

Mathematical 3D Printed Exhibits

DIY Creation Kit



Funky Chart

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:

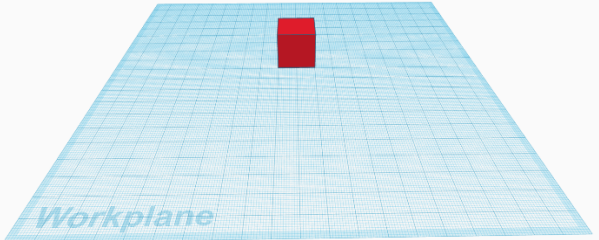
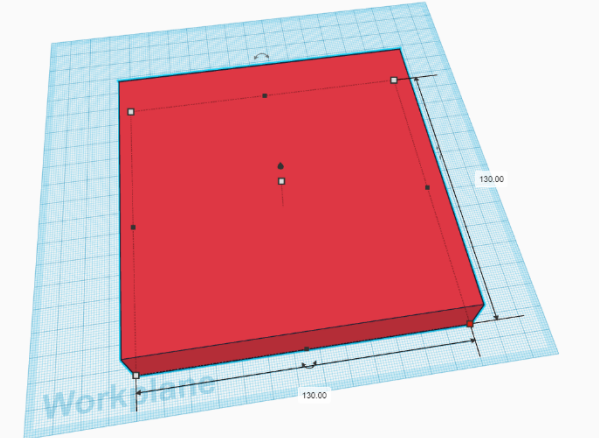
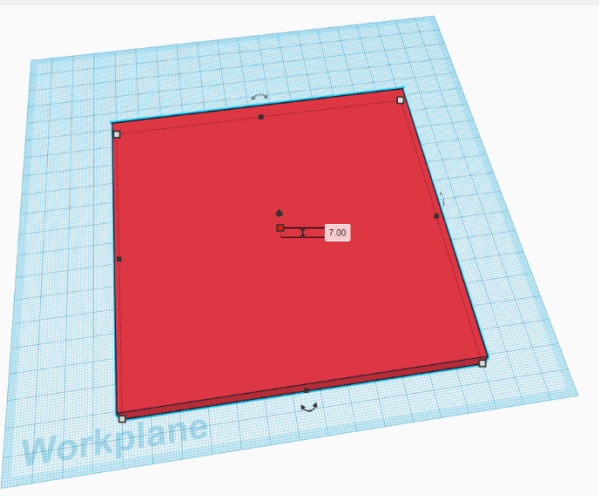
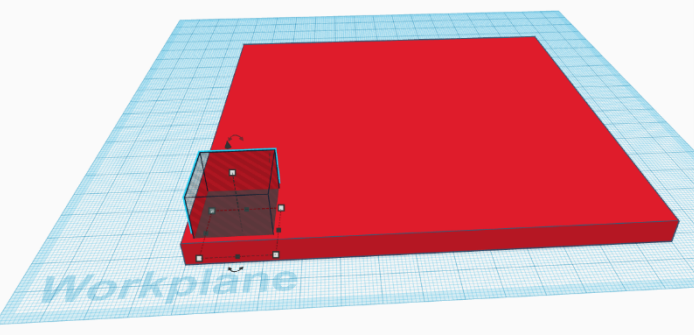
- A 3D printer
- 2 or 4 colours of filament for the 3D printer
- A cutter to make the hole

