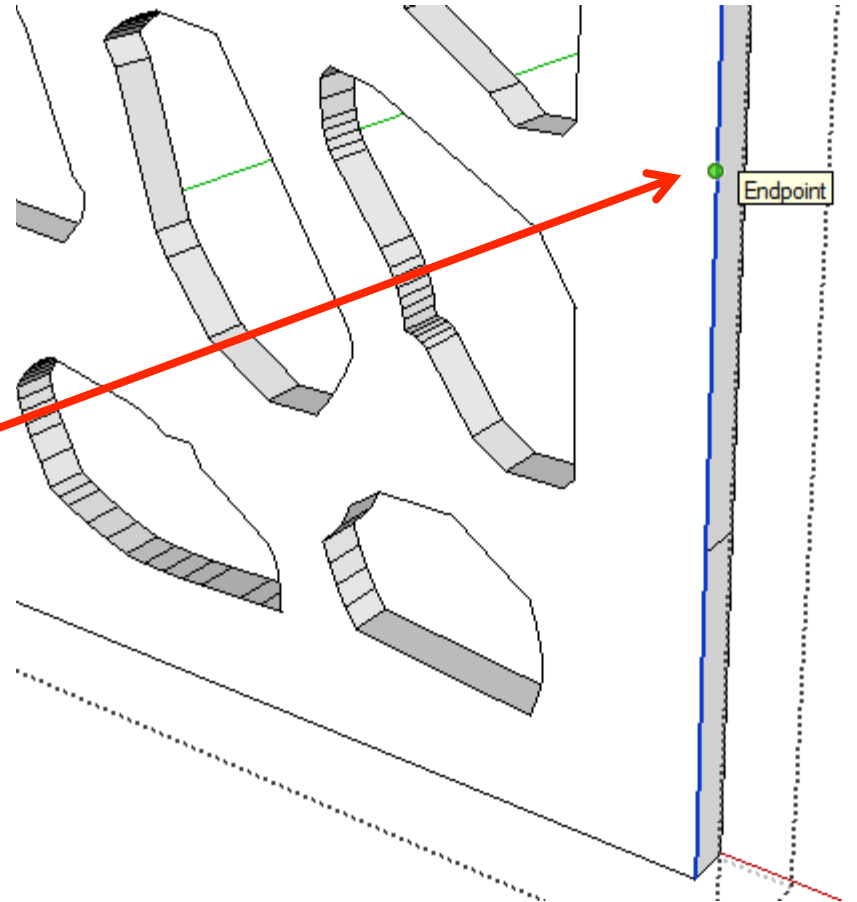
16. Using the **pencil tool,** draw a
    line across the green axis to
    the other **edge.**

17. **Repeat** the lines all the way
    up on each endpoint. You
    should have 11 rectangles on
    the side.

18. Select the orbit tool and *rotate the piece* *so you can see the opposite side*.

19. Using the *select tool, double click* on the piece shown to edit it. All the other pieces should be greyed out. Then click on the edge shown to highlight it in blue.
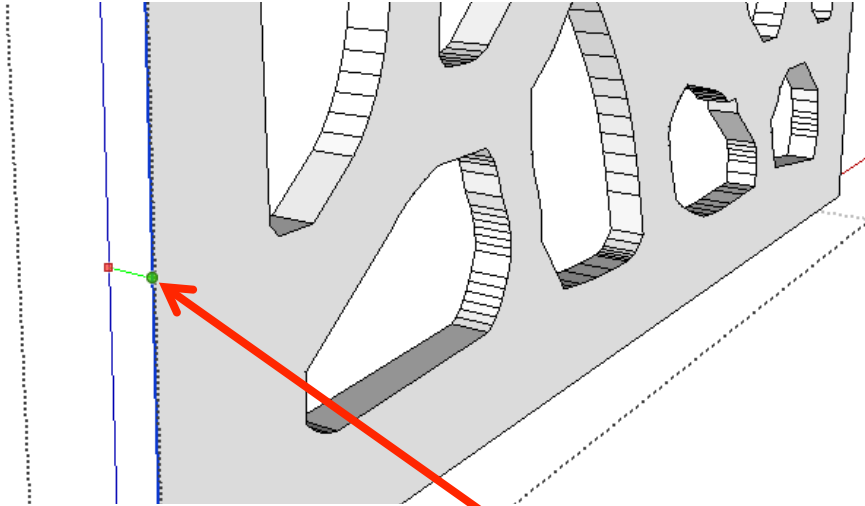
20. Whilst on the selected *blue* line, *right click* with the mouse and select *divide.* Using the *mouse,* you can move it up and down the blue line to divide it into segments or you can type *11 and press enter.*

11 segments
Length: ~ 28.8mm

21. Using the *pencil tool,* move your pencil along the blue line until it snaps to an *endpoint*.
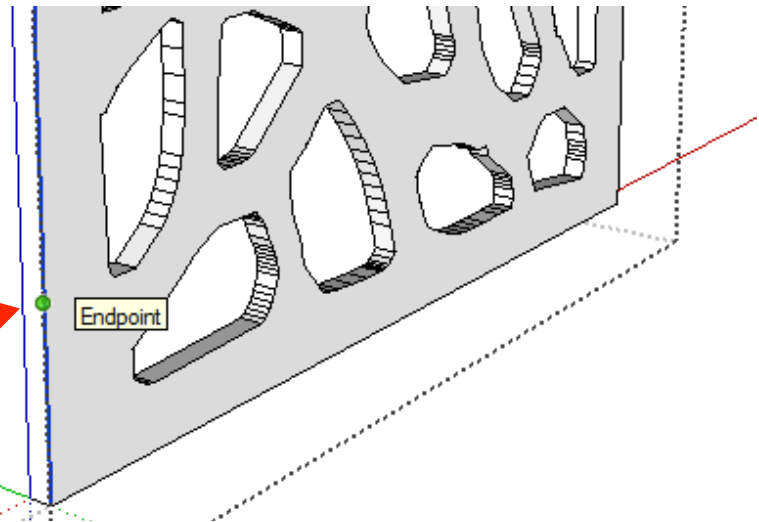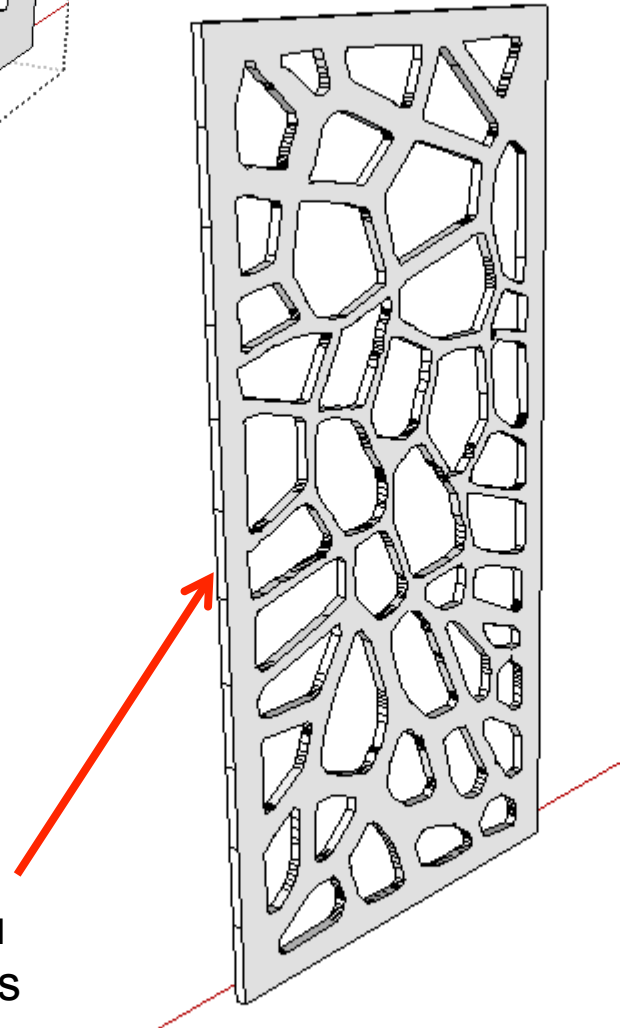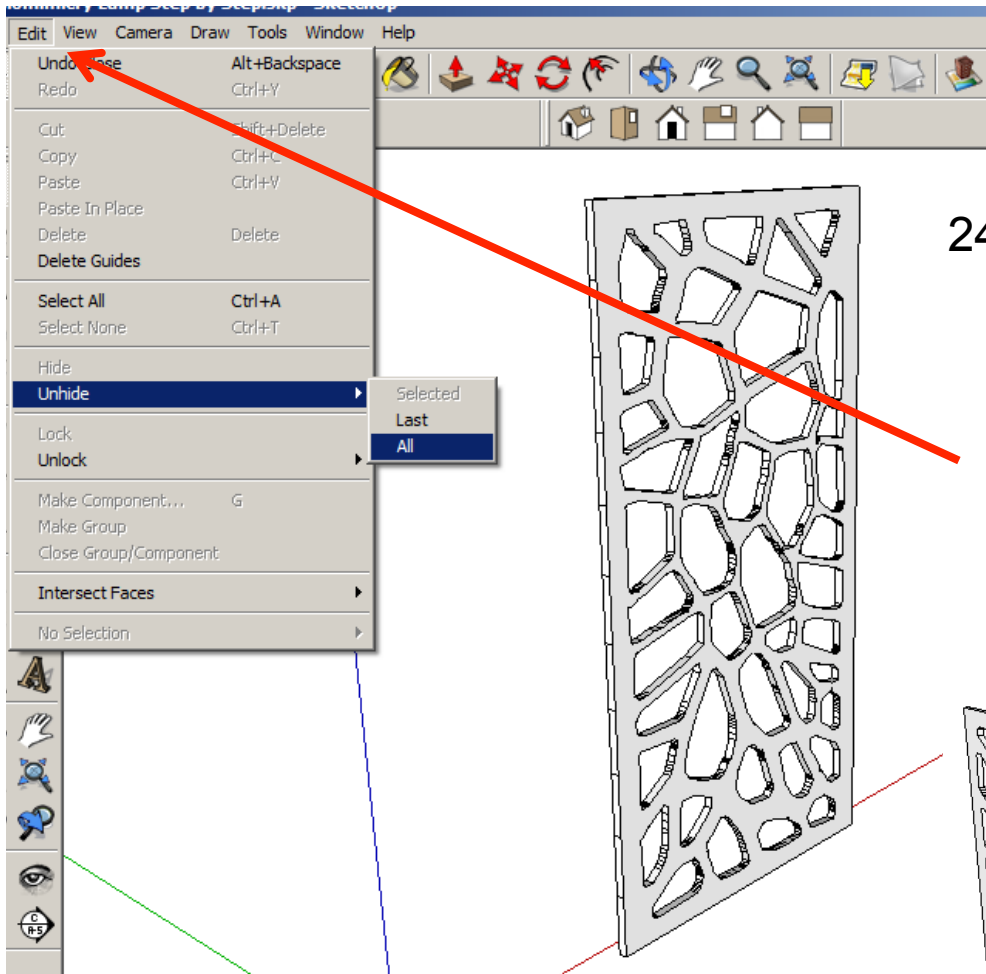
Endpoint

