



Find your other half

Learning Objectives:

- Know how to manipulate simple shapes using tinkercad.com
- Understand how 3D printers work and the limitations of 3D printing.

Level of Difficulty: Level 2

List of Materials Required:

- A 3D printer
- 4 or 2 colours of filament for the 3D printer
- A cutter to remover supporting material

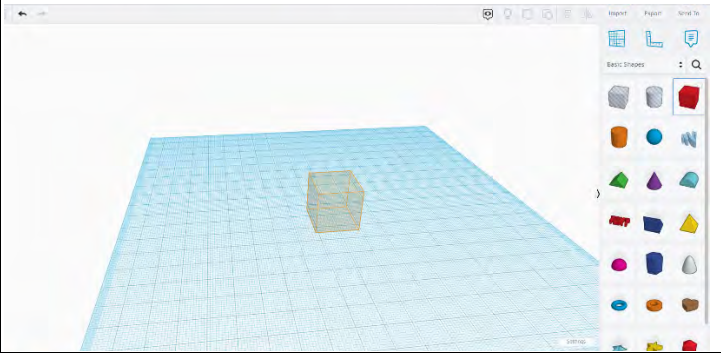
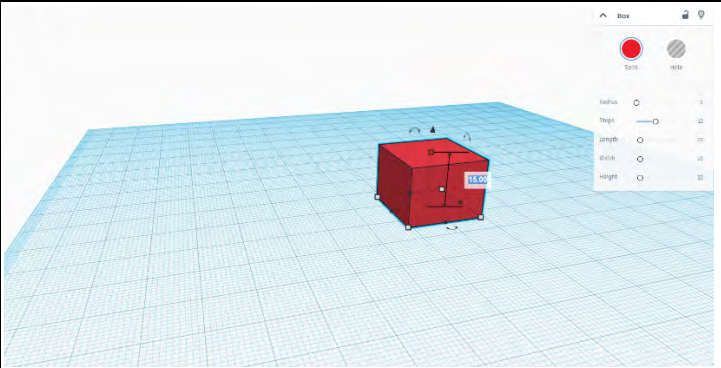
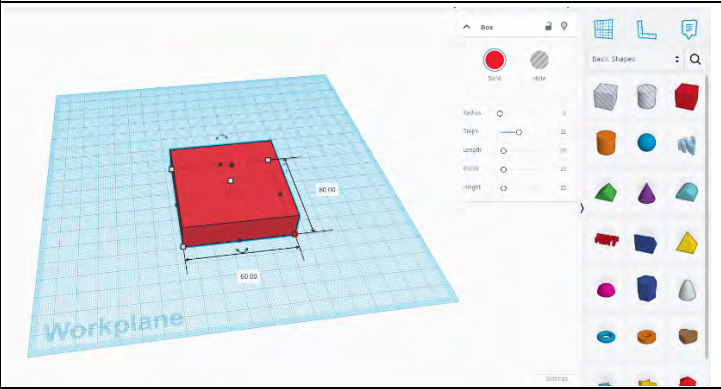
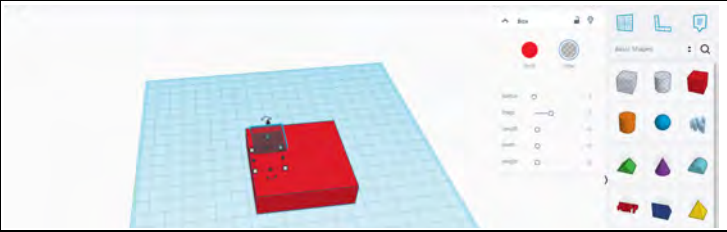
3D Modelling Skills Needed:

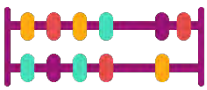
- Know how to move an object in the workplane
- Know how to create a circle
- Know how to create a hole
- Know how to resize an object
- Know how to group objects



