

CAD SKILLS



CAD Tutorial : Shipping Container 1st Floor

Level of Difficulty



Time

Approximately 10–30 minutes

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.

Learning Styles











Visual : *Presentation*

Auditory: *Video*

Kinaesthetic: *Demonstration*








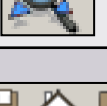
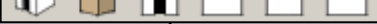
Sketchup Help Guide:

Computer Aided Engineering: 15. Drawing and Modification Commands

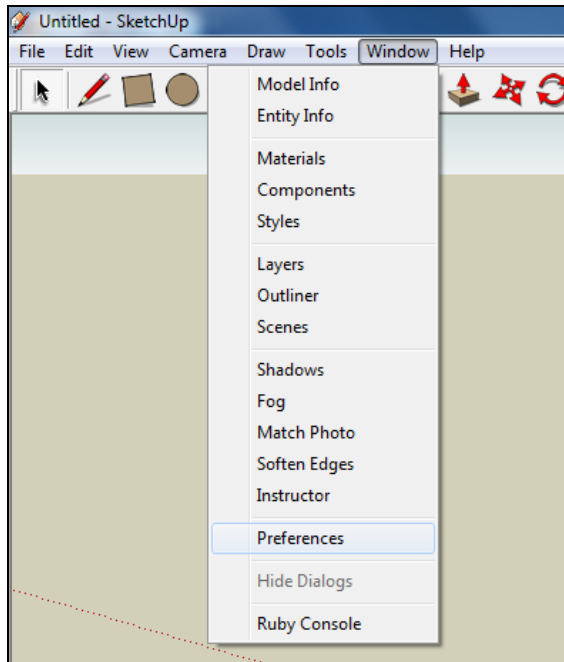
Drawing and Modification Tools	image	Description	Advantages
Modifying Tool 1. Pencil tool		used to draw lines in X, Y and Z direction. Can draw simple or complex shapes very quickly.	Advantages: <i>Allows user to draw or modify shapes very quickly and can be used to construct 3D objects faster than traditional hand drawings</i>
Modifying Tool 2. Trim tool		allows the user to remove overlapping elements.	Advantages: <i>Allows user to erase overlapping lines and edges to draw complex 3D shapes very quickly.</i>
Modifying Tool 3. 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: <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. Move Tool		used to move entire shapes or pull lines on a drawing.	Advantages: <i>Allows user to draw or modify shapes very quickly and can be used to construct unusual 3D shapes quickly</i>
Modifying Tool 5. Dimensions tool		used to show sizes and radius of drawn objects	Advantages: <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 Extrusion Tool (follow me)		allows the user to highlight a path that turns blue. A chosen shape will then follow the chosen path	Advantages: <i>Allows user to draw profiles of shapes and follow the path to draw complex 3D shapes very quickly.</i>
Modifying Tool 7. Arch tool		You can use the arch tool to draw a radius from two given points. Can be used to draw corners etc..	Advantages: <i>Allows user to rotate and position shapes quickly to draw complex 3D shapes very quickly.</i>
Modifying Tool 8. Circle tool		allows the user to draw different sized radius circles and chamfered corners	Advantages: <i>Allows user to draw profiles of shapes and follow the path to draw complex 3D shapes very quickly.</i>
Modifying Tool 9. Orbit tool		You can use the Orbit 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	Advantages: <i>Allows user to rotate and see all angles of their design quickly</i>
Modifying Tool 10. Tape measure tool		allows the user to draw guide lines to given sizes and mark out radius etc.	Advantages: <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

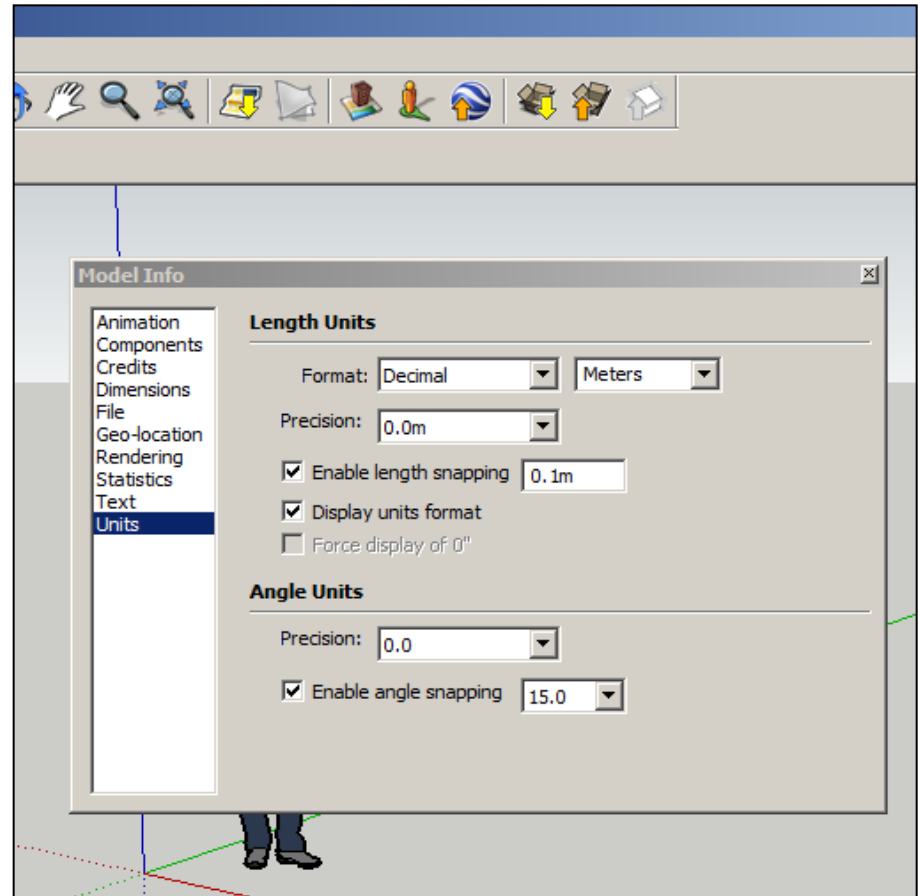
Drawing and Modification Tools	image	Description	Advantages
Modifying Tool 11. Square tool		used to draw squares and rectangles.	Advantages: <i>Allows user to draw guides of shapes and draw complex 3D shapes very quickly.</i>
Modifying Tool 12. Offset tool		You can use the contour tool to draw parallel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

