

3D Encounters

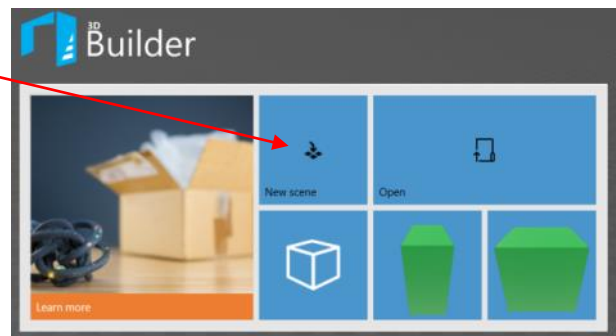
TechResort Sessions #5119



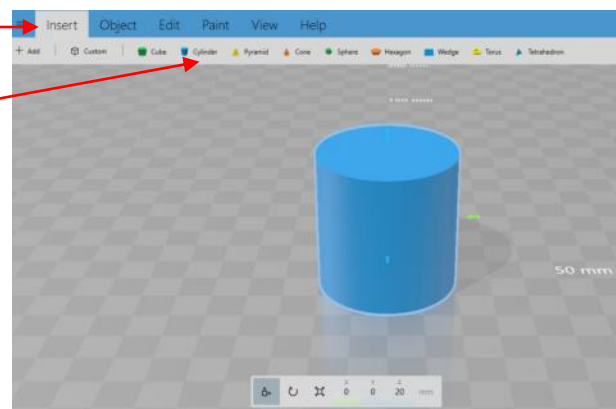
Skills involved:	Use of 3D Software	✓
	Creativity	✓
Suitable for ages:	9 - 12	

Starting the software and navigating the workspace

- Open 3D Builder and create a NEW SCENE by clicking on it:

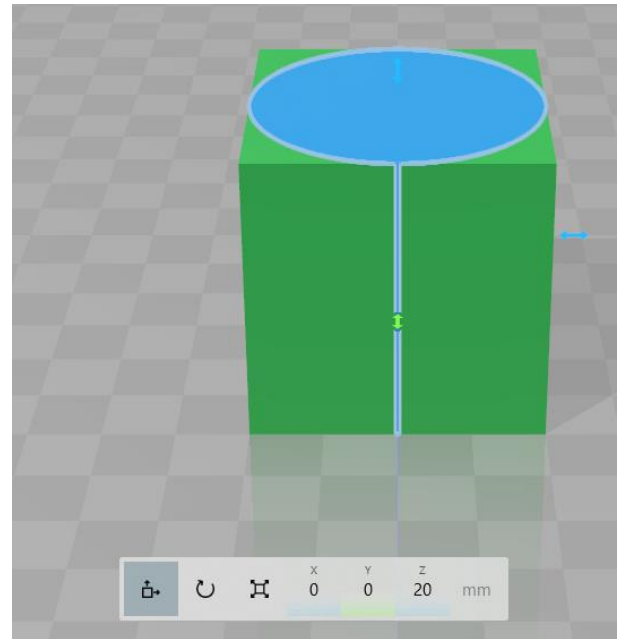
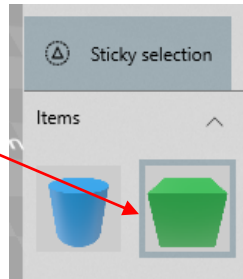


- Insert a Cylinder by clicking on 'Insert' and then 'Cylinder'

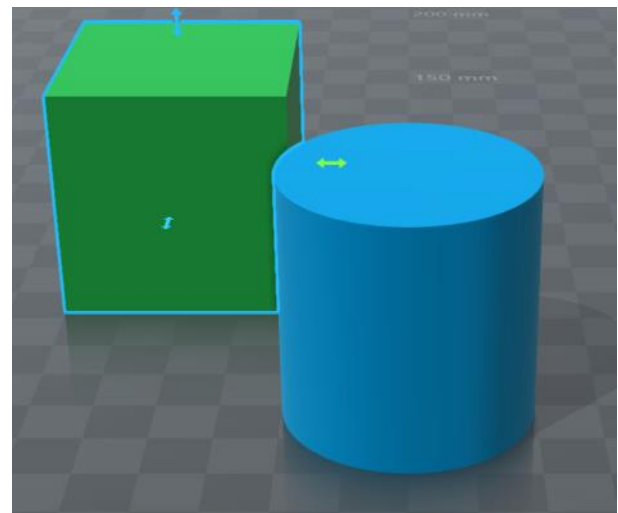


- Insert a Cube in the same way
- Experiment with moving the cylinder and cube about. Note that you can move them together or individually depending on which of them you have selected