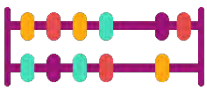
Step-by-step 3D Modelling

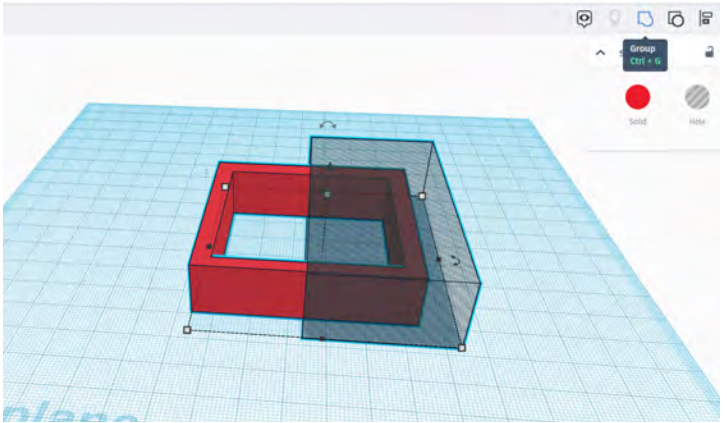
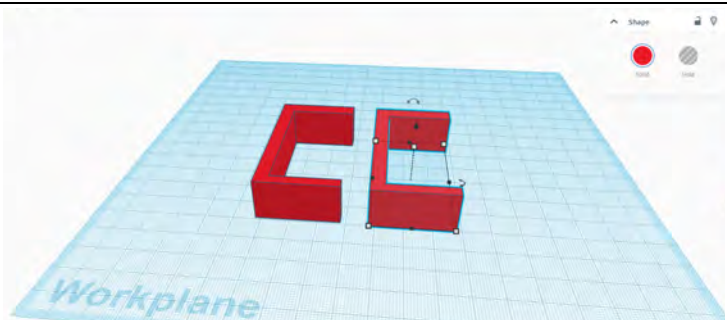
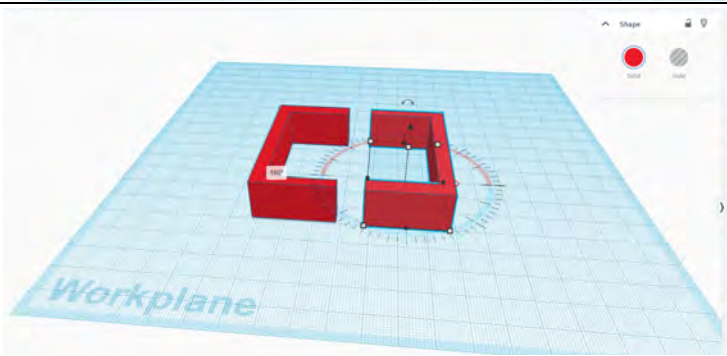
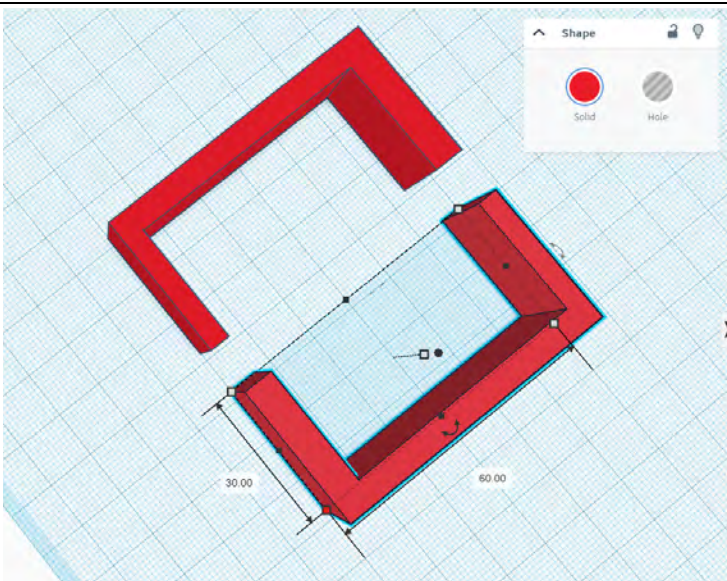
Square

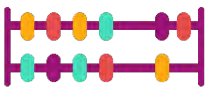
<p>Step 1</p>	<p>Select the box and put it on the workplane</p>	
<p>Step 2</p>	<p>Adjust the box's height to 15mm(1.5cm)</p>	
<p>Step 3</p>	<p>Adjust the dimensions to 60mmx60mm (6cmx6cm)</p>	
<p>Step 4</p>	<p>Add an empty (hole) box in the solid box</p>	



Step 5	Adjust the empty box's dimensions to 50mmx50mm (5cmx5cm) and its height to 15mm	
Step 6	Press the left-click and select the item. Once it is selected, group it.	
Step 7	Select another empty (hole) box and put it on the edge of the solid box	
Step 8	Adjust the dimensions to width 0.1mm and length 80mm and centre it on the existing box. Hint: Check if it's aligned by selecting all items and using the align tool available	
Step 9	Select the empty box in the middle and adjust its width to 40mm to cover half the square.	