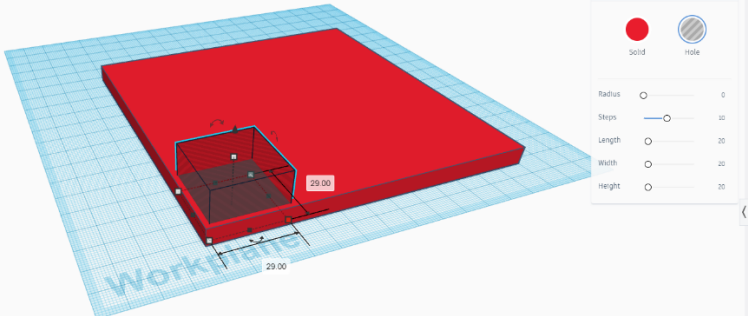
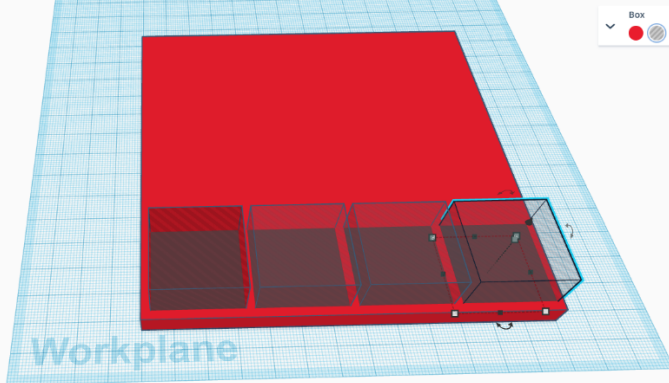
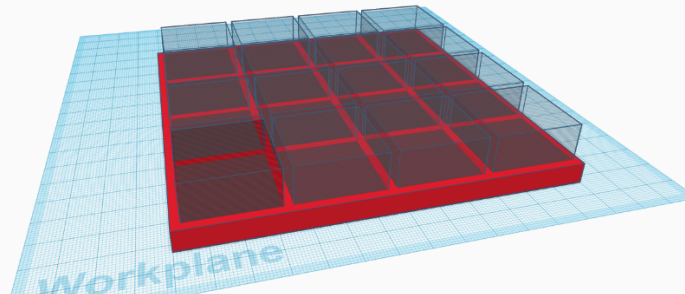
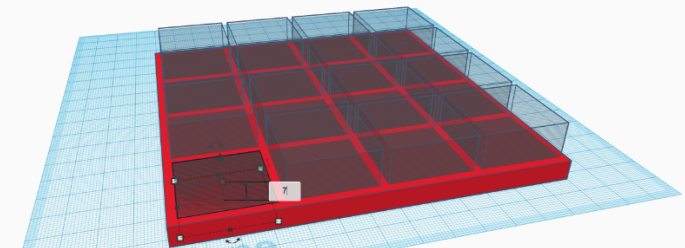
3D Modelling Skills Needed:

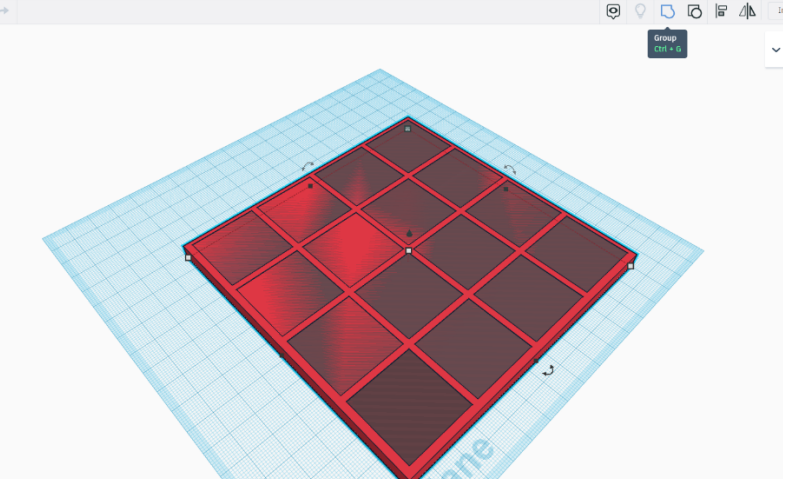
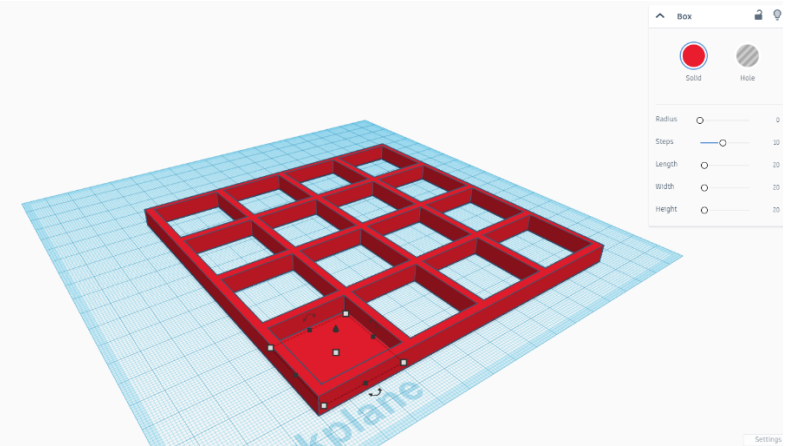
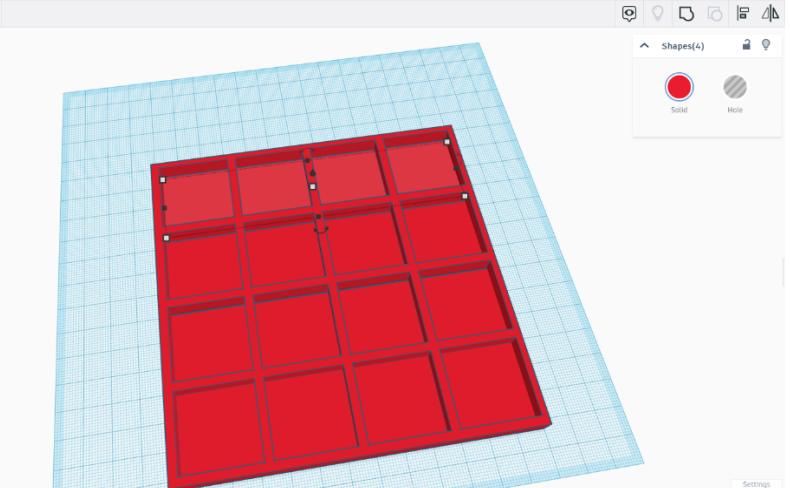
- Know how to move an object in the workplane
- Know how to create a circle
- Know how to create a hole
- Know how to resize an object
- Know how to group objects