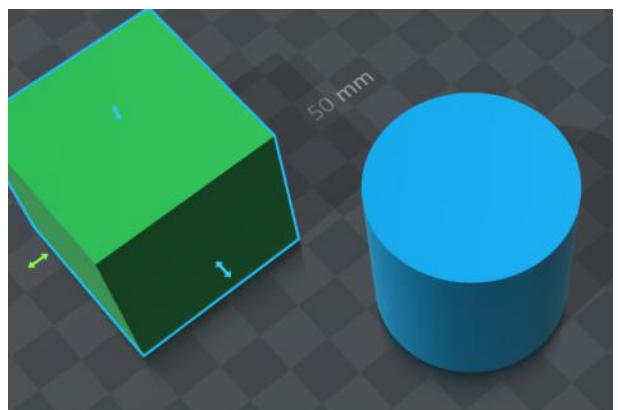
Only the cube is highlighted. Left-click items to select or deselect them



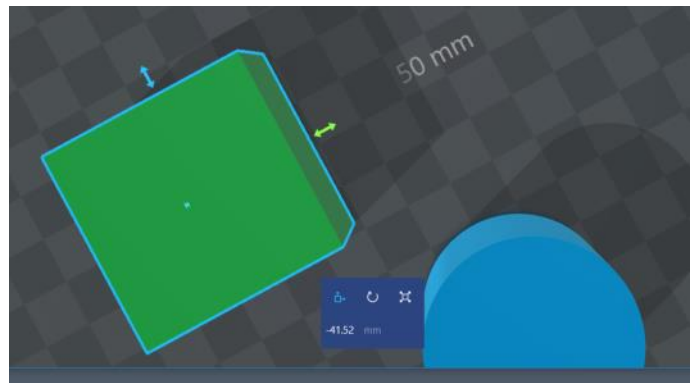
- You can select the arrows that allow you to change the position in one direction only, or you can click and hold on the object itself (don't click near the arrows) to move freely



- Left click on the workspace (checkerboard) and hold then move your mouse to change your viewing angle



- Right click to move your current view up and down or left and right
- Left click and hold shift to zoom your current view in and out
Or use the scroll wheel on your mouse