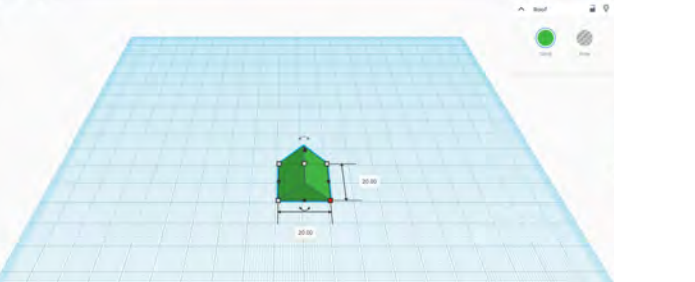
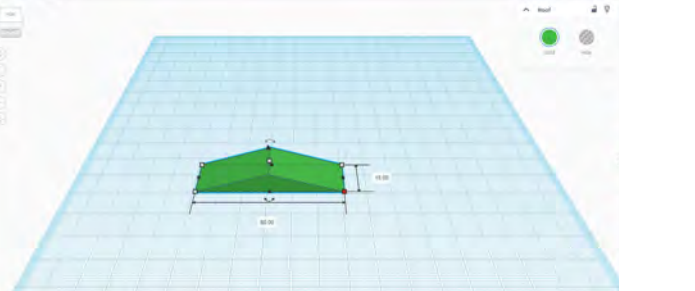
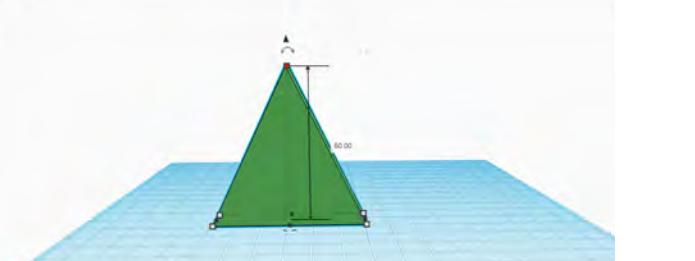
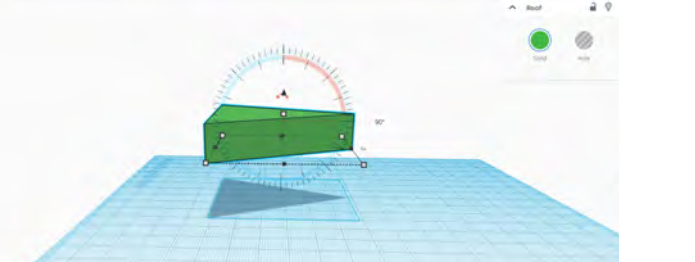
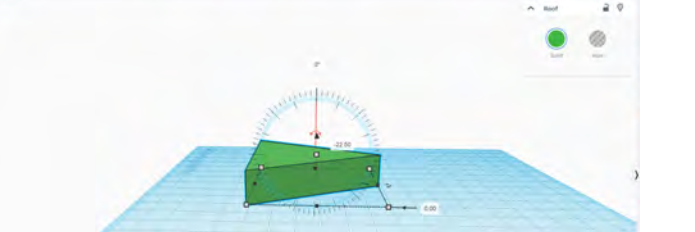
<p>Step 10</p>	<p>Select all items and group them.</p>	
<p>Step 11</p>	<p>Duplicate the remaining half square.</p>	
<p>Step 12</p>	<p>Rotate the duplicate to 180 degrees</p>	
<p>Step 13</p>	<p>Check the dimensions and make adjustments to the width and length.</p>	



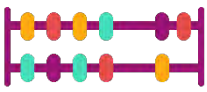
Tip:

- If you notice any issues with the width, use the empty box to cut out pieces and adjust it.
- To change the colour, go to Shape -> Solid -> Presets or Custom.