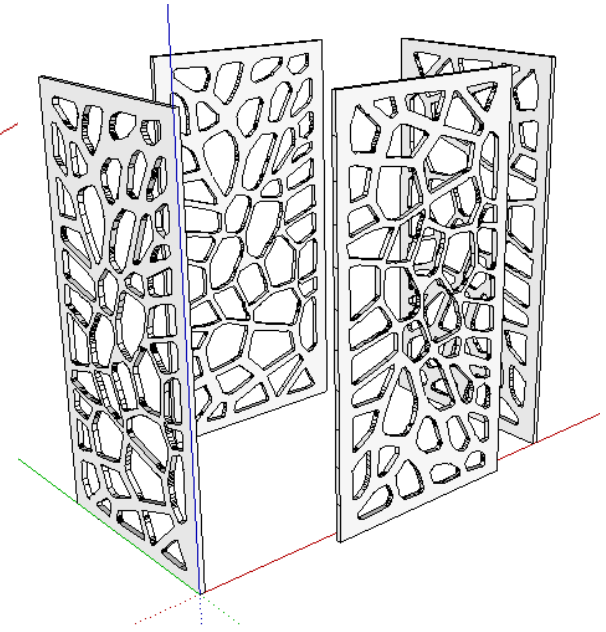22. Using the *pencil tool,* draw a line across the green axis to the other *edge.*

23. *Repeat* the lines all the way up on each endpoint. You should have 11 rectangles on the side.
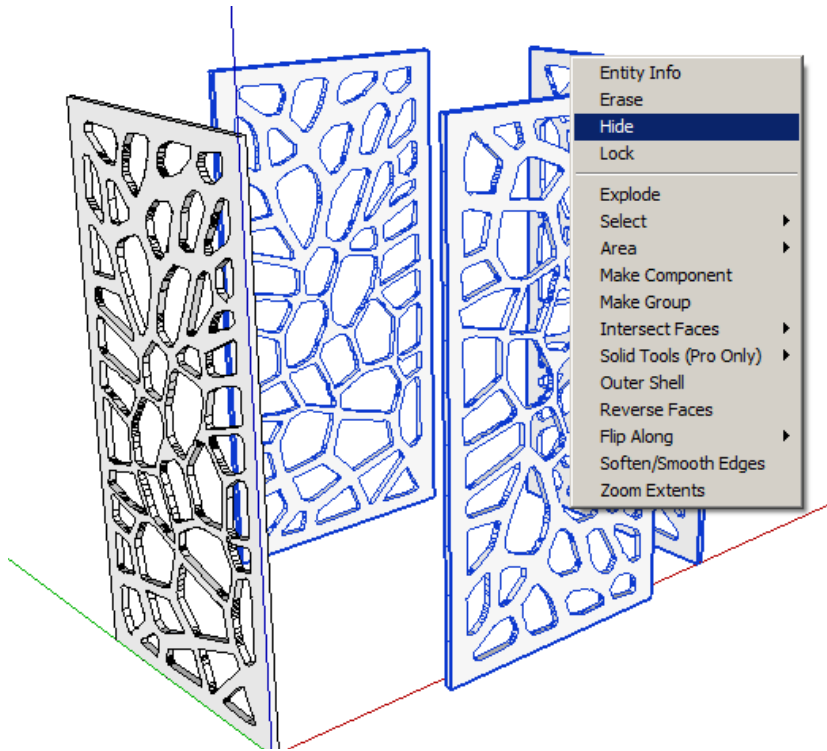
Edit View Camera Draw Tools Window Help

Undo Close	Alt+Backspace
Redo	Ctrl+Y
Cut	Shift+Delete
Copy	Ctrl+C
Paste	Ctrl+V
Paste In Place	
Delete	Delete
Delete Guides	
Select All	Ctrl+A
Select None	Ctrl+T
Hide	
Unhide	▶
Lock	
Unlock	▶
Make Component...	G
Make Group	
Close Group/Component	
Intersect Faces	▶
No Selection	▶

Unhide ▶
- Selected
- Last
- All

24. Select the *edit tool bar* on the top of the page, slide down unit you come to *unhide* and then select *unhide all.*

25. All the pieces you previously hid will come reappear on the screen.

Right-click context menu:
- Entity Info
- Erase
- **Hide**
- Lock
- Explode
- Select ▶
- Area ▶
- Make Component
- Make Group
- Intersect Faces ▶
- Solid Tools (Pro Only) ▶
- Outer Shell
- Reverse Faces
- Flip Along ▶
- Soften/Smooth Edges
- Zoom Extents

26. Using the *select tool,*

click on the side piece with the lines drawn on.

Hold the shift key down

(arrow pointing up found u
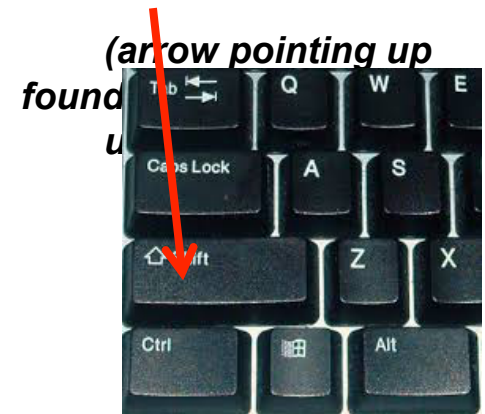
Click on the other two pieces so three are highlighted

27. Right click with the mouse and select *hide.*
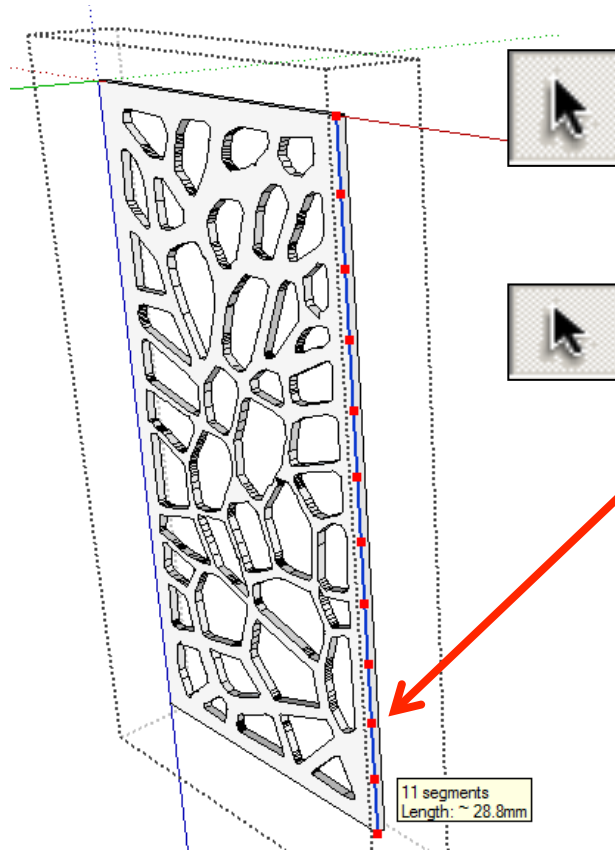
28. Using the *select tool, double click* on the piece shown to edit it. All the other pieces should be greyed out. Then click on the edge shown to highlight it in blue.

29. Whilst on the selected *blue* line, *right click* with the mouse and select *divide.* Using the *mouse,* you can move it up and down the blue line to divide it into segments or you can type *11 and press enter.*

11 segments
Length: ~ 28.8mm

30. Using the *pencil tool,* move your pencil along the blue line until it snaps to an *endpoint*. Draw your lines and repeat on the other side
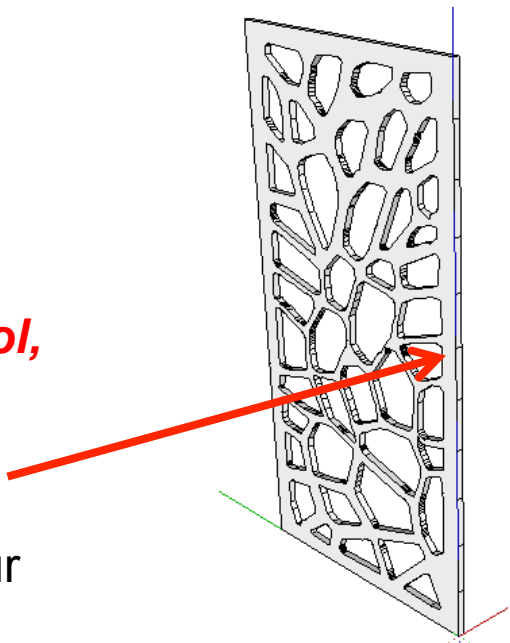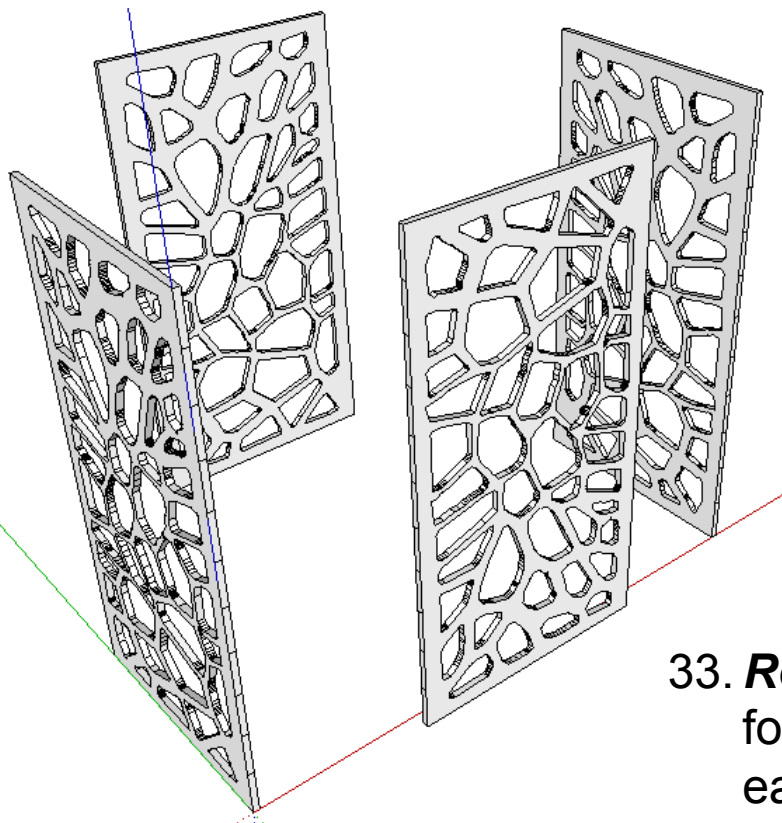
31. Select the ***edit tool bar*** on the top of the page, slide down unit you come to ***unhide*** and then select ***unhide all.***