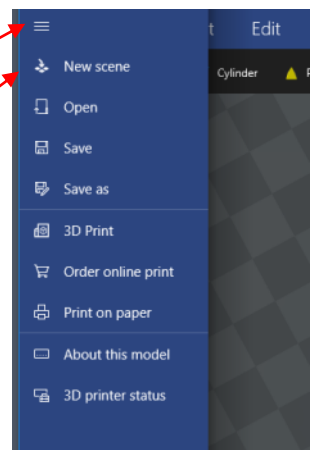


Now practice changing your view of the workspace before doing the next activity

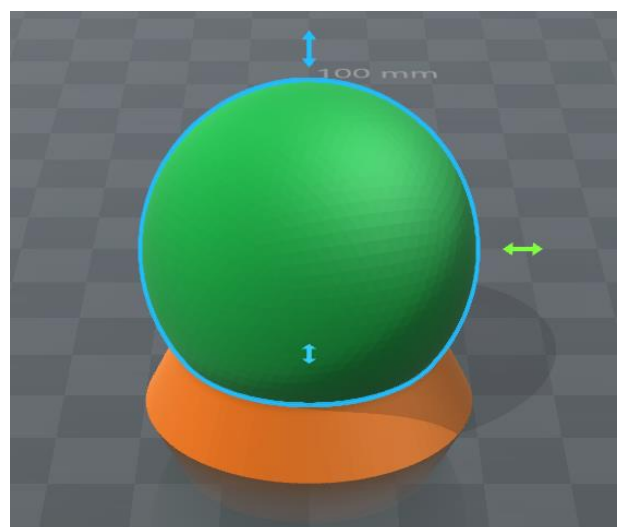
Combining and Subtracting shapes

- Start a new Scene

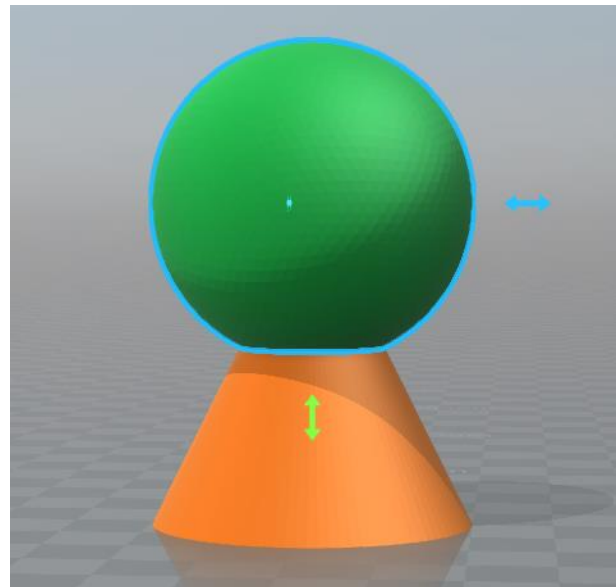
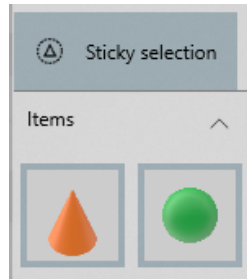
Click the menu symbol
Then select
New scene



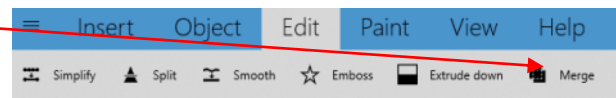
- Insert a Cone and a Sphere



- Drag the Sphere upwards
- Select both shapes by clicking on the Cone in the Items box make sure they're both selected like this:



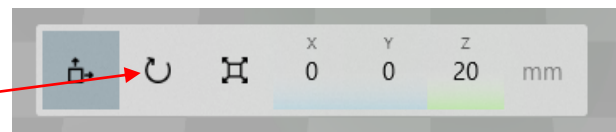
- In the Edit menu select "Merge"



- Now when you click and drag the shape, you can see it's a single shape. You can't now return to being two separate shapes.

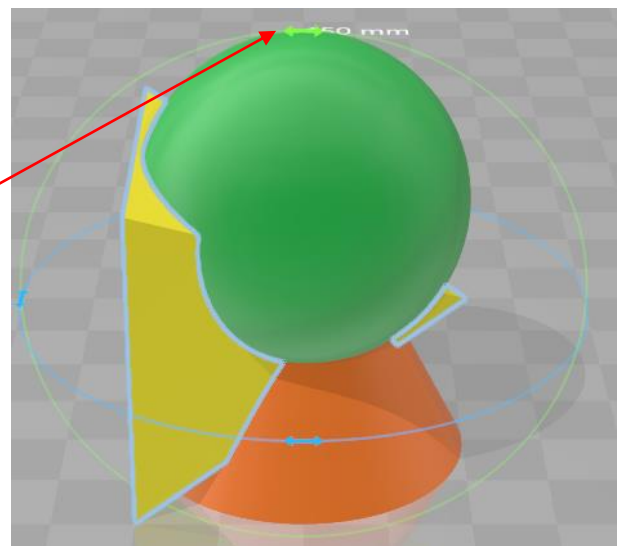
- Insert a pyramid and click on the 'Rotation' symbol at the

Rotation symbol



- Use the rotation circles to rotate the pyramid through 90 degrees

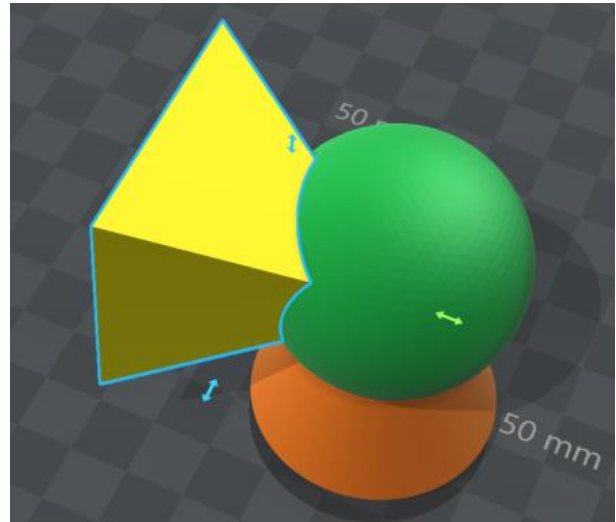
Click on an arrow then drag the arrow to rotate in that direction