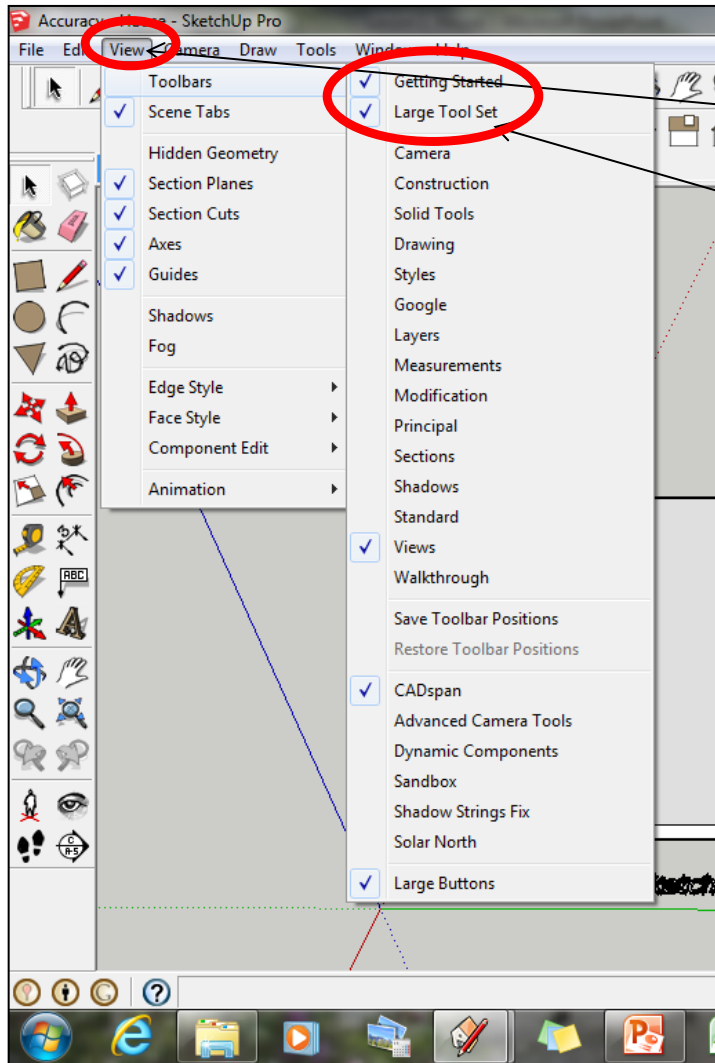


2. Select **Units** and choose **Decimal Metres**. We are using this template because we are doing a product design.

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

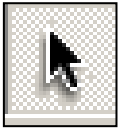


3a Select **View**

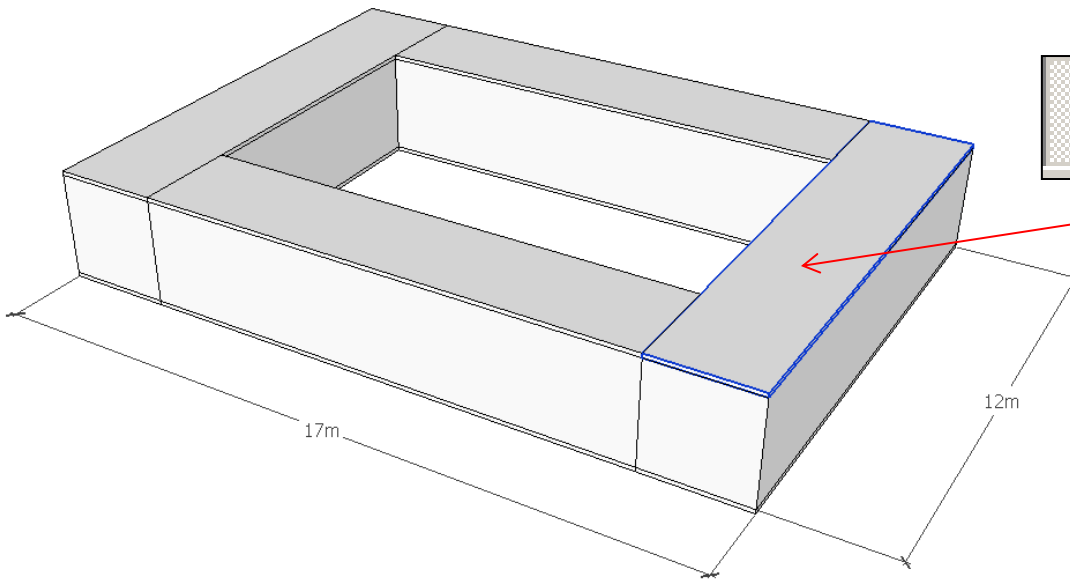
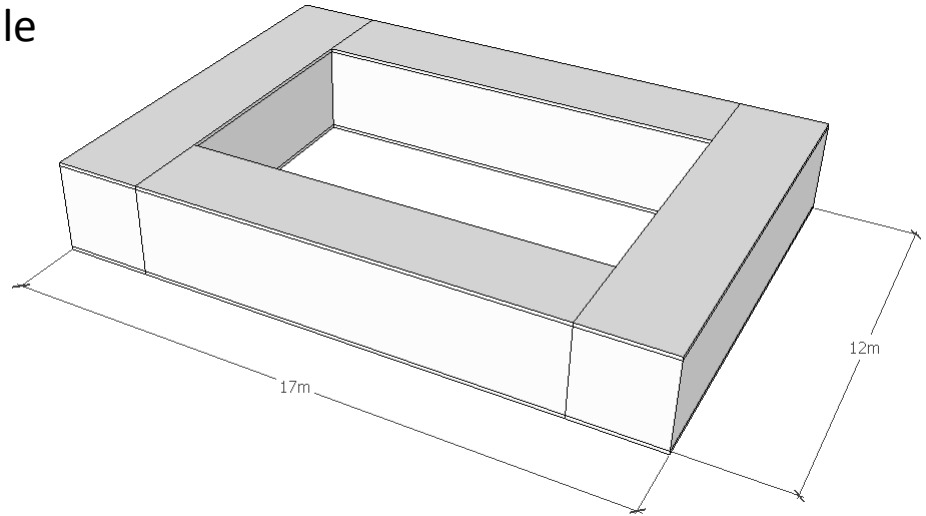
3b Tick Getting Started