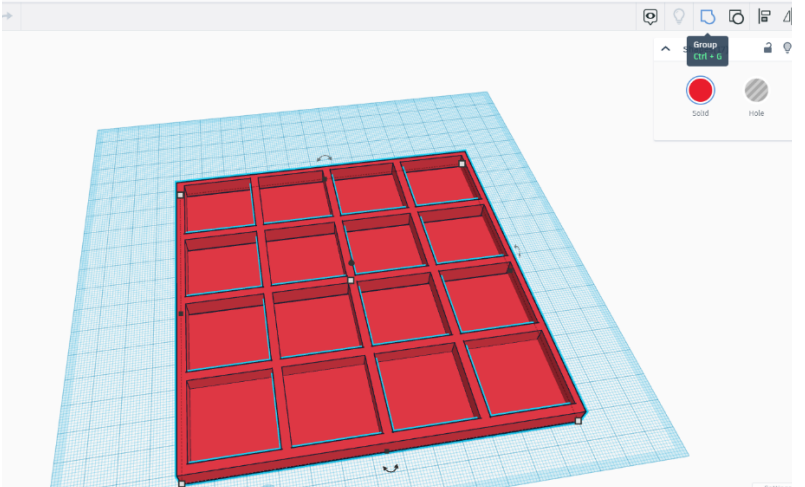
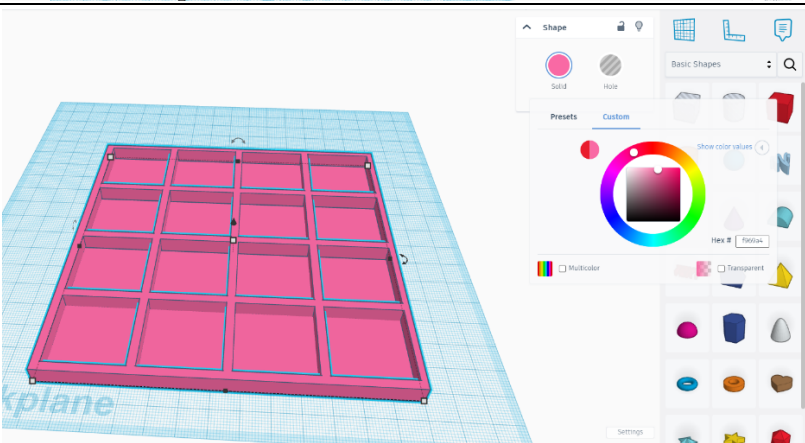
Step-by-step 3D Modelling