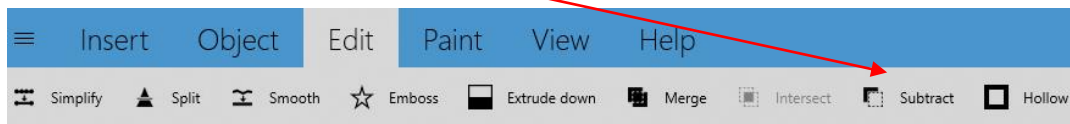
- Now reselect the 'Move' symbol



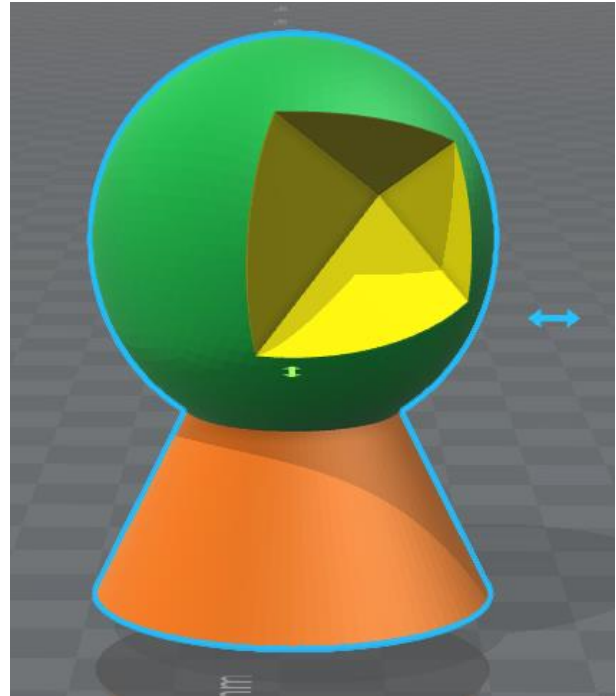
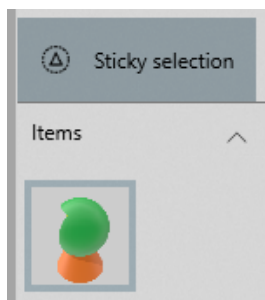
- Move your Pyramid (with the arrows or free moving) so that it sticks right in your cone-sphere



- Making sure that ONLY the Pyramid is selected go to the "Edit" menu and select "Subtract". You may need to be patient.



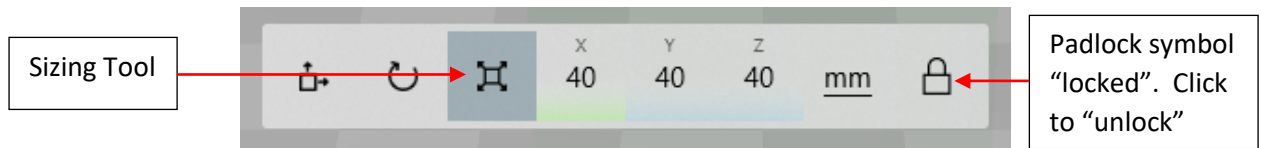
- In the items menu, there's only one item now...



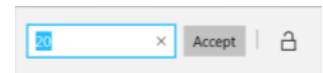
You make more complex shapes by merging and subtracting the simple shapes – practice a little more if you need to

Changing the Size

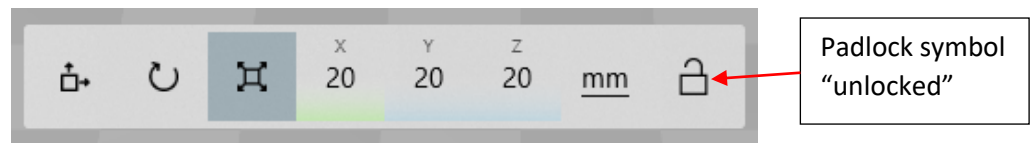
- Start a New Scene
- Insert a cube
- Select the sizing tool



- Making sure the padlock symbol is show as “unlocked”, click on the number in below ‘x’ and type the number 20 in the box.