3c Tick Large Tool Set

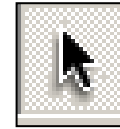
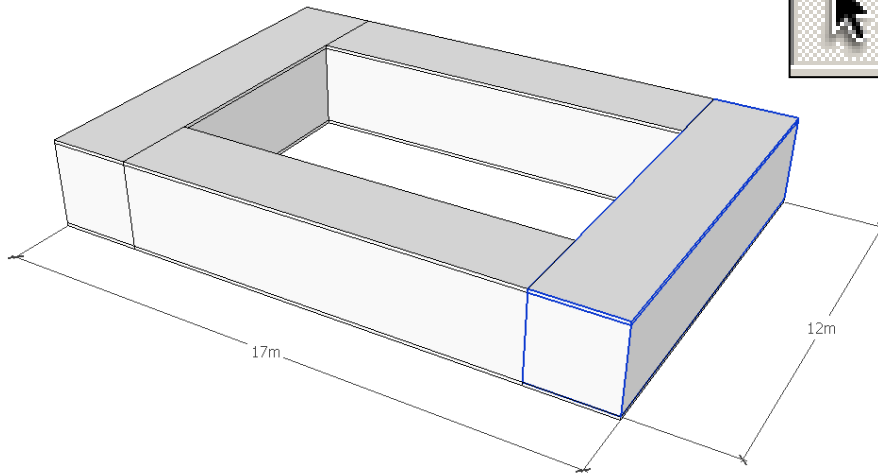
Note: this will place a tool bar across the top (**getting started**) and the side (**Large Tool Set**)



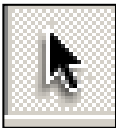
1. Open your sketch-up file from last lesson.



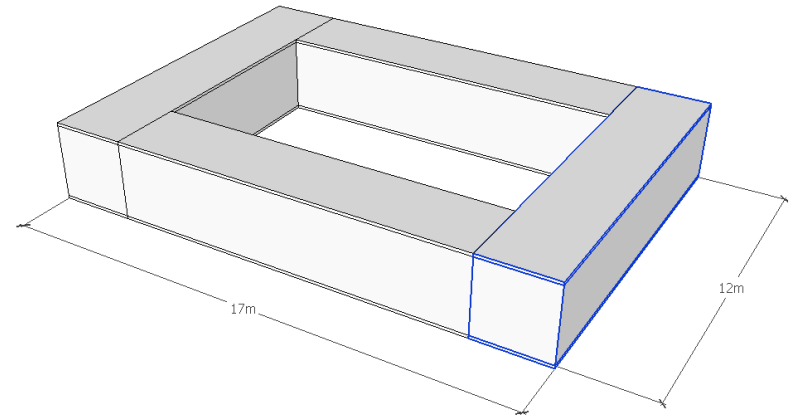
2. Use the **select tool**. Click on the roof.