Board

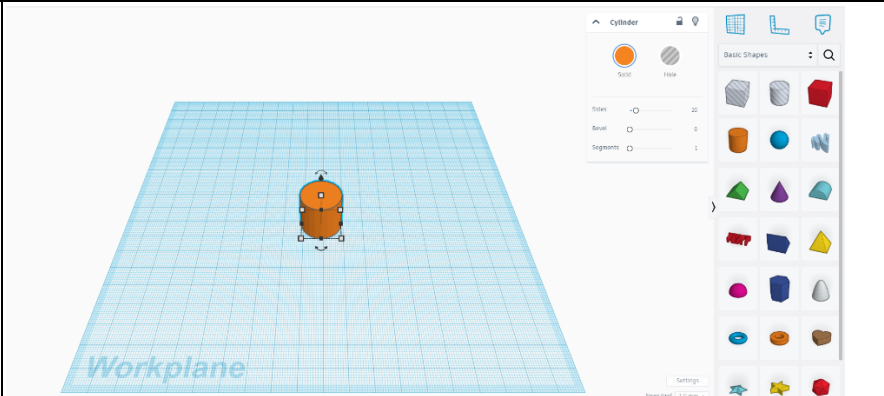
Step 1	Add a solid box on the plan	
Step 2	Resize the box from the default to 130mmx130mm (13x13cm)	
Step 3	Adjust the height to 7mm (0.7cm)	
Step 4	Add an empty (hole) box in the solid box	