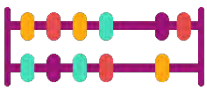
Triangle

Step 1	Select the shape Roof and put it on the workplane.	
Step 2	Adjust its dimensions to 60mm width and 15mm length.	
Step 3	Adjust the height to 60mm	
Step 4	Rotate the top to 90 degrees	
Step 5	Use the arrow to move the item flat on the workplane. You will see that it reaches 0.00.	

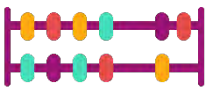




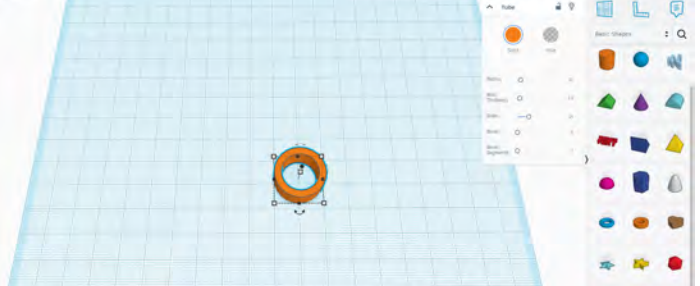
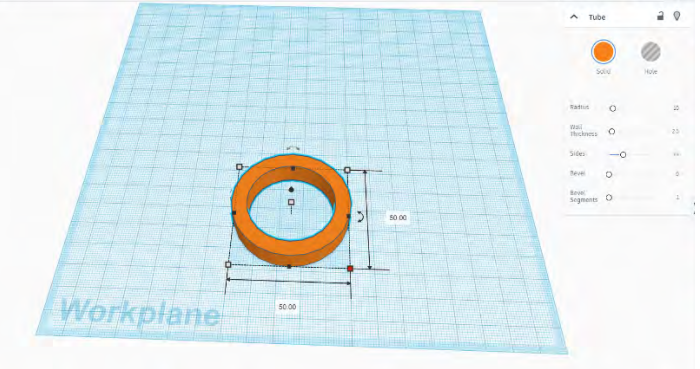
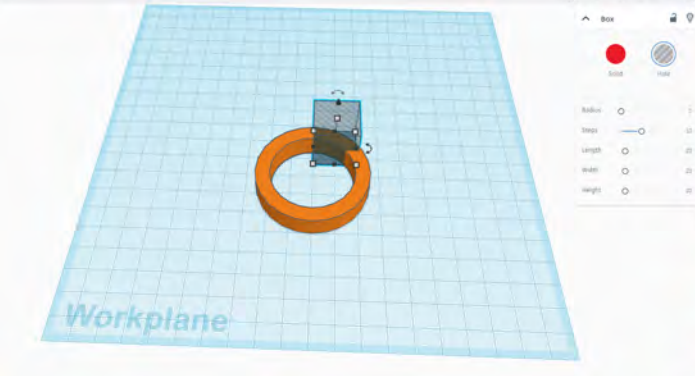
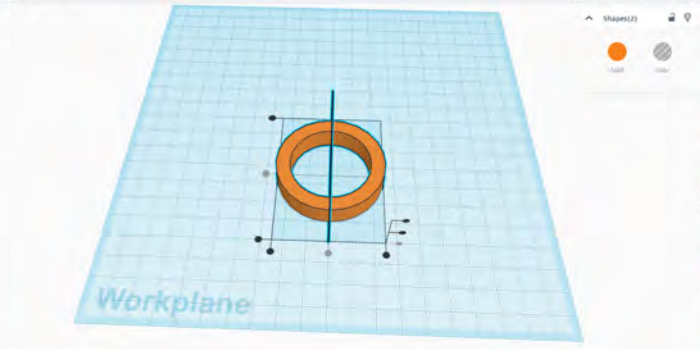
Step 6	Select an empty (hole) box and put it on the edge of the solid triangle.	
Step 7	Adjust the empty box width to 0.01 and length to 70mm. Move it to the centre of the triangle. Hint: Use the align tool to see if it is in the centre.	
Step 8	Select the empty box and set it width to 40mm to cover half the triangle.	
Step 9	Select the items and group them.	
Step 10	Duplicate the remaining item and select Shape -> Hole.	