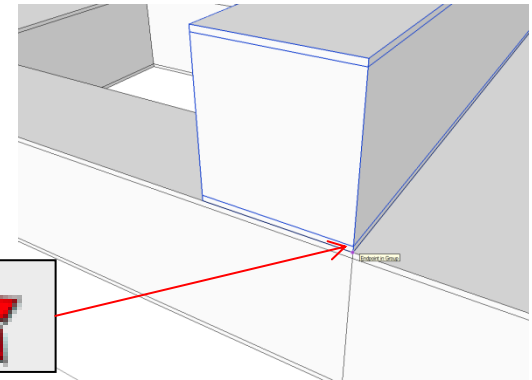
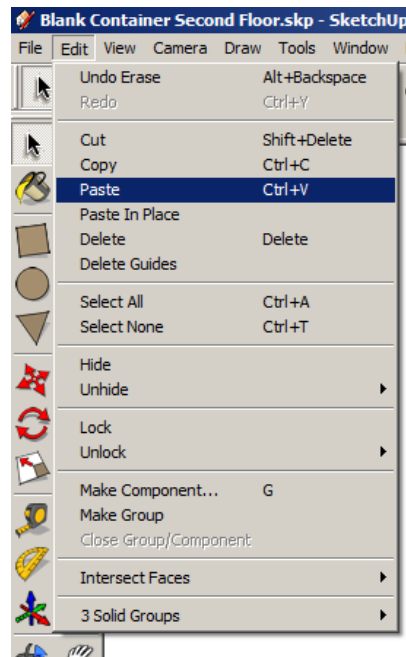
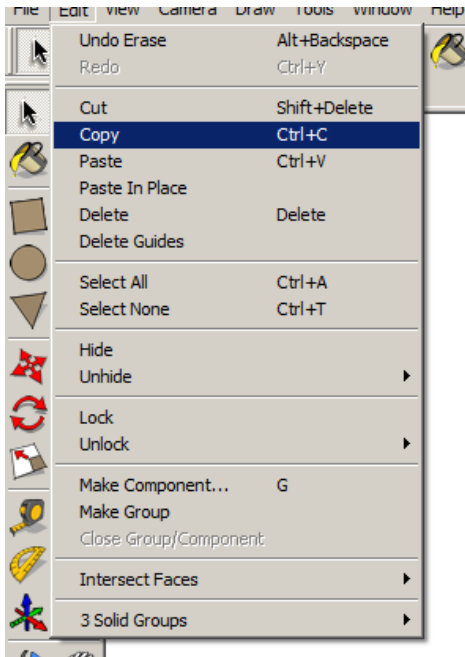


3. Hold the **Ctrl button down** and using the **select tool** click on the wall.



4. Hold the **Ctrl button down** and using the **select tool** click on the base.

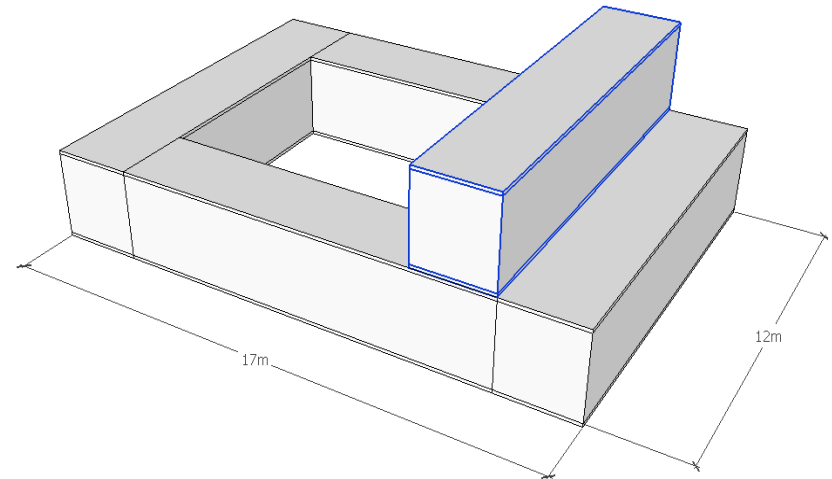


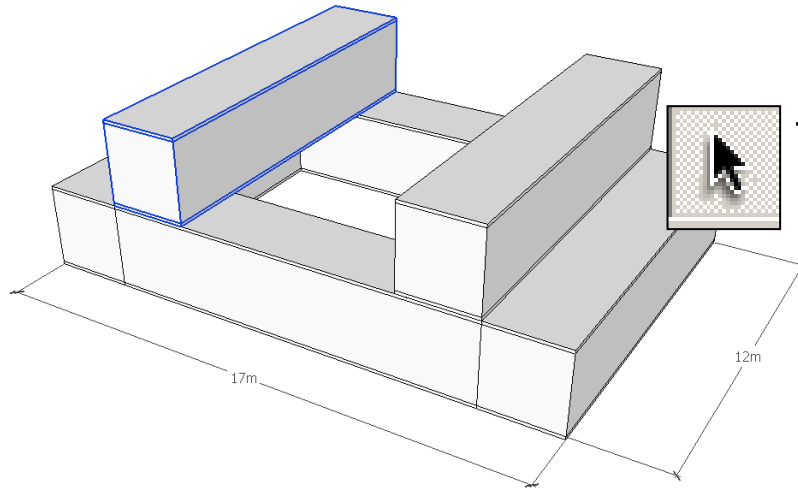


6. Using the **move tool** grab the highlighted container in the top or bottom corner. Match it to the same corner of the corresponding container you wish to move it next too.

5. Once all three parts of the container have been selected click on the **top toolbar edit** and then **copy** and then **Paste** to paste. Copy more containers as you want for the second floor. You can use a **maximum of 6** for both floors!