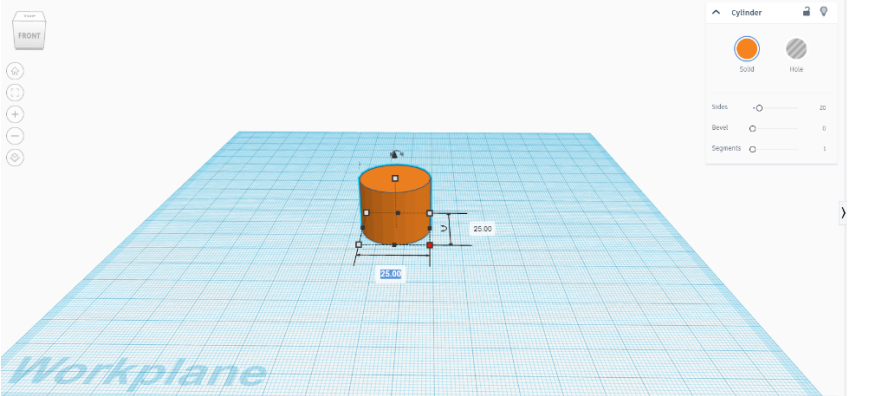
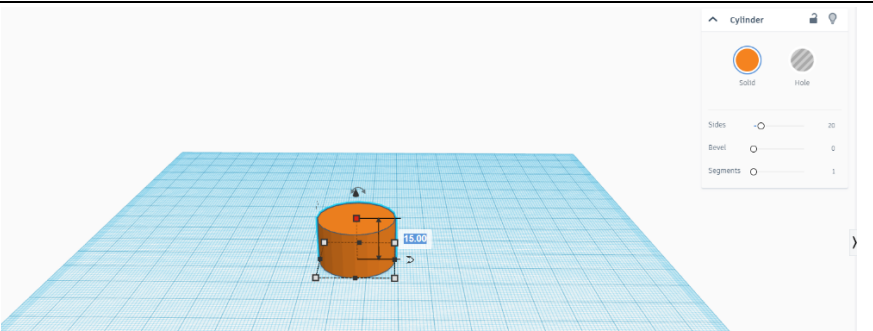
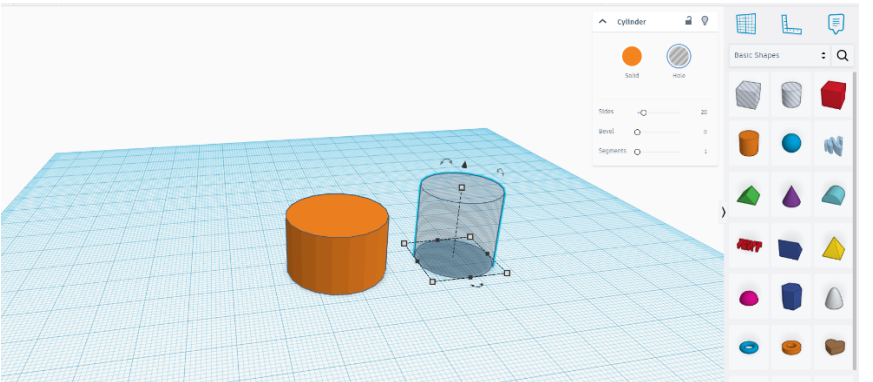
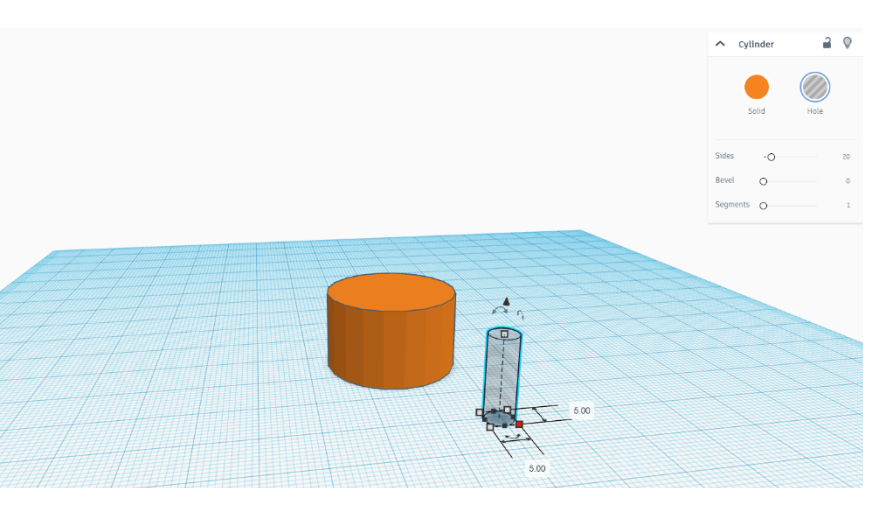
Step 5	Set the dimensions to 29mmx29mm	
Step 6	Copy (Ctrl+C) and paste (Ctrl+V) the box to make the first row with 3 other boxes	
Step 7	Keep Shift pressed and select the 4 boxes. Once they are selected, copy and paste them to create the remaining 3 rows	
Step 8	Set each box and set its height to 7mm	