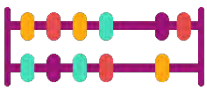
<p>Step 11</p>	<p>Experiment with the width that you would like your solid triangle to have.</p>	
<p>Step 12</p>	<p>Select the items and group them.</p>	
<p>Step 13</p>	<p>Duplicate the remaining triangle.</p>	
<p>Step 14</p>	<p>Rotate the duplicate triangle to 180 degrees.</p>	
<p>Step 15</p>	<p>Check the dimensions and make adjustments to the width and length.</p>	



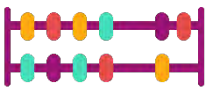
Circle

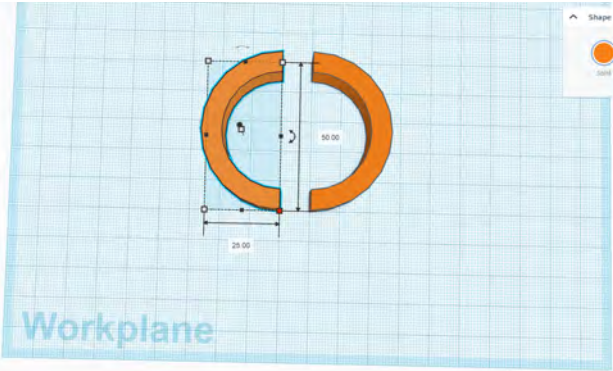
Step 1	Select the tube shape and put it on the workplane	
Step 2	Adjust the dimensions to 50mmx50mm	
Step 3	Select an empty (hole) box and put it on the top of the circle	
Step 4	Adjust the dimensions of the empty box to width 0.01mm and length 70mm and center it on the circle.	



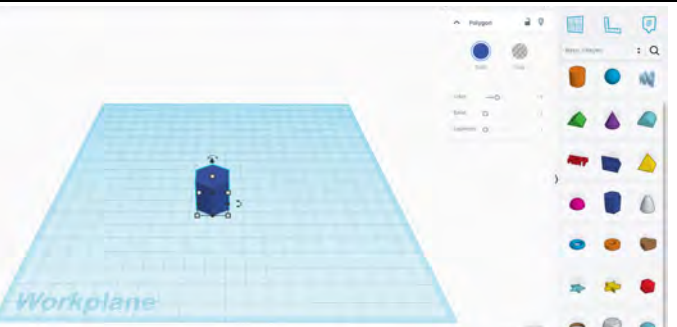
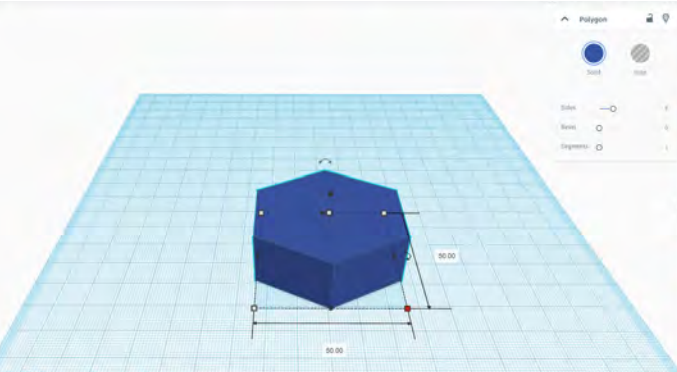
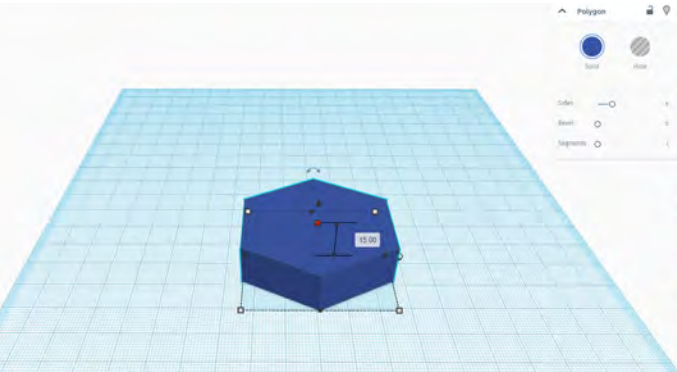


Step 5	Resize the width of the box to 40mm to cover half the circle.	
Step 6	Select all items and group them.	
Step 7	Duplicate the remaining circle	
Step 8	Move and rotate the new circle to 180 degrees.	