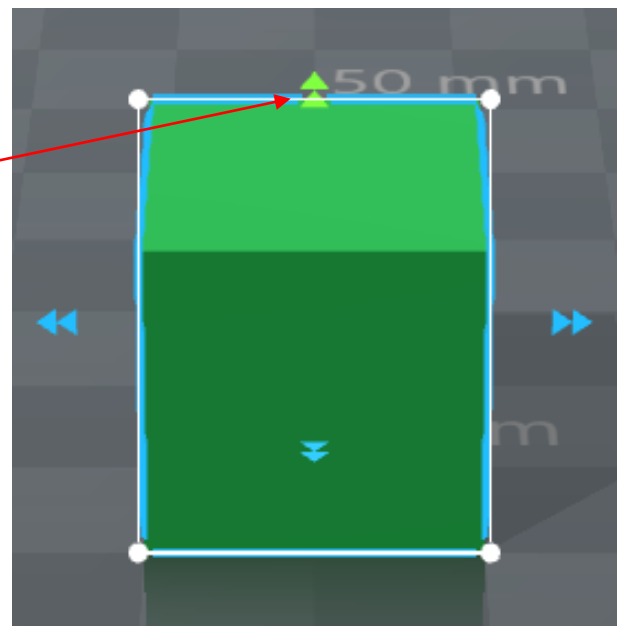


- Notice what happens to ‘y’ and ‘z’
- Now click on the padlock sign



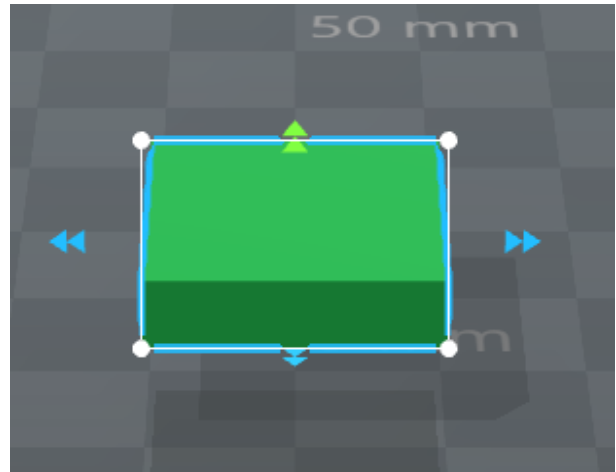
- Click on the “height” sizing arrow above the cube

Shape resizing arrow. Green when selected.

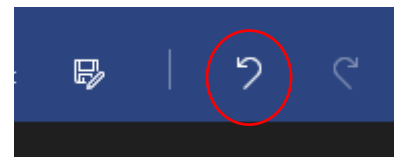


- Change height of the box to 5. You can do this by dragging the resizing arrow or by clicking on the number below ‘z’ and typing in the box. What happens to ‘x’ and ‘y’?

- You can change the size of the width, depth or height individually as long as the lock symbol is shown as unlocked.



- If you get something wrong you can click the undo arrow at the top of the screen
- Or press Ctrl + Z both of these undo your last change.



- Click a different sizing arrow on your shape and change the size and see what happens.

Practice inserting and resizing different shapes

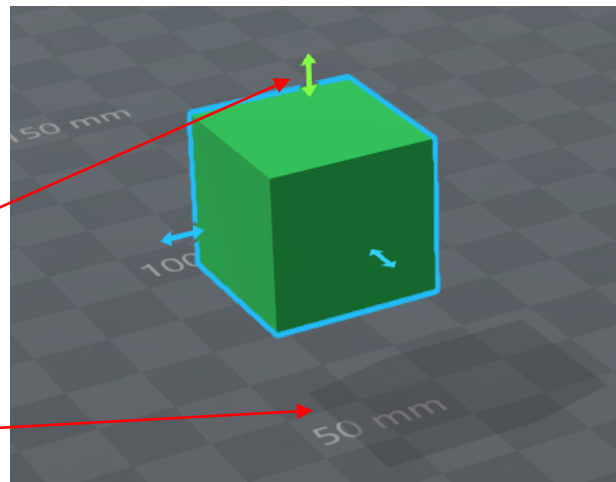
Shapes need to be on the ground!

- A 3D printer needs an object to be flat on the print-bed for it to print properly. This means the designer needs to ensure objects are “settled” on the workspace before they finish.

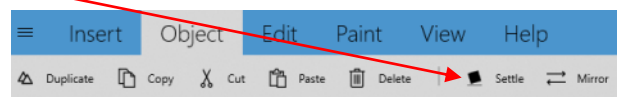
- With the move tool selected, click the arrow above your object and drag the object upwards. Angle your view so you can check the object is off the ground