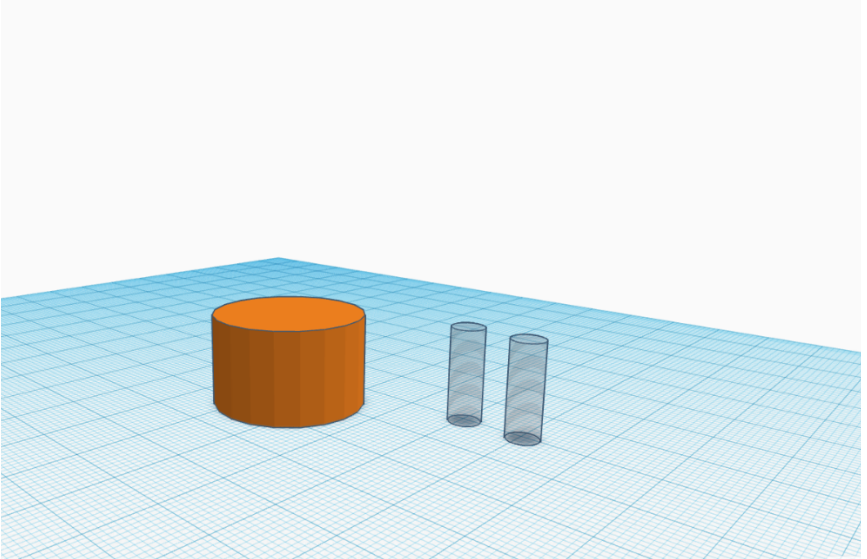
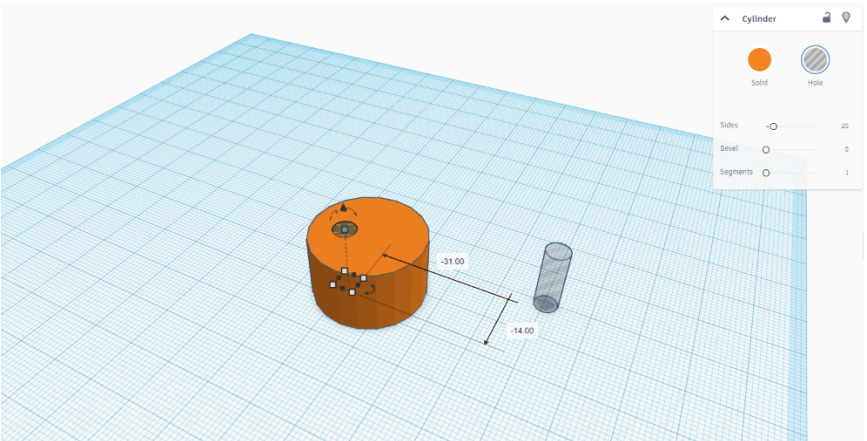
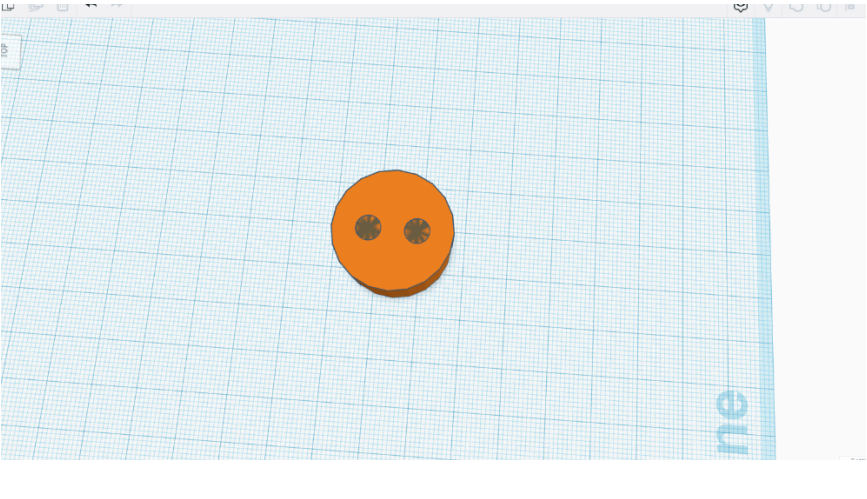
<p>Step 9</p>	<p>Select all the items with the left click and group them</p>	
<p>Step 10</p>	<p>Select a solid box and set the dimensions to 29mmx29mm and the height to 1mm to match the gap created</p>	
<p>Step 11</p>	<p>Copy and paste the solid box into all the remaining gaps</p>	