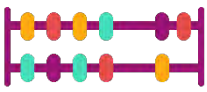


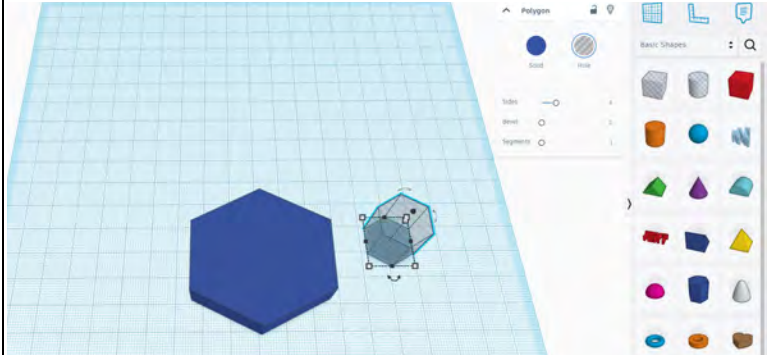
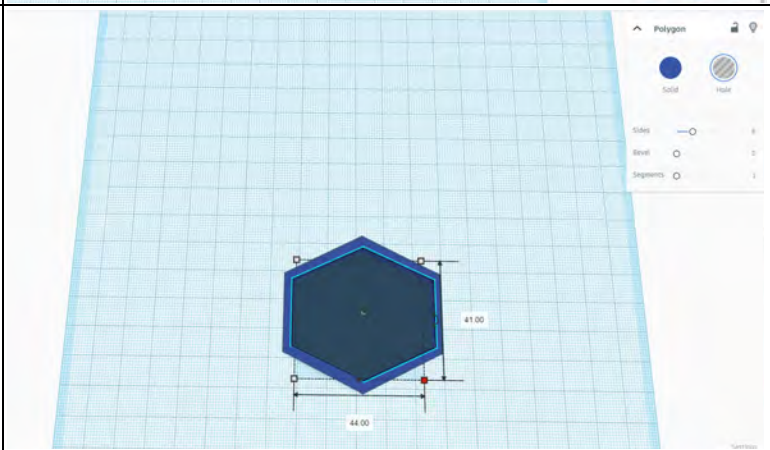
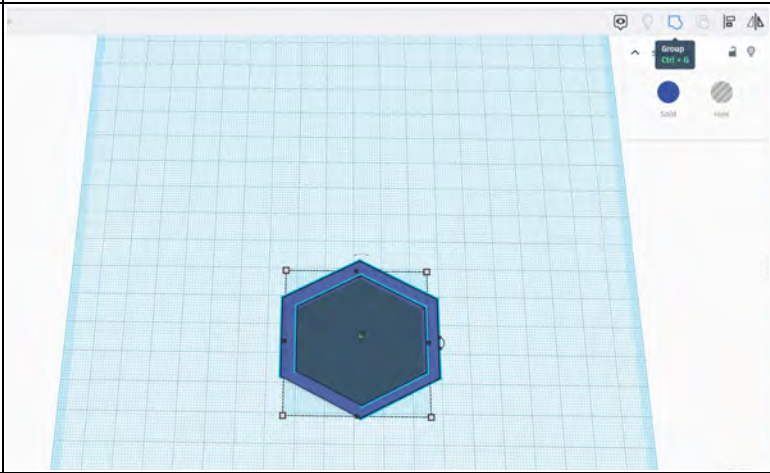
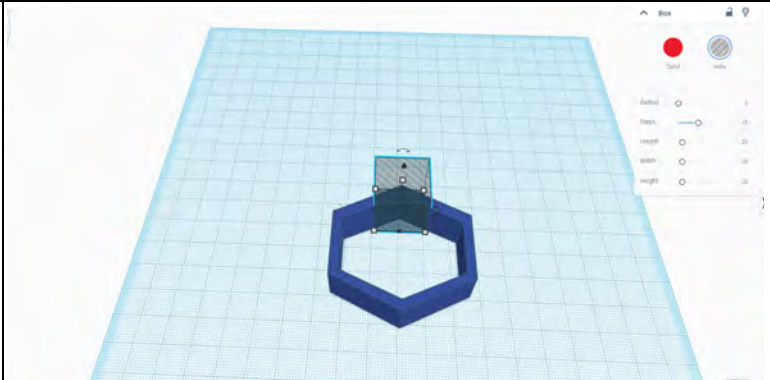
Step 9	Check the dimensions and make any necessary adjustments.	
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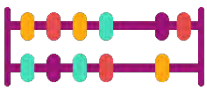
Polygon