32. All the pieces you previously hid will come reappear on the screen.

33. ***Repeat the previous steps*** so that all four pieces have the divide lines on each side. If you get stuck just follow the steps ***8 - 24***
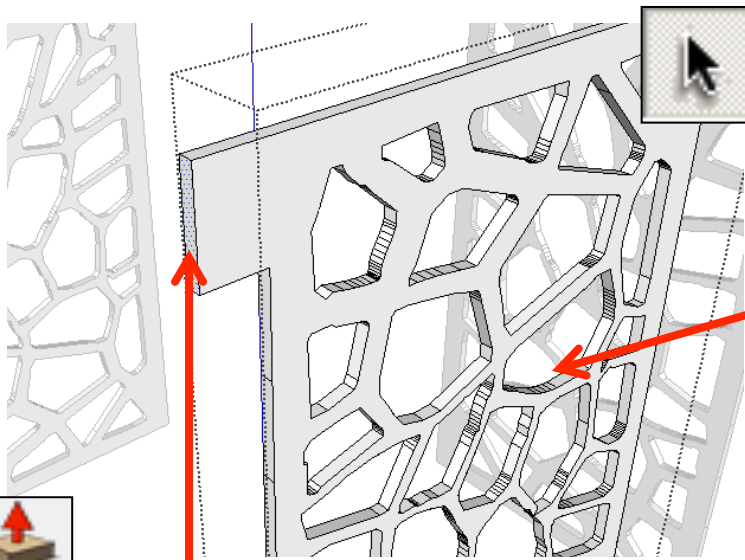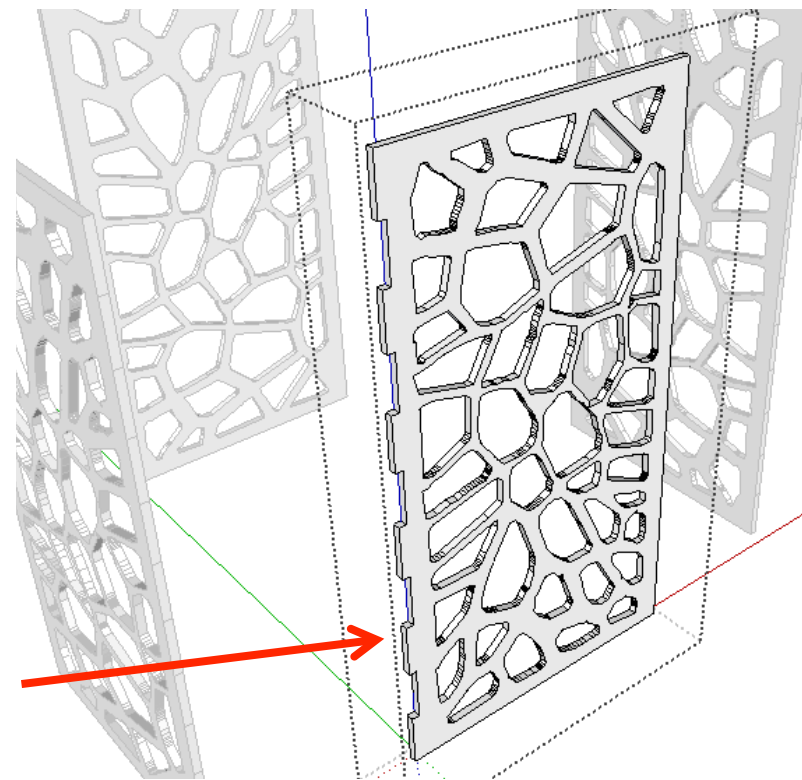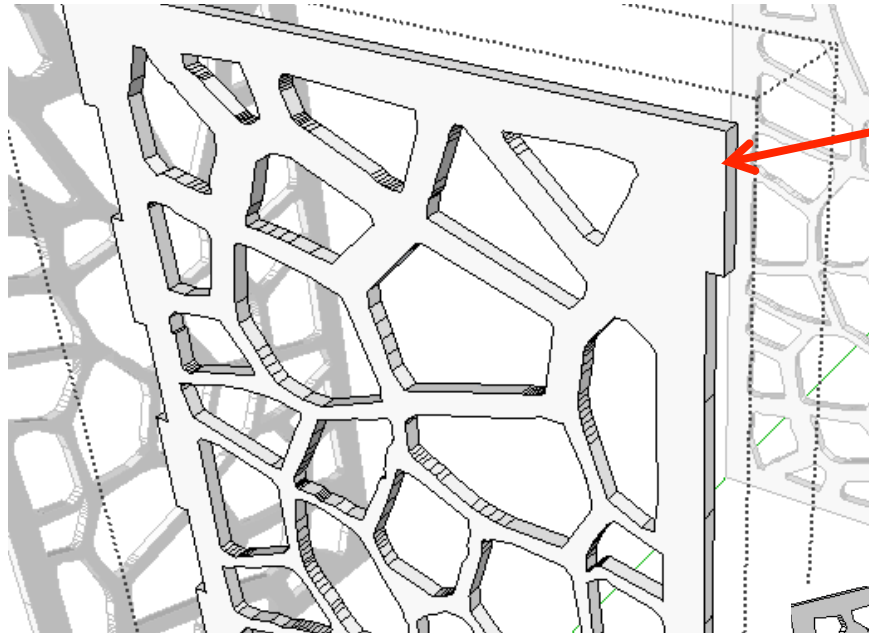
34. Using the *select tool, double click* on the piece shown to edit it. All the other pieces should be greyed out..

35. Using the *push pull tool.* Hover over the top rectangle on the side. It will go *dotted* as you hover over it. Pull the shape outwards. Type in *4 and press enter.*

36. Using the *push pull tool.* Repeat for every other rectangle down the side by pulling each one out by 4 as shown opposite
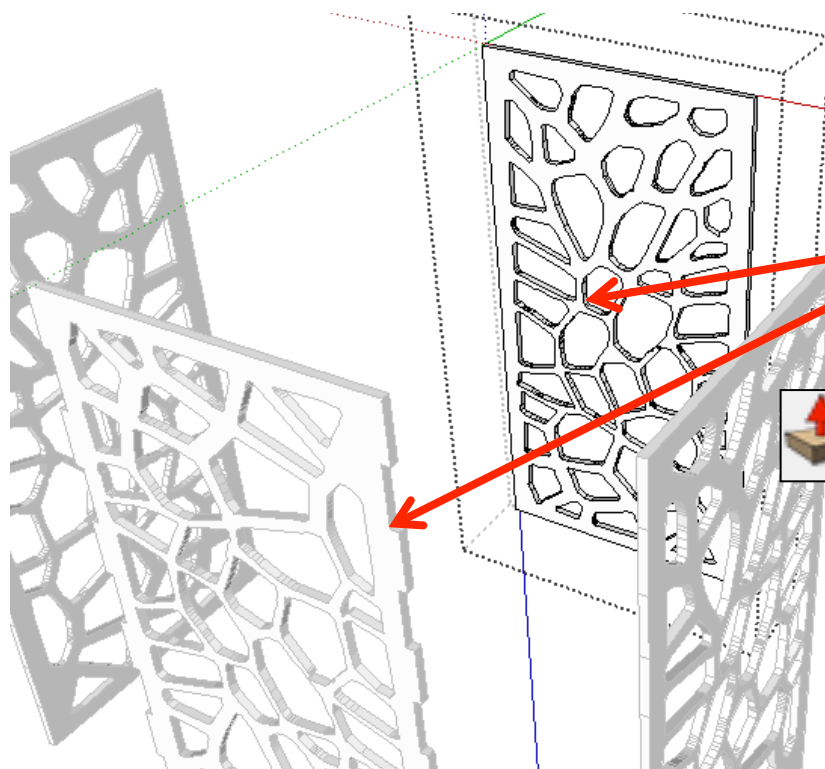
37. ***Repeat the previous steps*** on the opposite by pulling the top rectangle out, typing ***4 and pressing enter.***