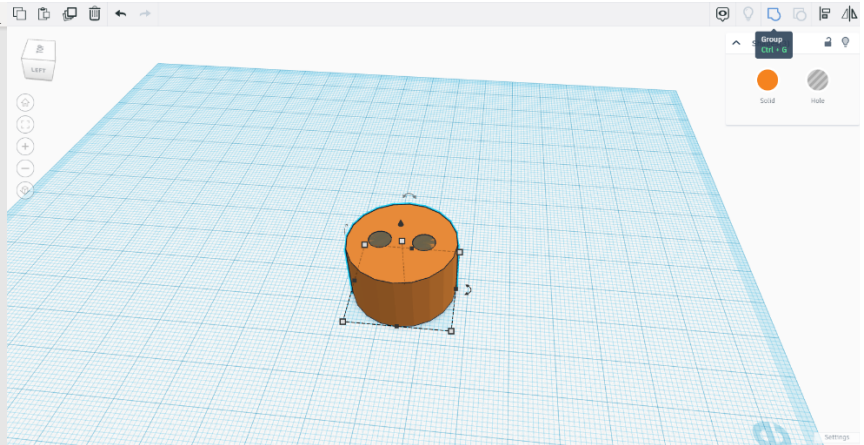
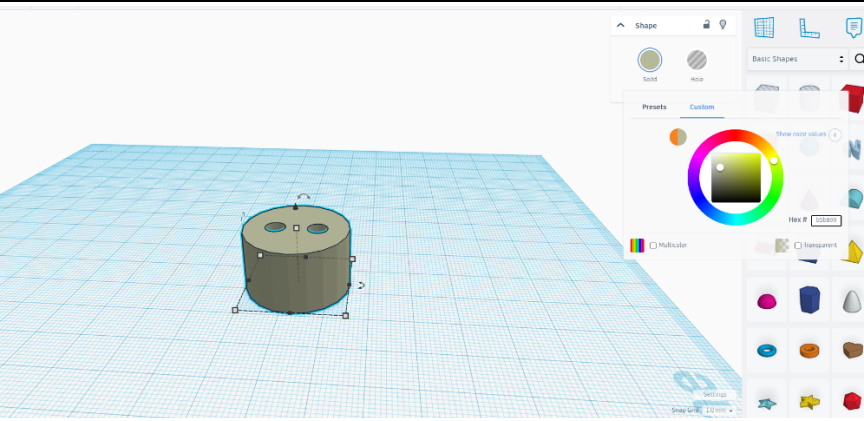
Step 12	Select all items and group them	
Step 13	Go to Shape-> Solid-> Custom and add the Hex code f969a4 to change the colour of the board	

Buttons

Step 1	Add a cylinder to the workplane	
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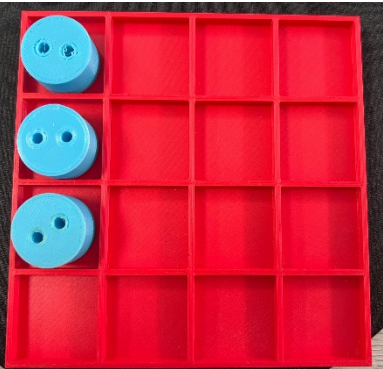
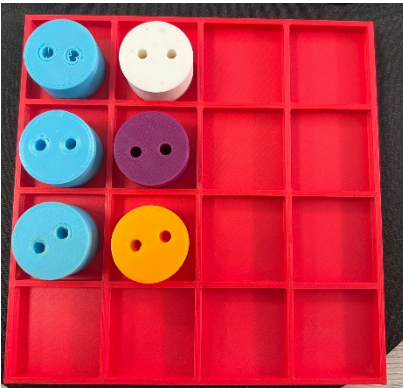
Step 2	Set the dimensions to 25mmx25mm	
Step 3	Adjust the height to 15mm (1.5cm)	
Step 4	Add an empty (hole) cylinder next to the solid cylinder	
Step 5	Set the dimensions of the empty cylinder to 5mmx5mm and its height to 15mm to match our existing cylinder	

<p>Step 6</p>	<p>Copy and paste the empty cylinder to create two</p>	
<p>Step 7</p>	<p>Select the first cylinder and set it in the solid cylinder towards one side of the edge</p>	
<p>Step 8</p>	<p>Put the other cylinder in the solid cylinder towards the other edge. Try to make the two empty cylinders have equal distances by moving them</p>	

<p>Step 9</p>	<p>Once you are happy with how the distance looks, select all items and group them</p> <p>Hint: Check to see that there are holes formed inside the cylinder by viewing the item from the top</p>	
<p>Step 10</p>	<p>Select the item and change its colour. Go to Shape-> Solid-> Custom and add the Hex code b5b899. to change the color of the button</p>	

Creation of the Exhibit

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

<p>Step 1</p>	<p>Print, cut and laminate the multiplication cards for the children to fill in the array with buttons</p>	<div data-bbox="612 405 1003 624">  </div> <div data-bbox="1011 405 1402 624">  </div> <div data-bbox="612 636 1003 855">  </div> <div data-bbox="1011 636 1402 855">  </div>
<p>Step 2</p>	<p>Use the 3D printer to print both the board and the buttons</p>	<div data-bbox="612 896 995 1263">  </div> <div data-bbox="612 1301 1016 1688">  </div>

Design Map