You can also use **Ctrl C** to copy and then **Ctrl P** to paste. Copy as many containers as you want for the ground floor. You can use a **maximum of 6** for both floors!

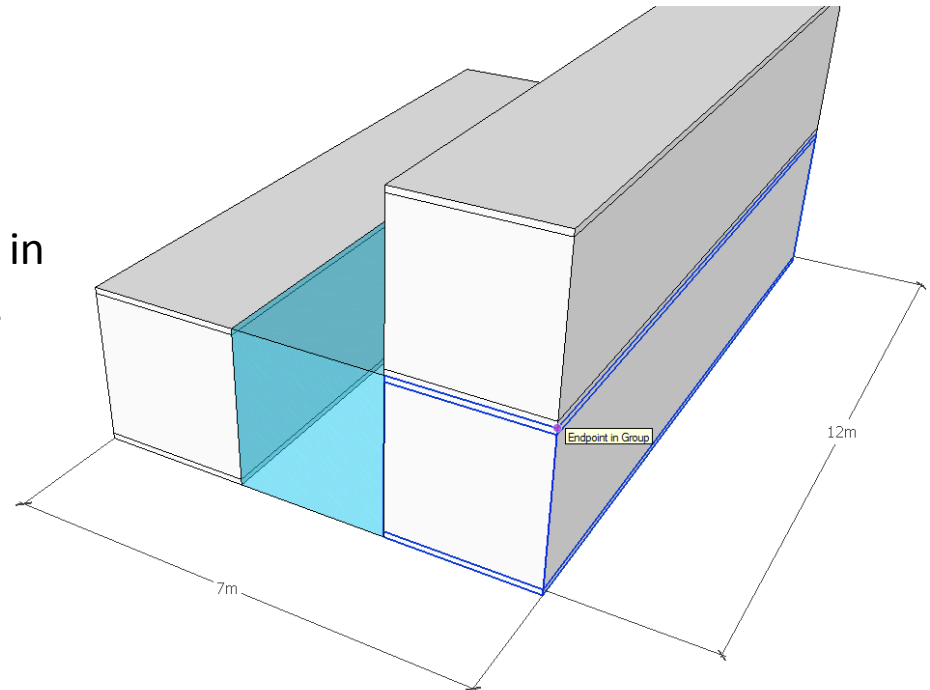


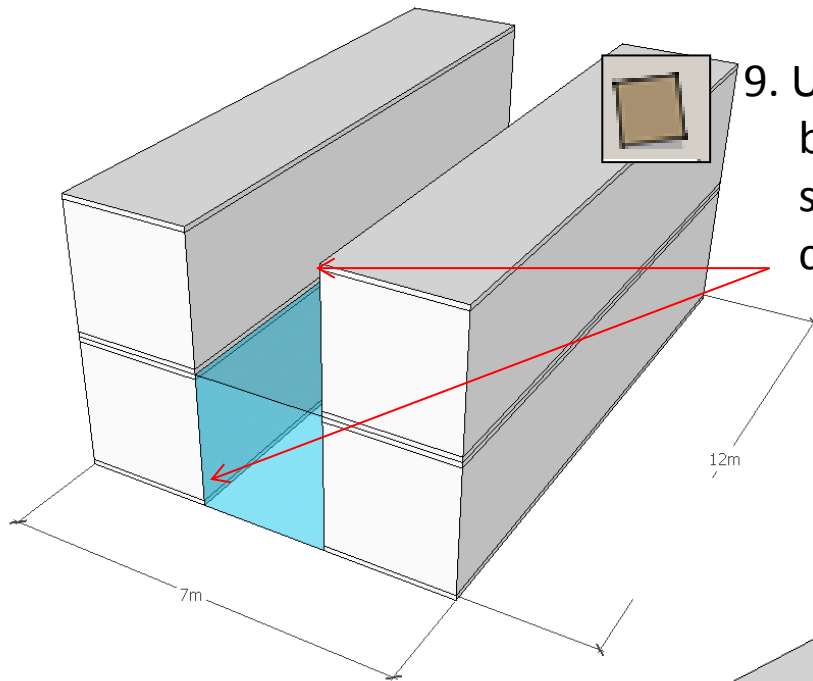


7. Using the ***select tool*** highlight the containers you wish to copy and paste using the techniques shown in steps 2, 3, 4,5 and 6