38. Using the ***push pull tool.*** Repeat for every other rectangle down the side by pulling each one out by 4 as shown opposite
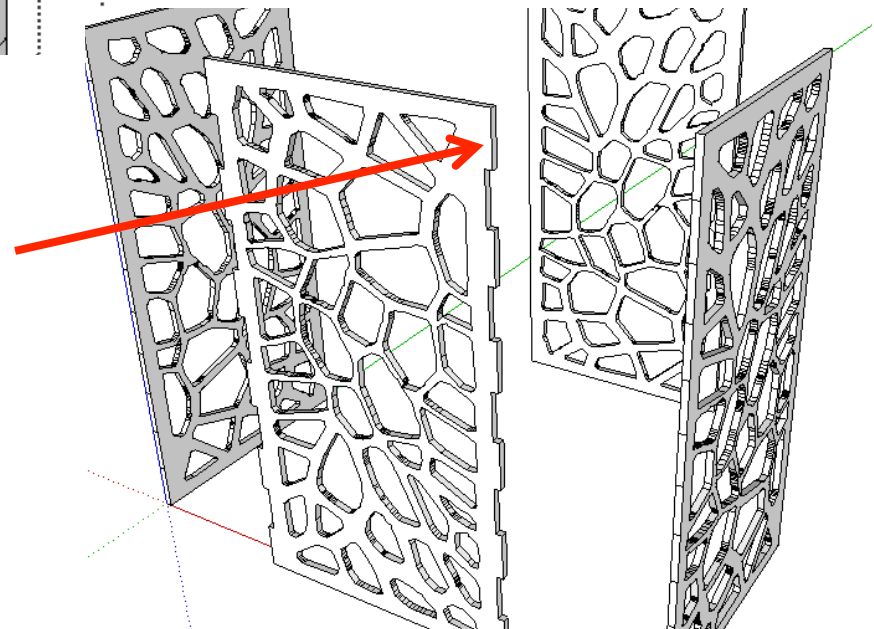
39. Using the *select tool, double click* on a piece directly opposite the last one to edit it. All the other pieces should be greyed out.
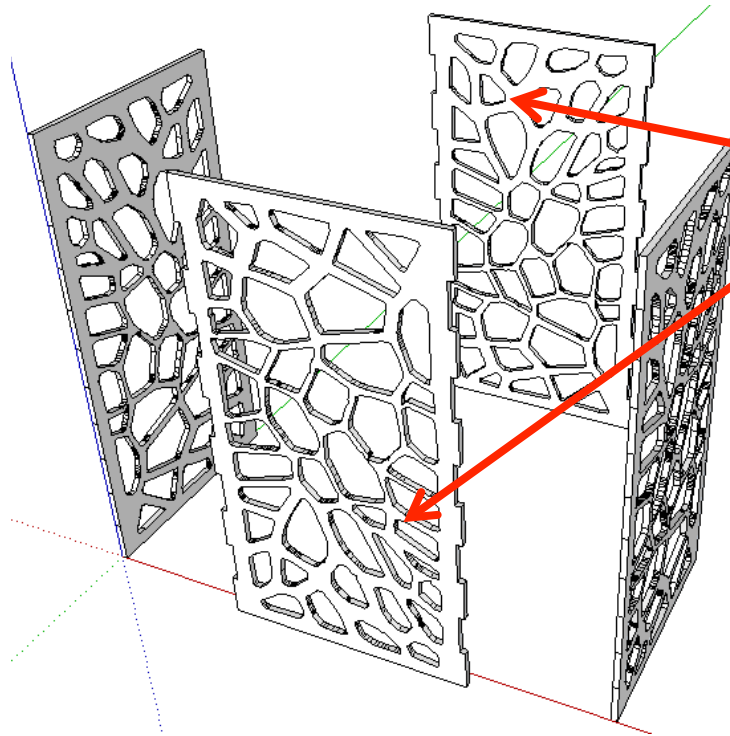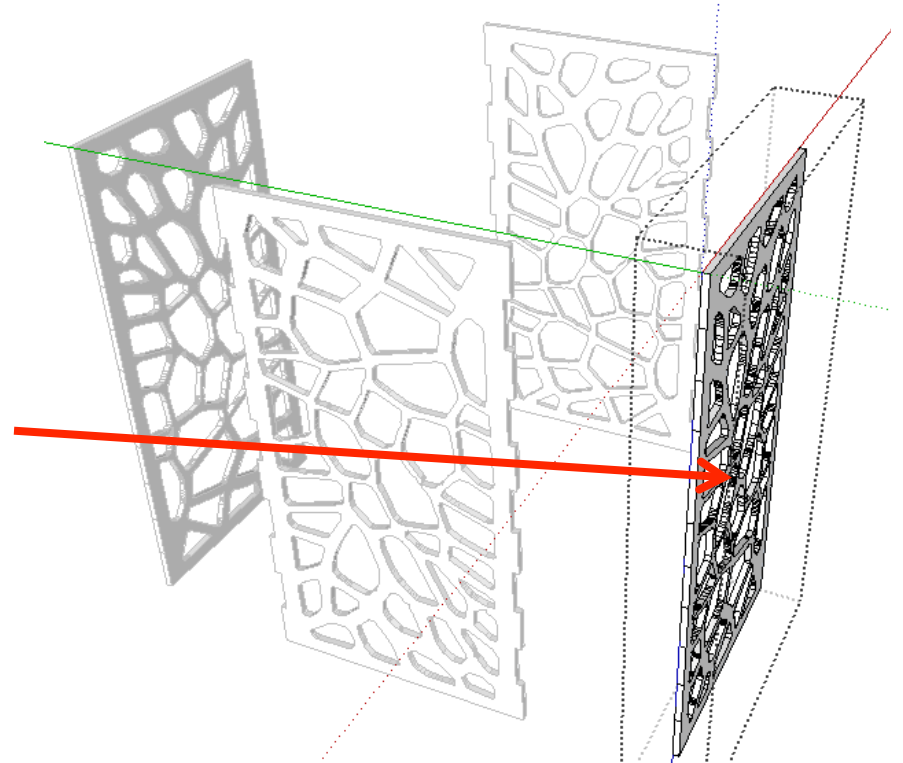
40. Using the *push pull tool.* Hover over the top rectangle on the side. It will go *dotted* as you hover over it. Pull the shape outwards. Type in *4 and press enter*

41. Using the *push pull tool.* Repeat for every other rectangle down the side by pulling each one out by 4 as shown previously and repeat on both sides
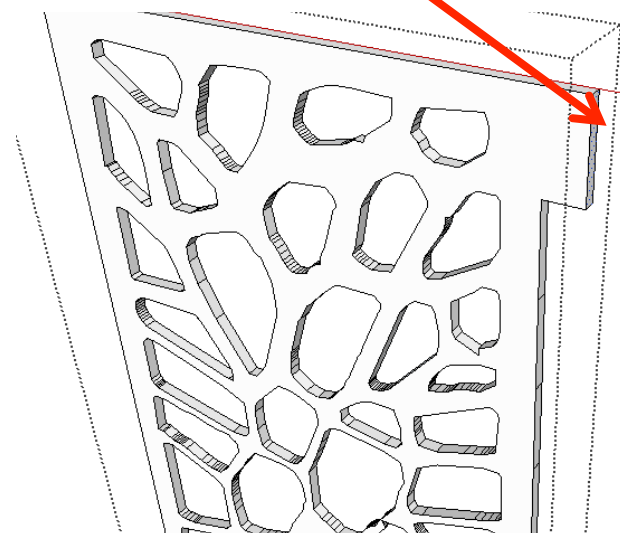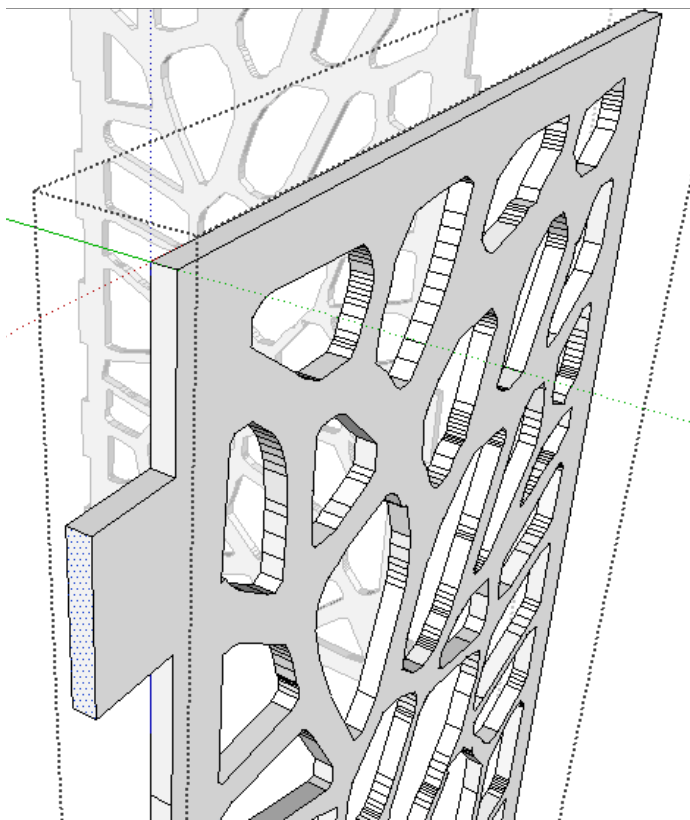
42. You should now have two pieces opposite each other with identical finger joints on both sides as shown

43. Using the *select tool, double click* on the piece shown. All the other pieces should be greyed out.
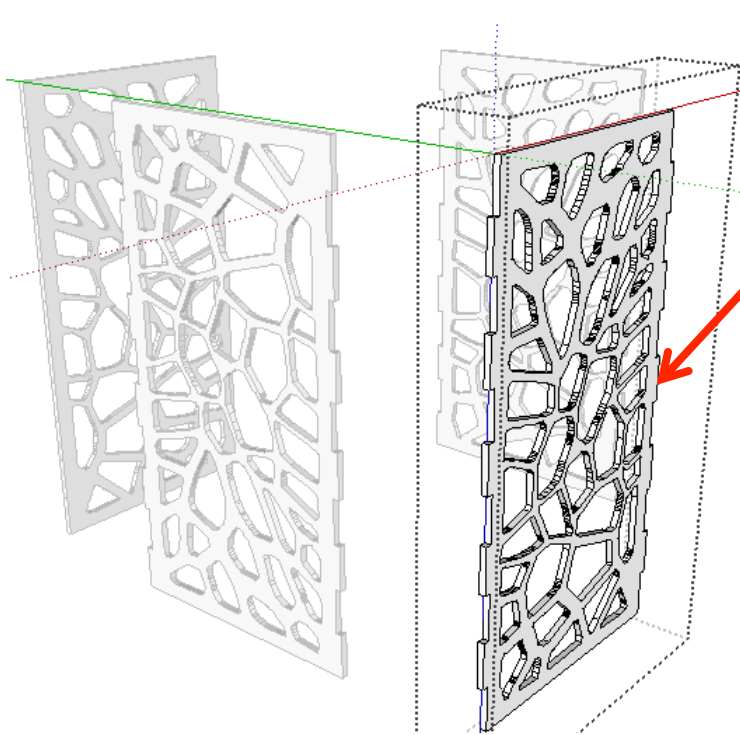
44. Using the *push pull tool.* Hover over the second from top rectangle this time. It will go *dotted* as you hover over it. Pull the shape outwards. Type in *4 and press enter.*
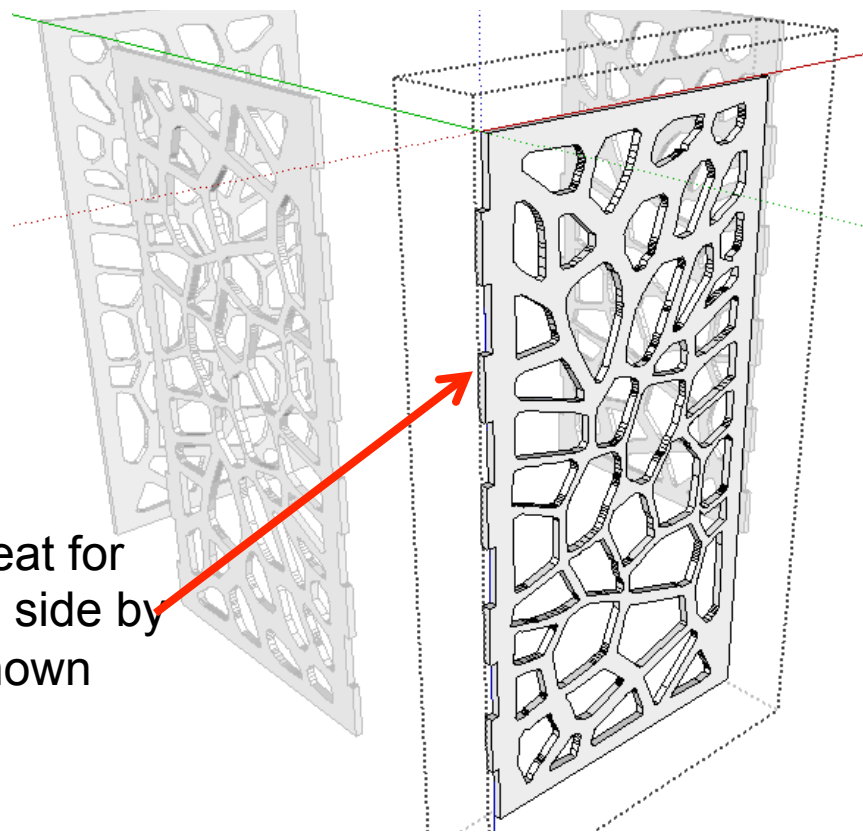
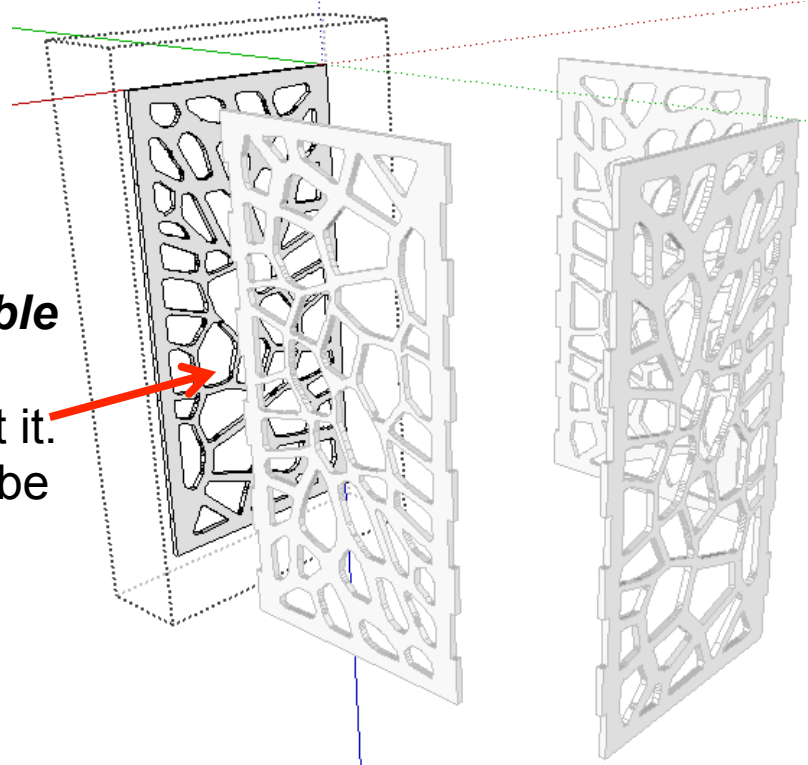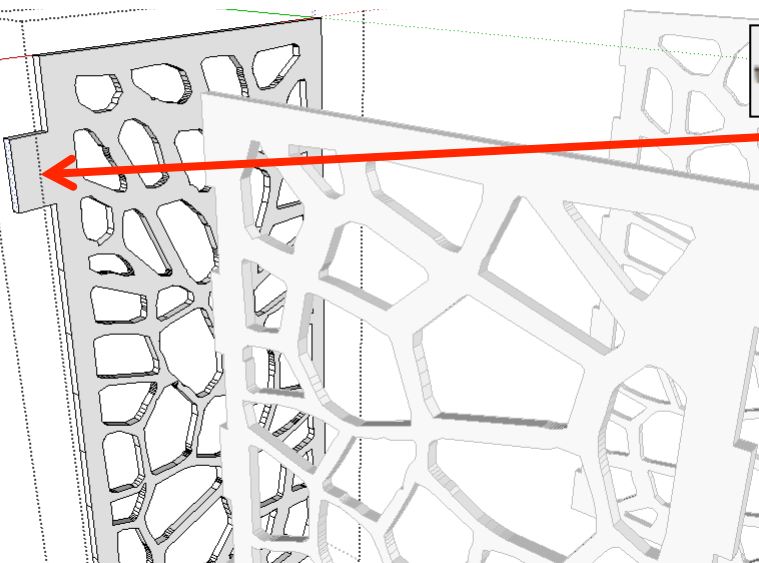45. Using the *push pull tool.* Repeat for every other rectangle down the side by pulling each one out by 4 as shown previously.