Step 1	Select the polygon shape and put it on the workplane	
Step 2	Set the dimensions to 50mmx50mm	
Step 3	Set the height to 15mm	

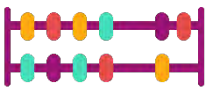


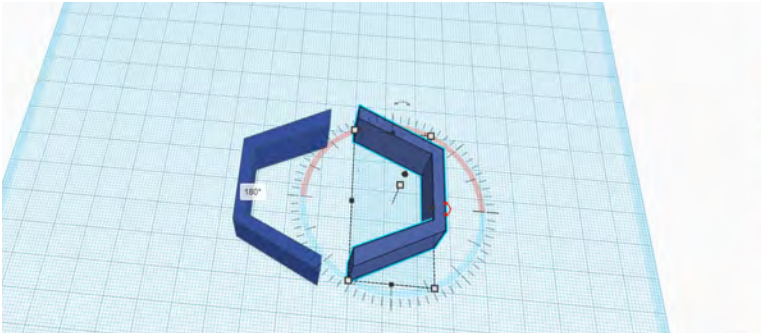
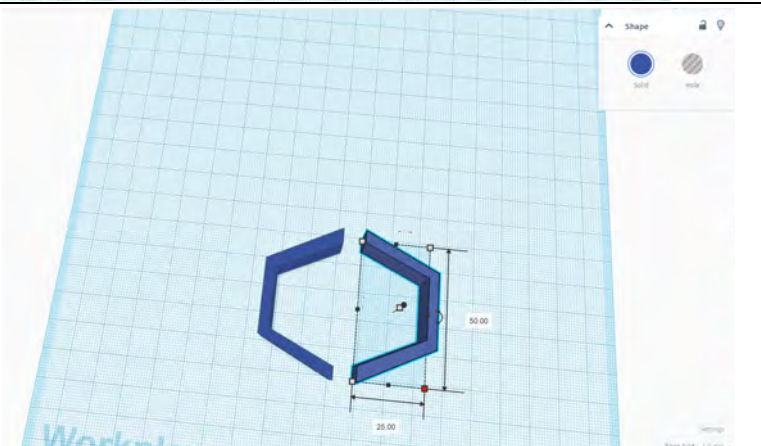


Step 4	Select another polygon and set the shape to hole	
Step 5	Adjust the dimensions of the empty (hole) polygon to 44mmx41mm and align into the center of the solid polygon	
Step 6	Select the items and group them.	
Step 7	Select the empty box and put on the edge of the polygon.	



Step 8	Adjust the dimensions of the empty box to 0.01mm for the width and 70mm for the length and align it.	
Step 9	Resize the empty box to cover one side of the polygon to 40mm width.	
Step 10	Select all items and group them.	
Step 11	Duplicate the remaining shape	

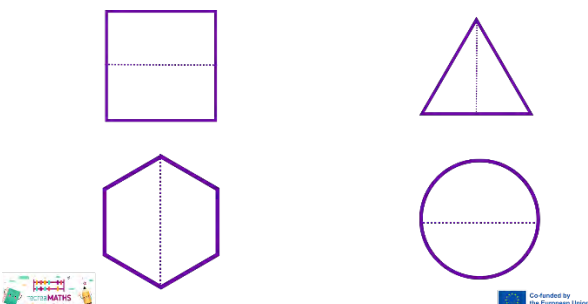



<p>Step 12</p>	<p>Rotate to 180 degrees</p>	
<p>Step 13</p>	<p>Check the dimensions and make any necessary adjustments.</p>	



Creation of the Exhibit

Assemble/disassemble and store the exhibits, accompanied by the corresponding time-frames

<p>Step 1</p>	<p>Print and laminate the board to be used</p>	
<p>Step 2</p>	<p>Use the 3D printer to print the half shapes</p>	

Design Map