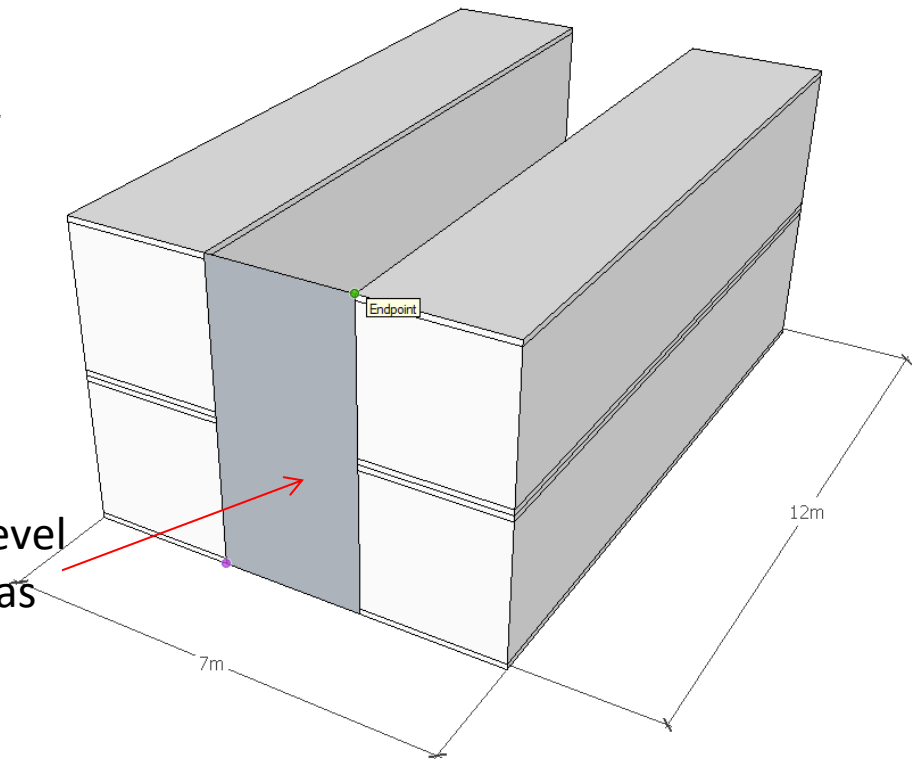


8. Using the ***move tool*** grab the highlighted container in the top or bottom corner. Match it to the same corner of the corresponding container you wish to move it next too.

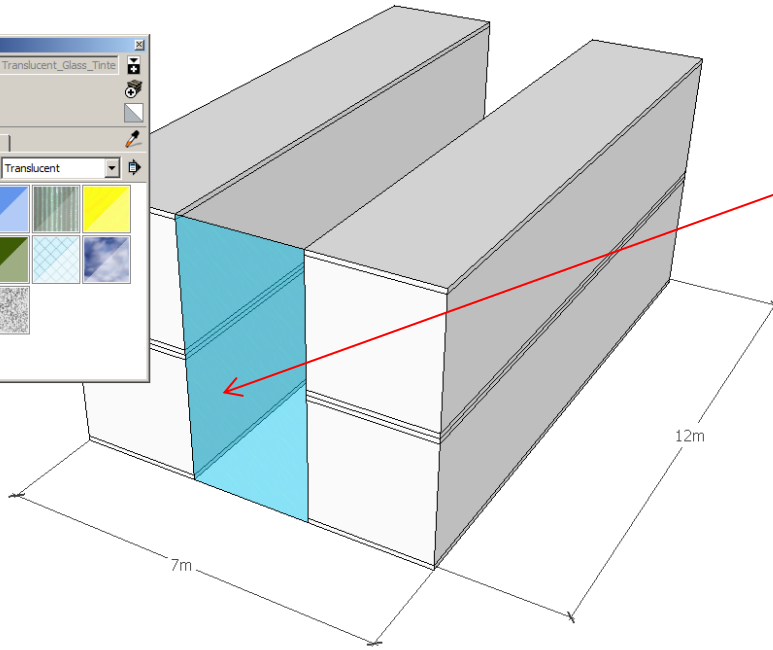
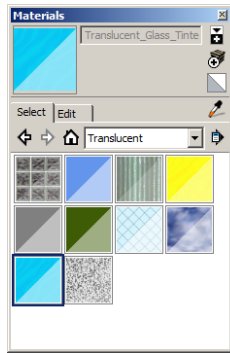




9. Using the **square tool** start in the bottom left hand corner and move the square tool to the top right hand corner as shown.



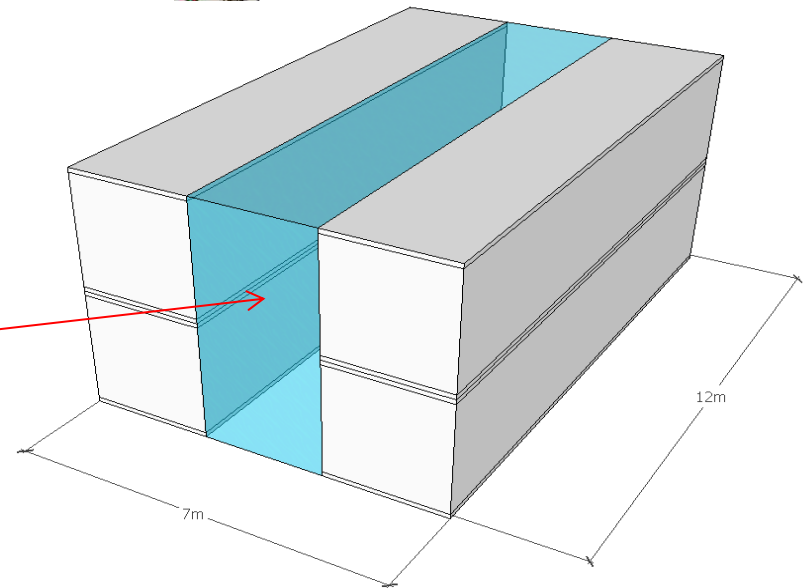
10. Provided the containers are level the square should fill in grey as shown opposite.