46. Using the *push pull tool.* Repeat on the opposite side starting with the second from top rectangle first.

47. Using the *select tool, double click* on a piece directly opposite the last one to edit it. All the other pieces should be greyed out.

48. Using the *push pull tool.*
Hover over the second from top rectangle this time. It will go *dotted* as you hover over it. Pull the shape outwards. Type in *4 and press enter.*

49. Using the *push pull tool.*
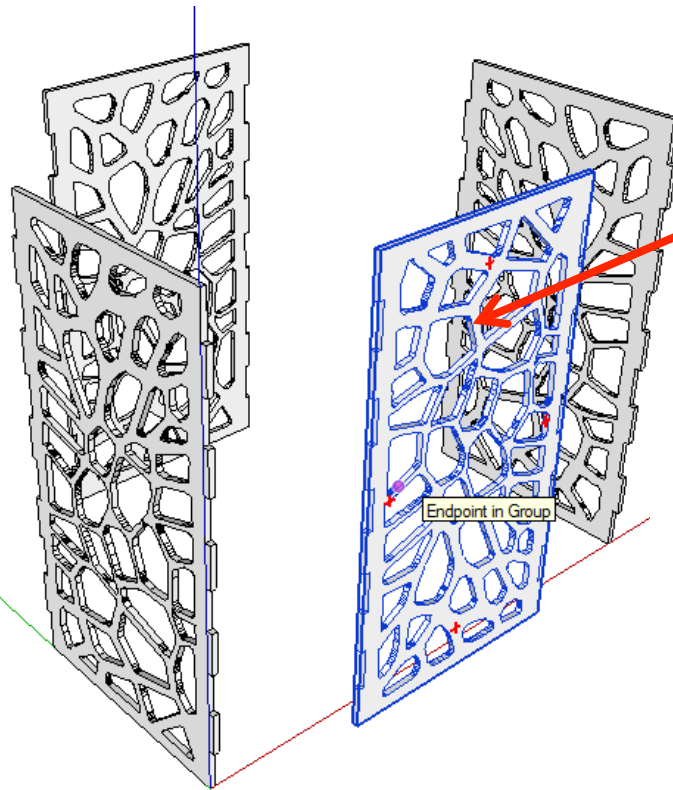Repeat for every other rectangle down the side by pulling each one out by 4 as shown previously.

50. Using the *push pull tool.* Repeat on the opposite side starting with the second from top rectangle first.
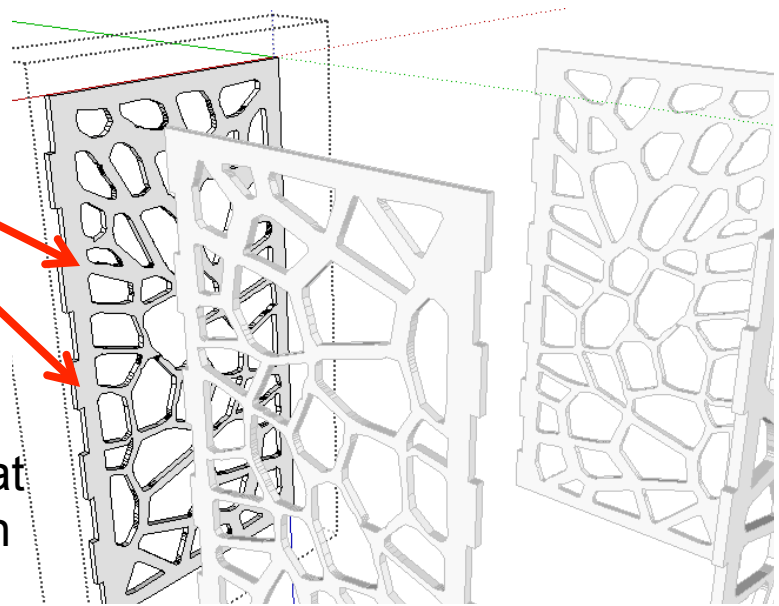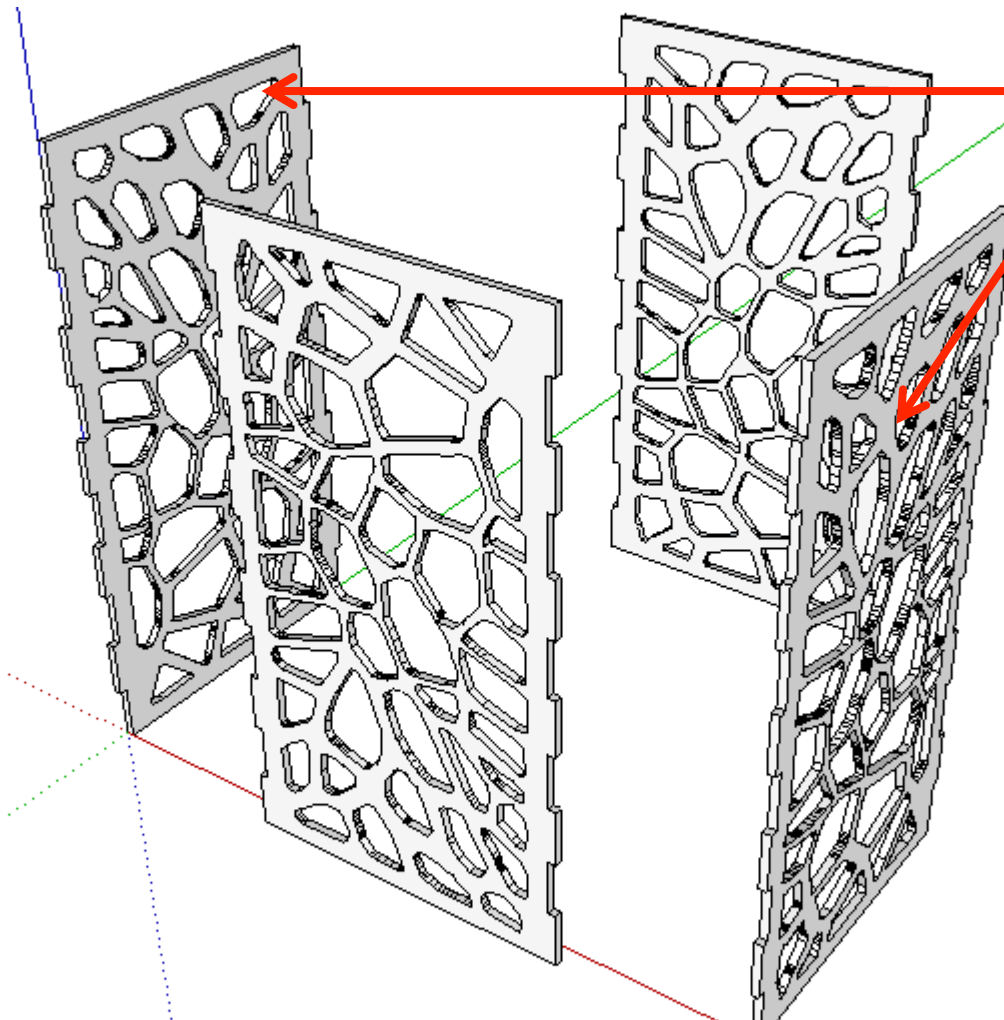
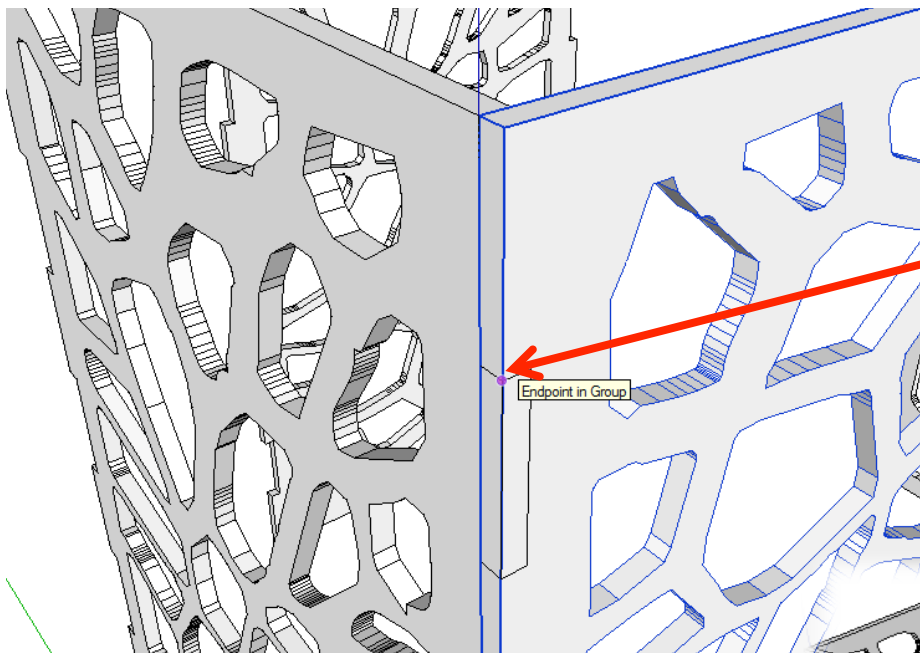51. You should now have two pieces opposite each other with identical finger joints on both sides as shown