Arrow used to drag the shape upwards

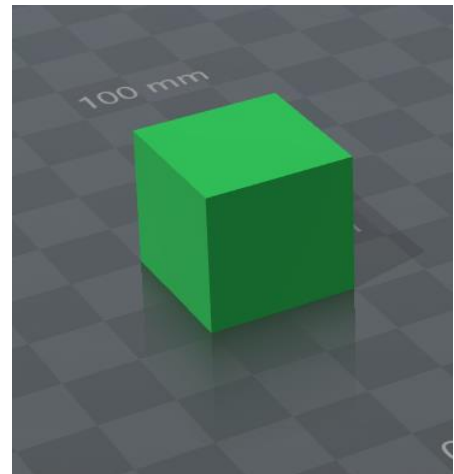
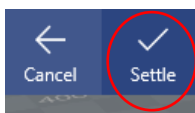
You can see the shape is not on the ground – you can even see its shadow



- In the Object menu, select “Settle”



- Check your object has landed properly and then click the “Settle” tick at the top of the screen



Design Challenge

- Now's your chance to use all the things you've just learned to design a small object of your own that we'll print for you.
- Because 3D printing takes a long time you will probably have to come back to collect your object.

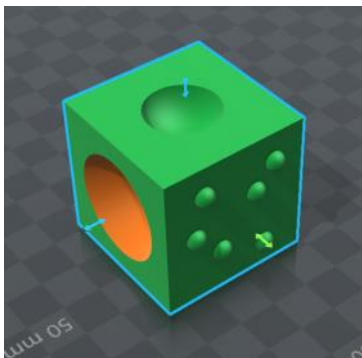
The design challenge has rules!

- The object should be about 20mm in all dimensions but if you want to make it long and thin make the longest bit no more than 40mm
- We may need to print your object smaller if it's too big.
- Make the bottom mostly flat
- Pieces that stick out at the sides will cause the printer to add extra material to support the shape which you'll have to remove after printing.
- The best shapes are not much wider at the top than the bottom.

Here are some examples:

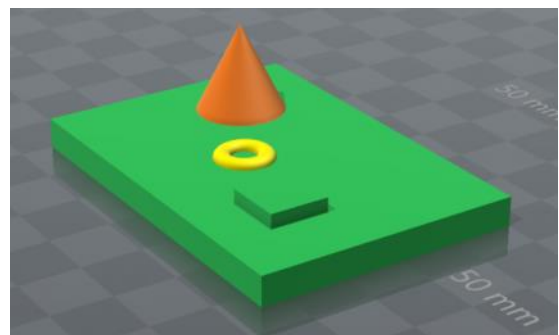
These sorts of shapes would print well...

- This one is narrower at the top than the bottom. The base is wide and flat.



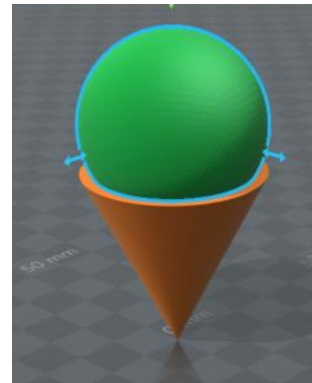
- Some bits sticking out are fine as long as they are small and curving like these dots. Circular openings usually print quite well.

- Wide flat panels with embossed shapes print really well but make sure the embossed shapes are bold and simple.



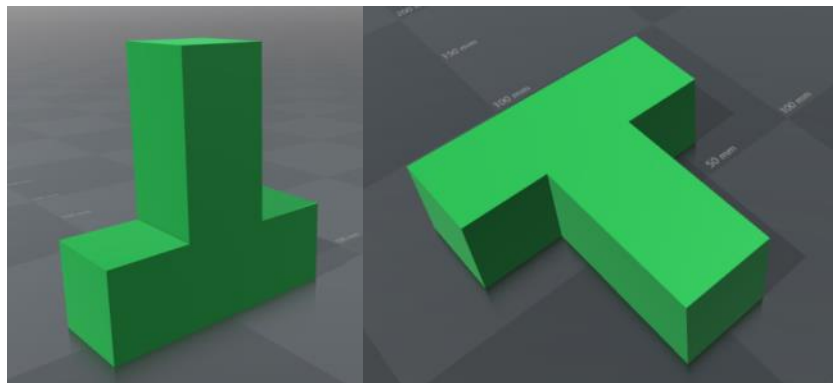
These examples wouldn't print as well – they would make the printer add additional supporting material which would need to be removed. This doesn't mean we can't print them, but they'd need some work after printing.

- This one doesn't have a proper base – it would require too much support material under the cone to make it print.



- The top of this T-shape is wider than the bottom part and the over-hang would need lots of support material

- ...but we could rotate the shape instead to print successfully



Now create your design

Save it to the PC's desktop from time to time
Make the file name your name and add a number each
time you save it so you keep old versions