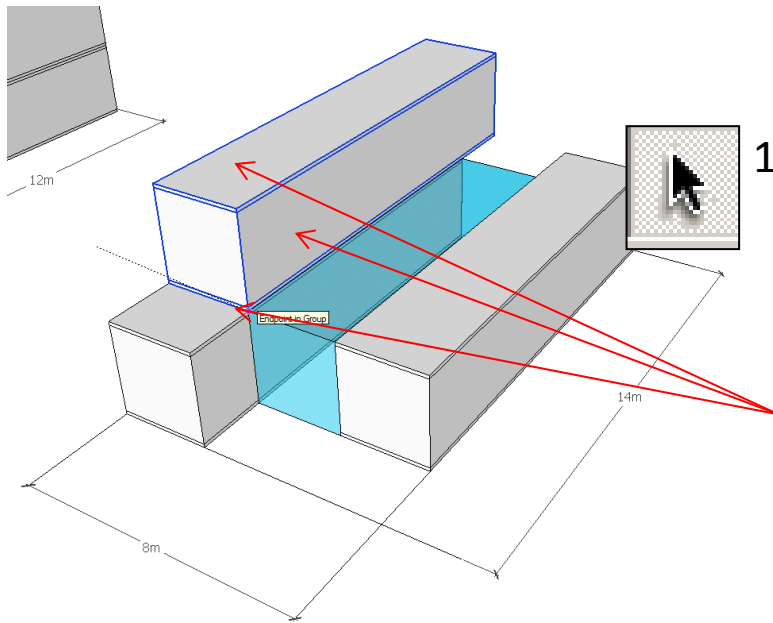


11. Select the **bucket tool**.
Use the drop down menu to select the **translucent material**.



12. Colour in your **glass partition**.

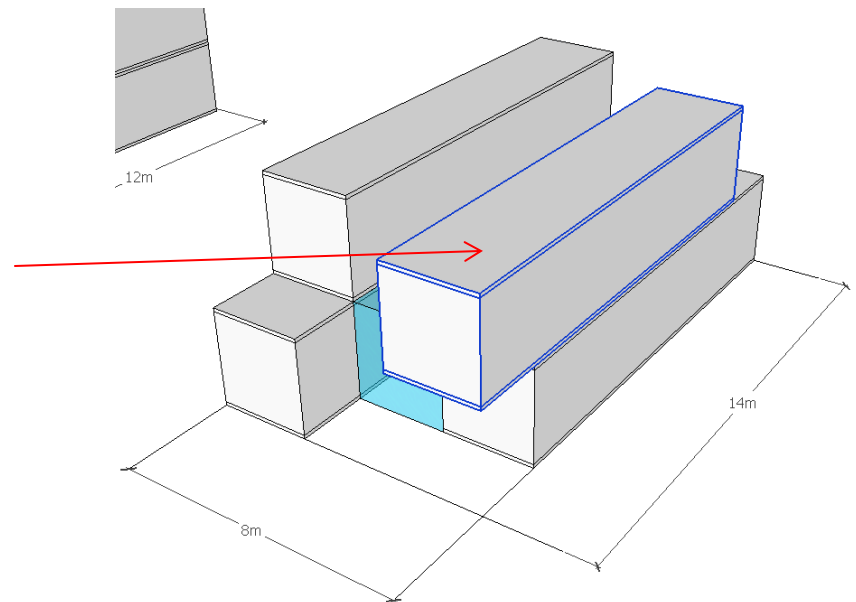


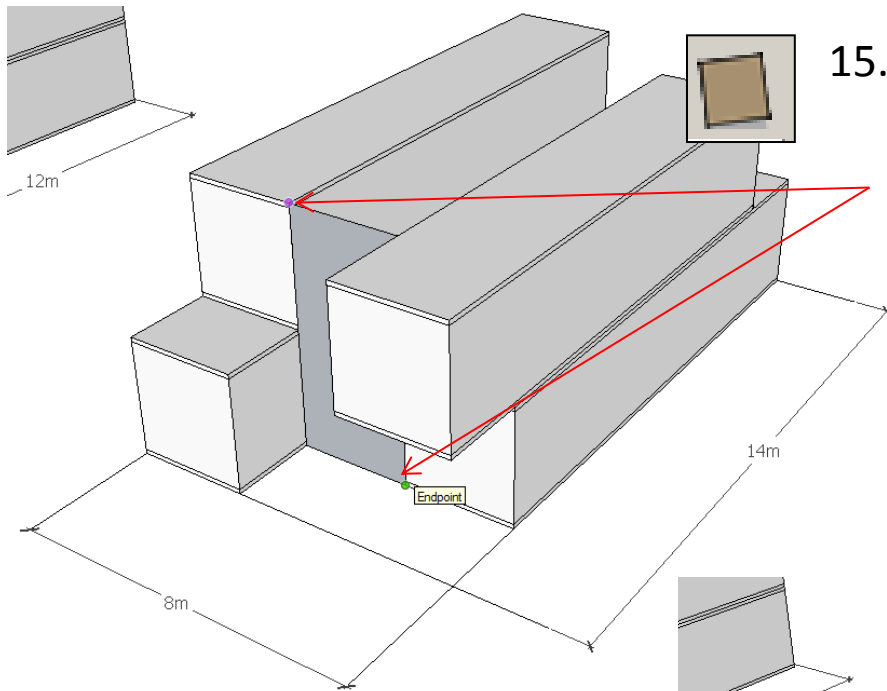


13. Using the ***select tool*** highlight the containers you wish to move by clicking on the roof, ***holding down Ctrl*** on the keyboard and then selecting the walls and floor so all three parts of the container are selected.