52. Using the *select tool, click once* on one of the pieces. It will go *blue* as shown.

Endpoint in Group

Endpoint in Group

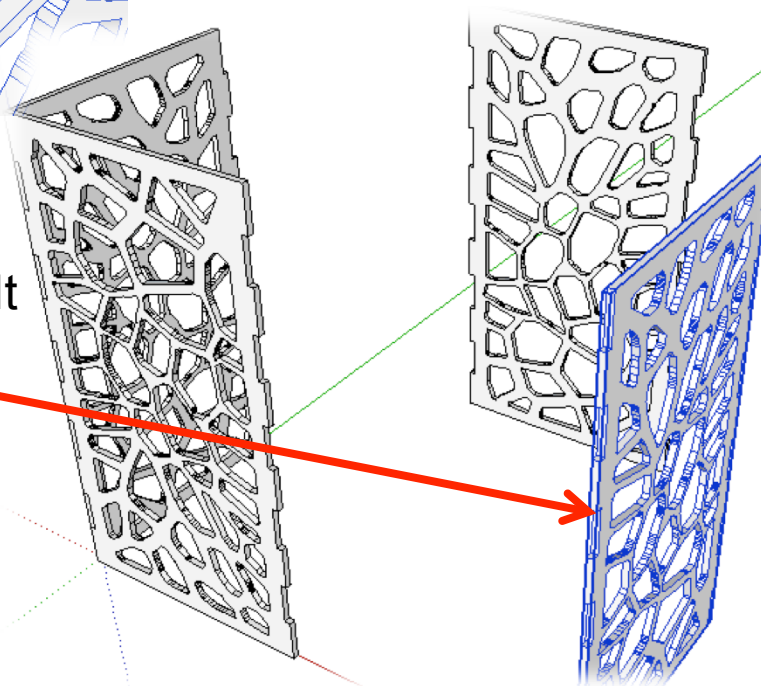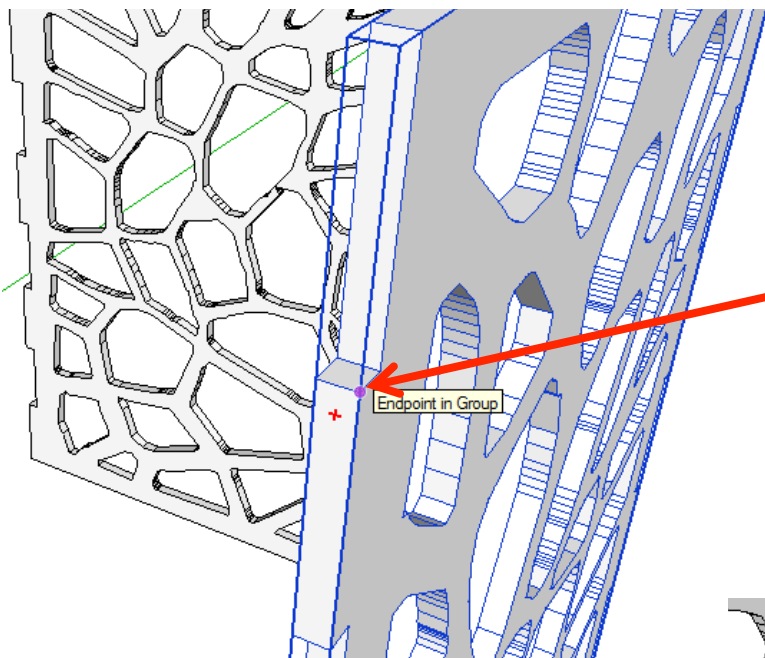53. Using the *move tool*, click on the *end point* shown.
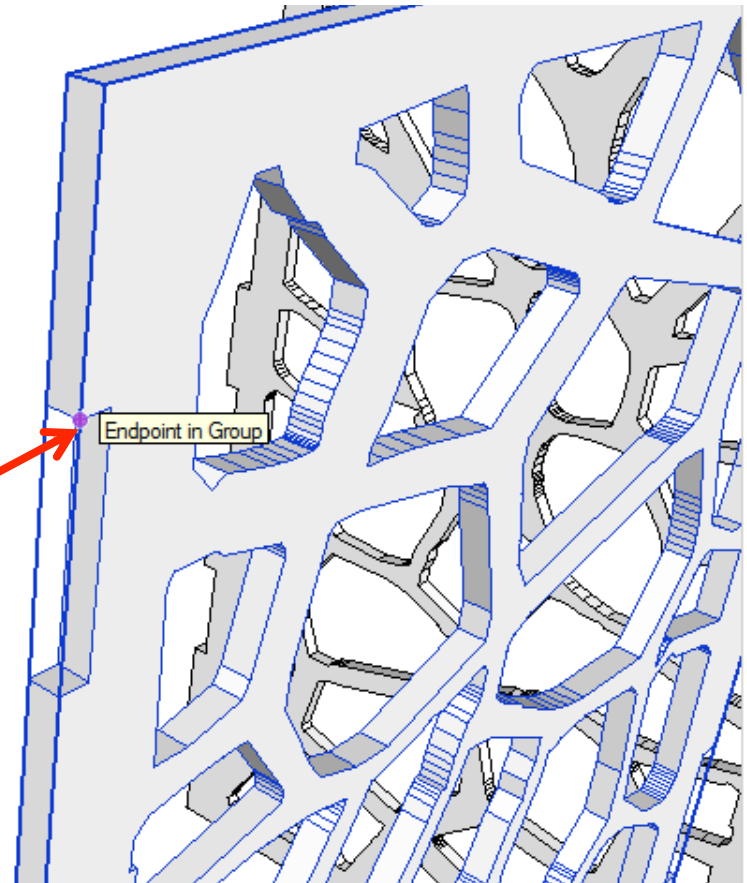
54. Using the **move tool**, move the piece so the finger joints **end points** line up as shown.

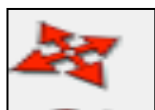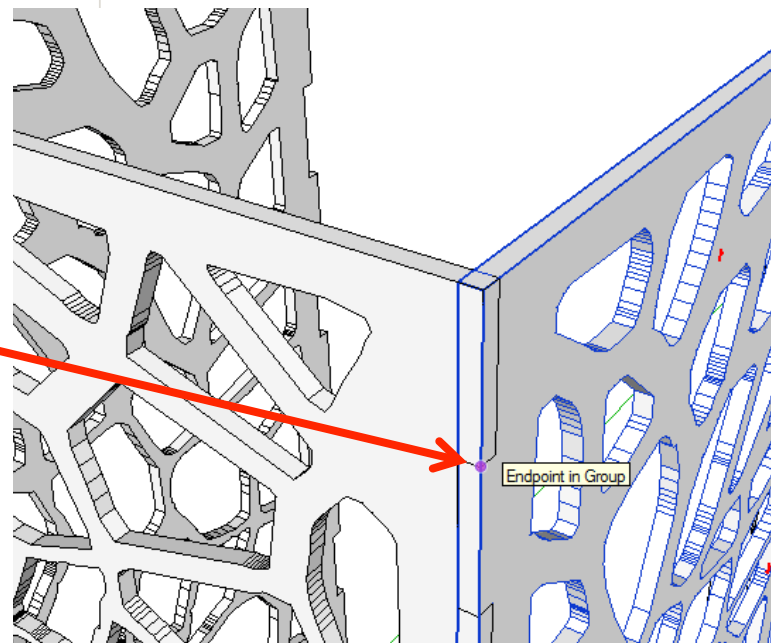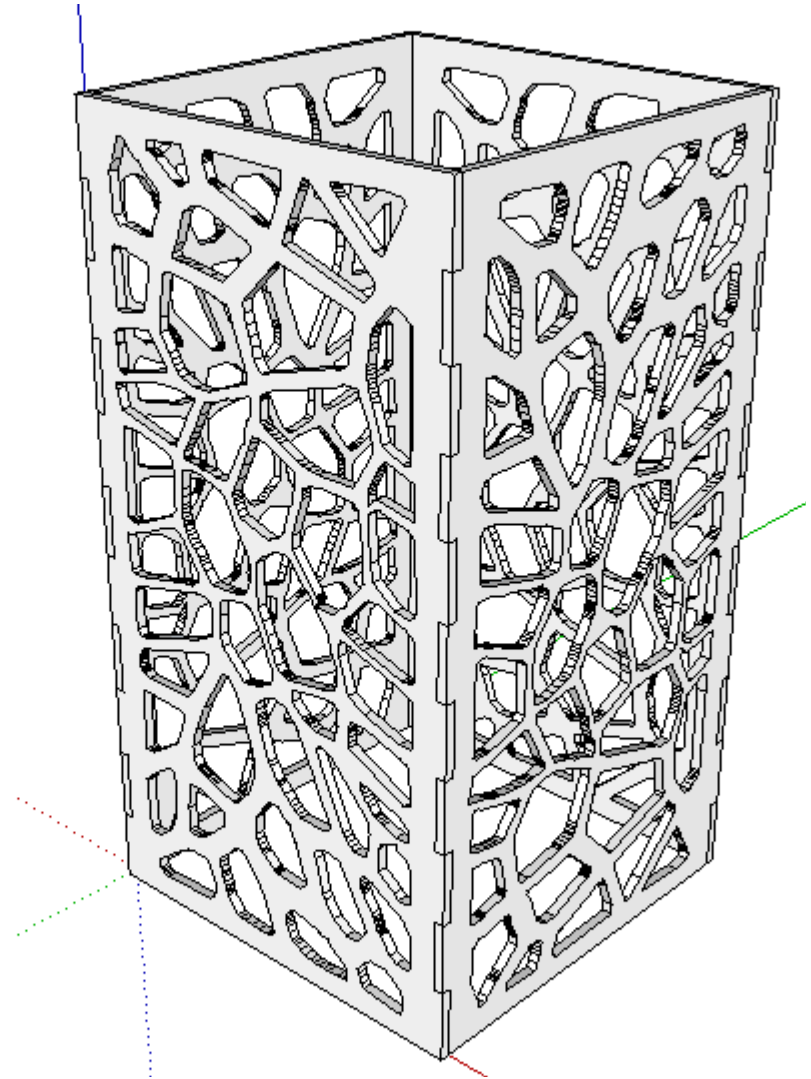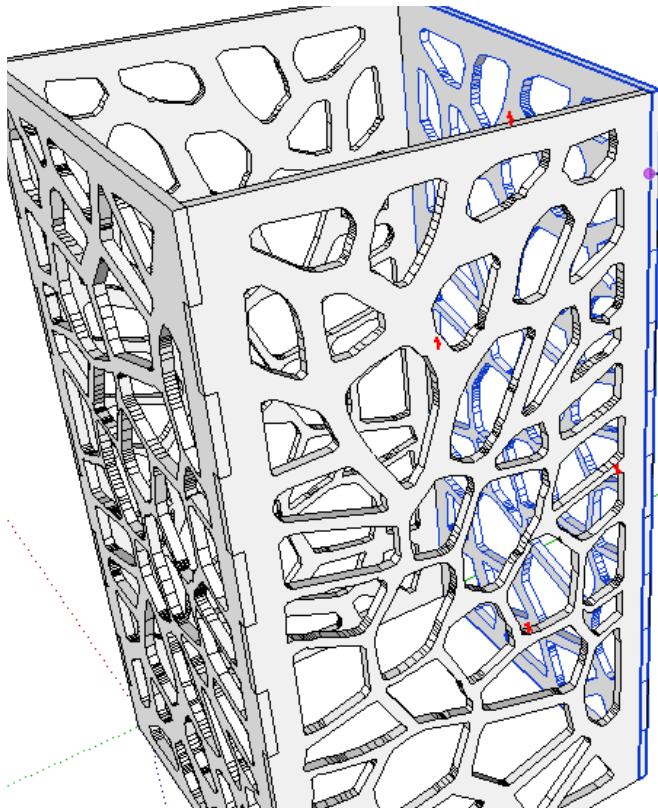Endpoint in Group