14. Using the ***move tool*** grab the highlighted container in the top or bottom corner. Move in forwards or backwards along the ***green axis***. ***Repeat*** with different containers to give your house a unique look.

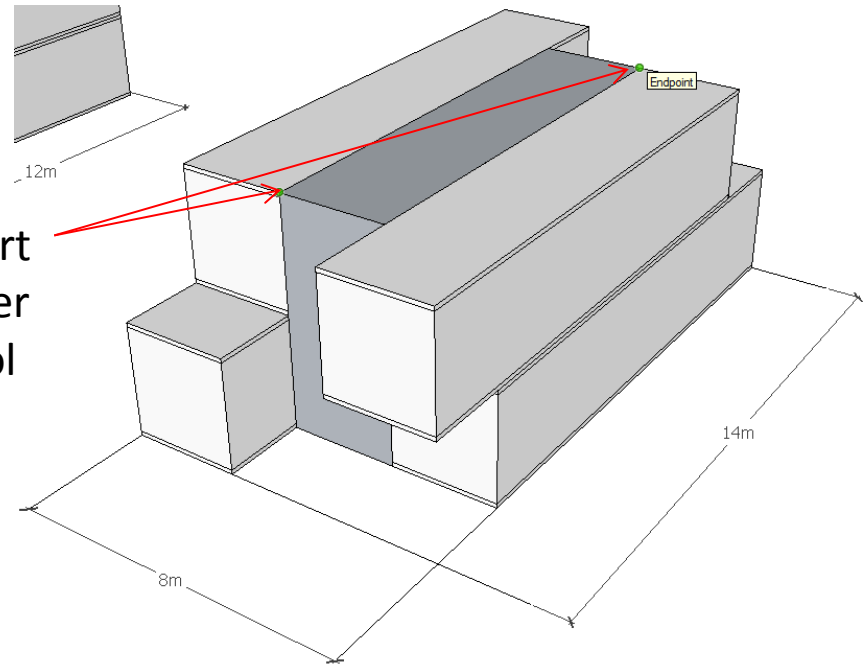


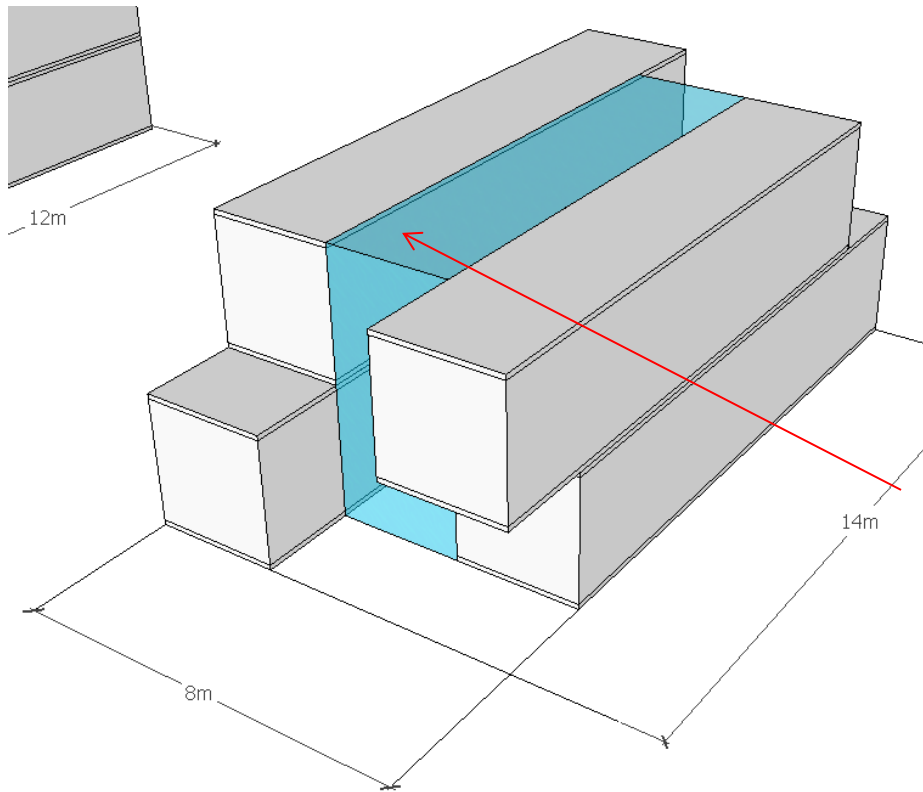


15. Using the **square tool** start in the bottom top hand corner and move the square tool to the bottom right hand corner as shown.

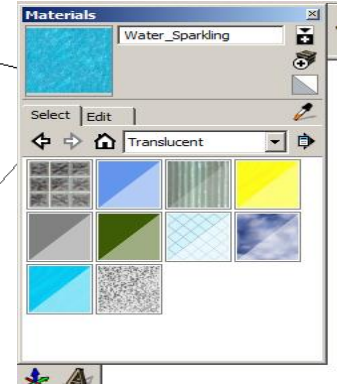


16. Using the **square tool** start in the top left hand corner and move the square tool to the top right hand corner as shown.





17. Select the **bucket tool**.
Use the drop down menu to select the **translucent material**.



18. Have a go at designing your own house re-using shipping containers.
Remember 6 containers in total..

extension

- Can you improve the design of the first floor taking into consideration:
 - Consumer needs
 - Cost
 - Size
 - Aesthetics