55. Using the **select tool, click once** on one of the pieces. It will go **blue** as shown.
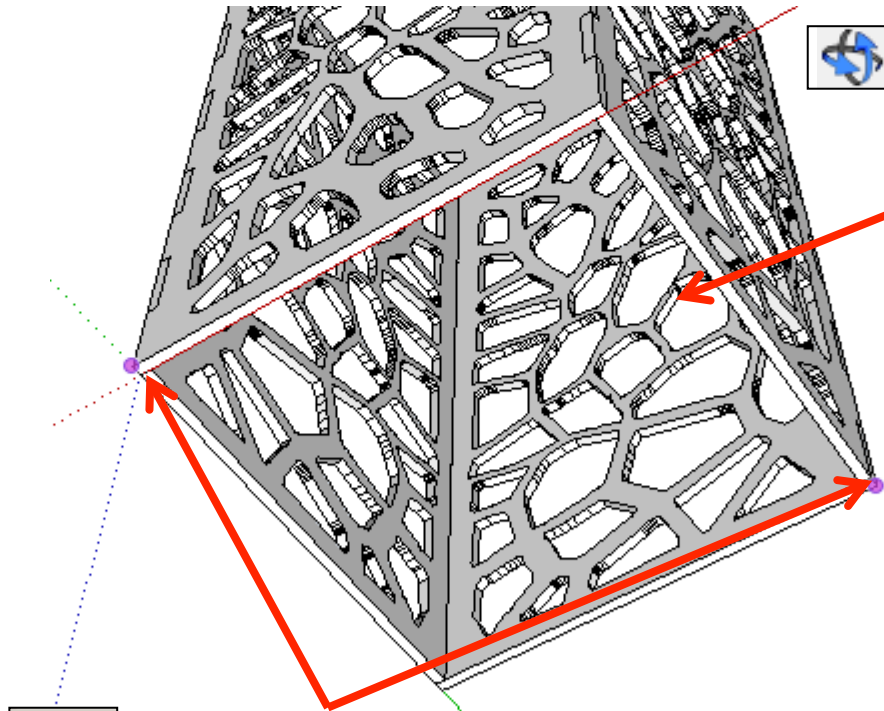
56. Using the *move tool*, click on the *end point* shown.

Endpoint in Group

57. Using the *move tool*, move the piece so the finger joints *end points* line up as shown.

Endpoint in Group

58. Using the *move tool*, move the last piece so the finger joints *end points* line up as shown. Your lamp side pieces should line up as shown.
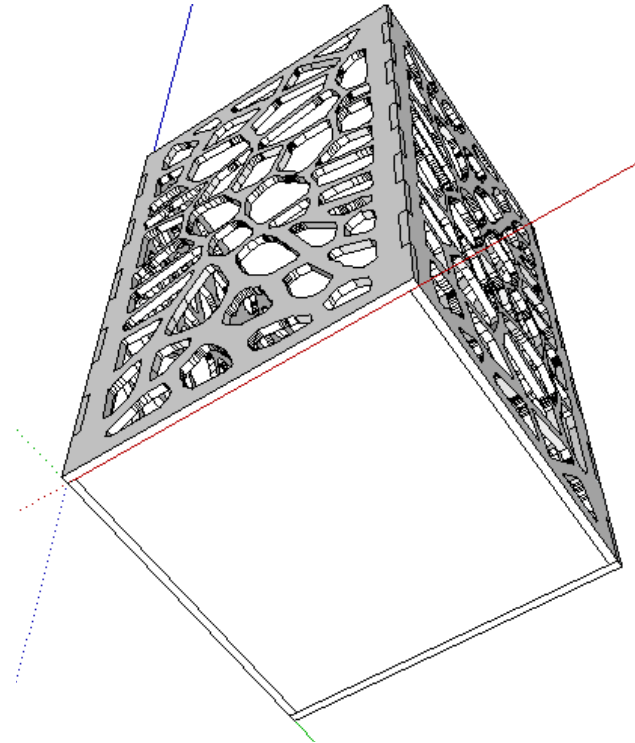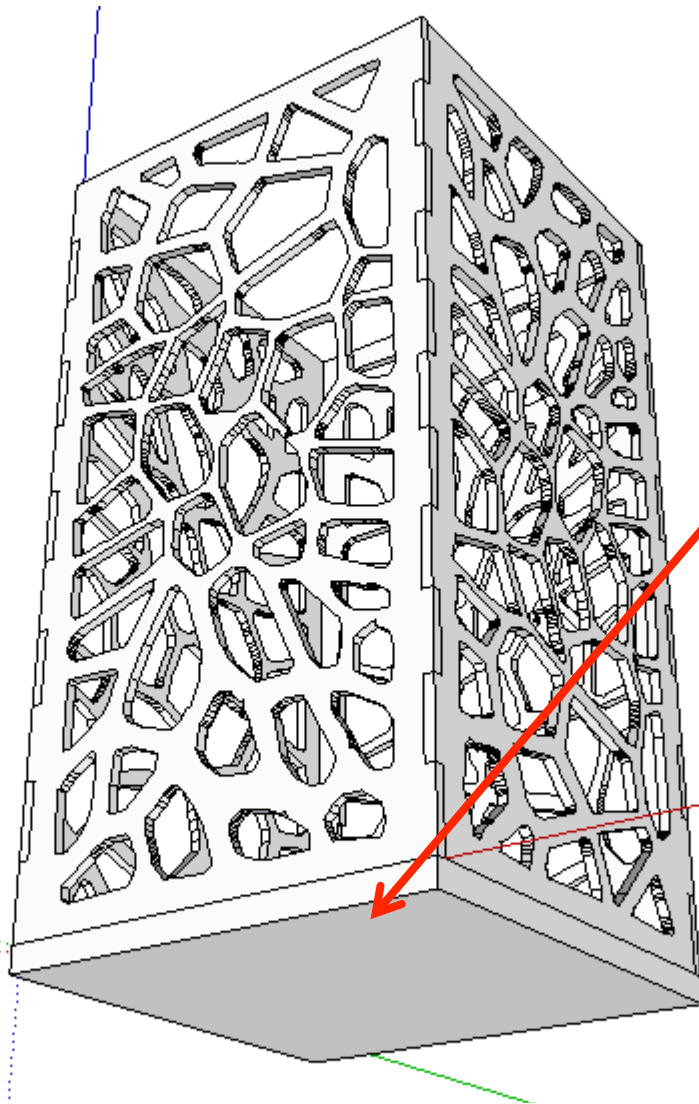
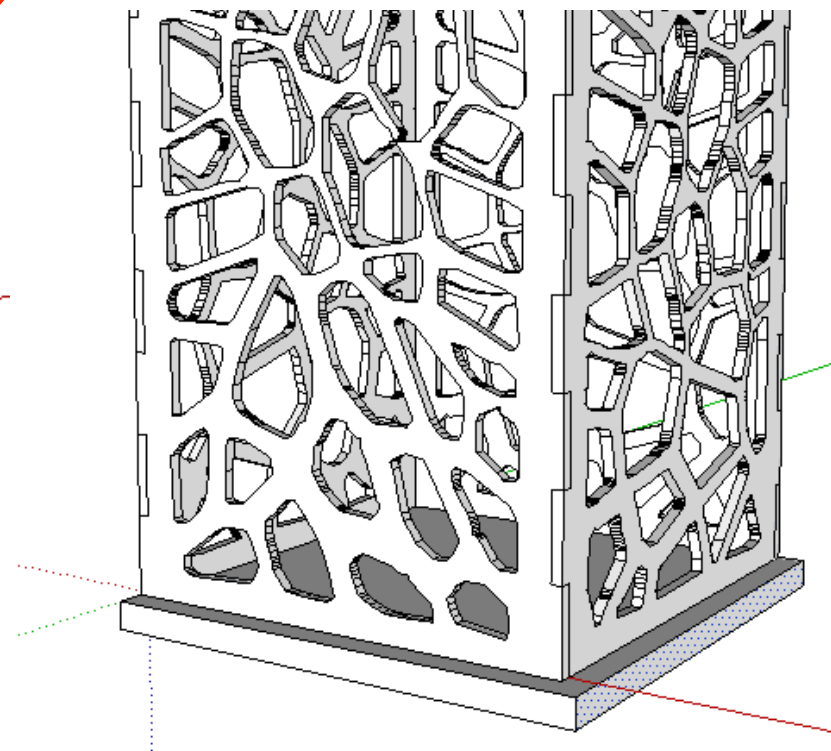59. Select the orbit tool and *rotate the piece **so you can see the underneath of your lamp***.

Endpoint in Group

60. Select the *rectangle tool* and click to *start one one endpoint* shown and *finish on the endpoint* on the *diagonal.*

61. Using the *push pull tool.*
    Pull the rectangle down.
    Type in 10 and press enter.

62. Using the **select tool, click** on the base piece three times and right click on the mouse and **press make group**

Entity Info
Erase
Hide

Explode
Select
Area
Make Component
Make Group
Intersect Faces
Reverse Faces
Flip Along
Soften/Smooth Edges
Zoom Extents

Add Photo Texture

63. Select the **rectangle tool** and click to **start one one endpoint** shown and **finish on the endpoint** on the **diagonal.**
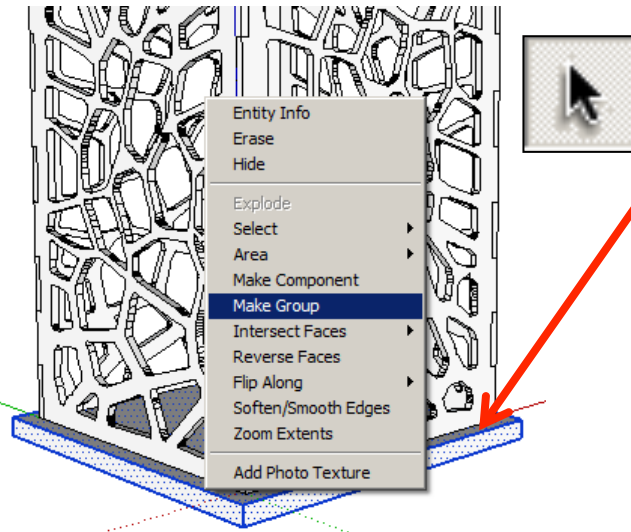
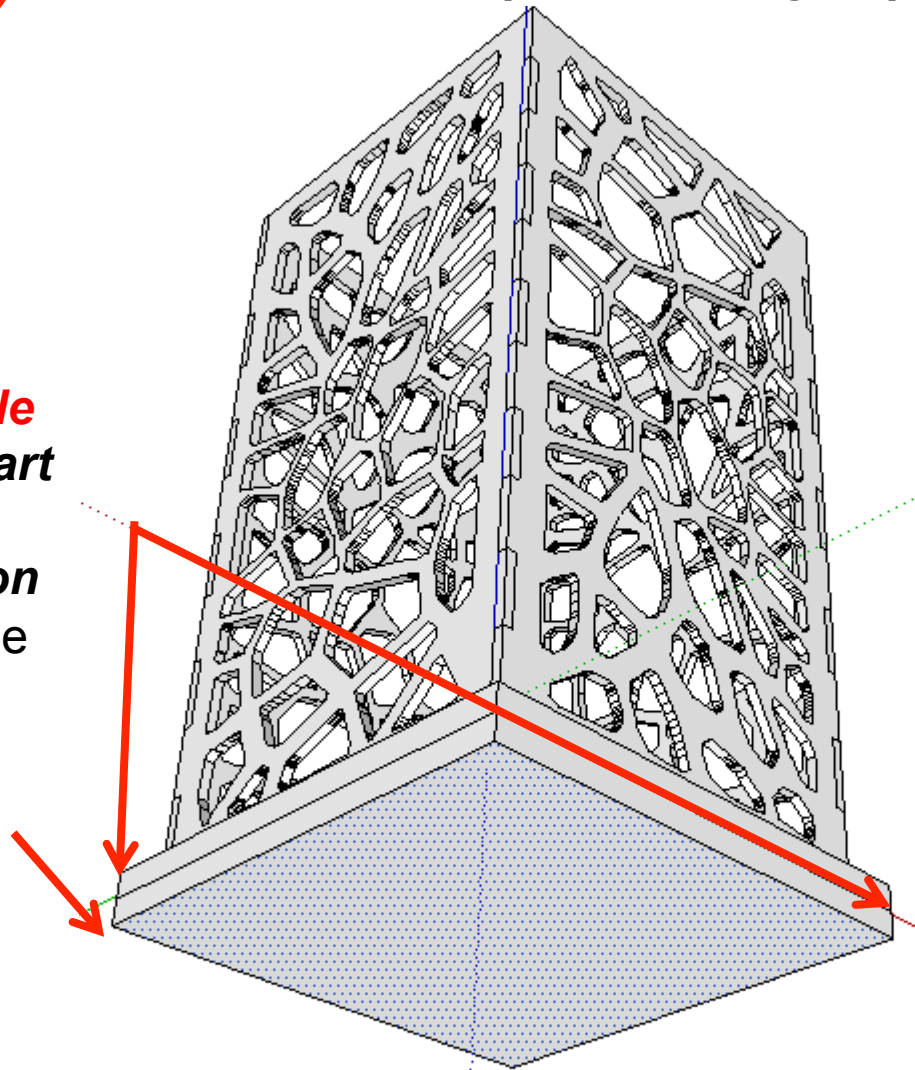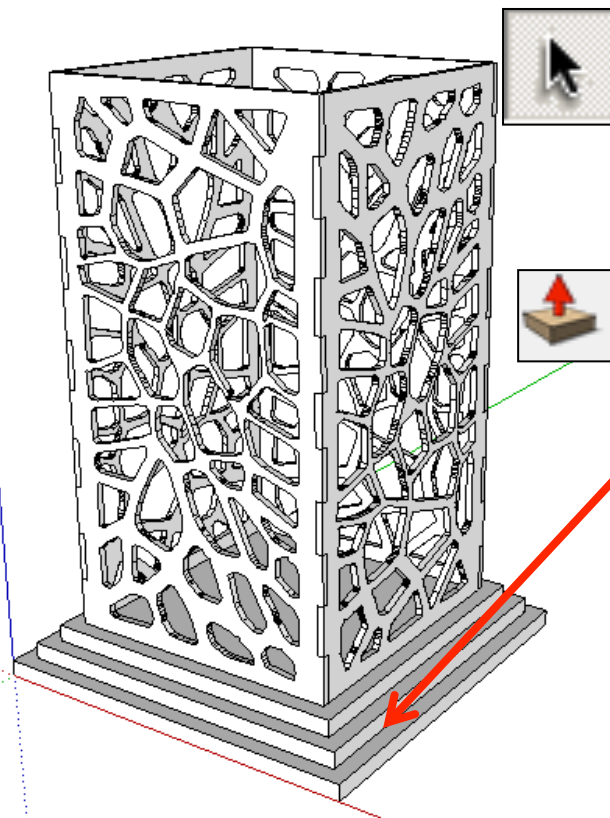64. Using the **push pull tool.** Pull the rectangle down. **Type in 10 and press enter. Make it a group**

65. Using the **select tool, double click** on a piece bottom piece you have drawn to edit it. All the other pieces should be greyed out.

66. Using the **push pull tool.** Pull the sides out. **Type in 10 and press enter. It should give you a stepped effect.** Add a third base and step again.

67. Repeat all the steps to add a roof on. Experiment with your roof and base design. Perhaps use the **follow me tool** to add a fancy edge.
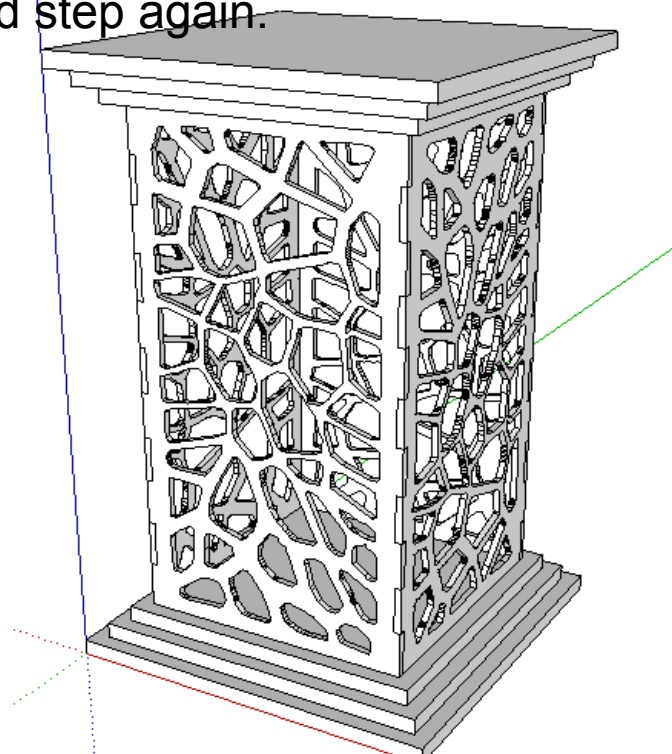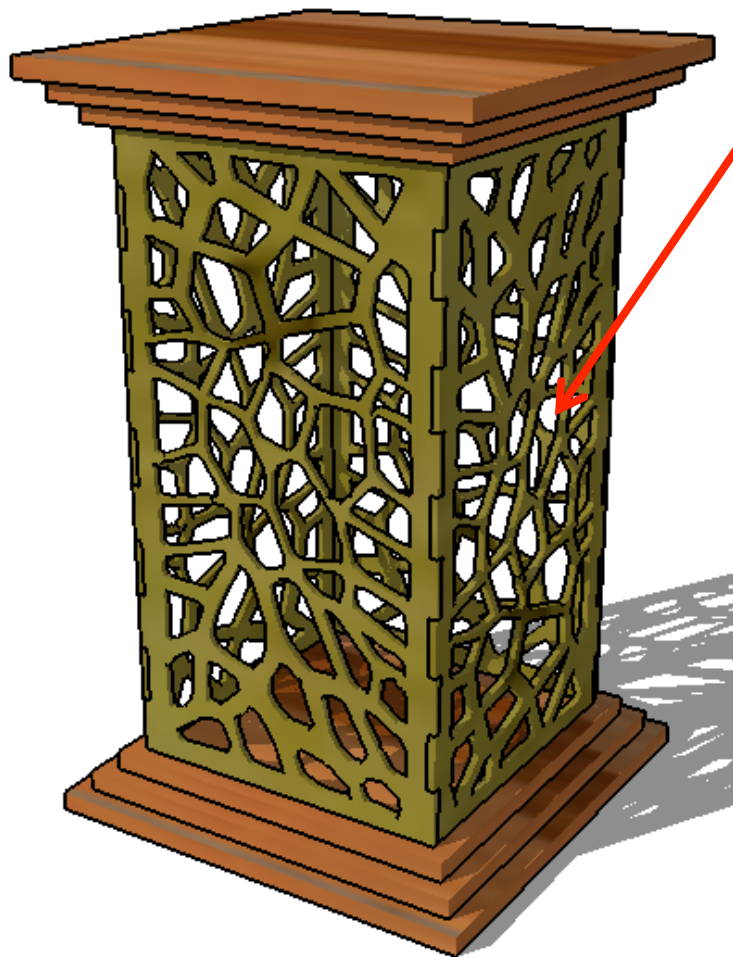
68. Use the *colour bucket* to render your design and add shadows etc.