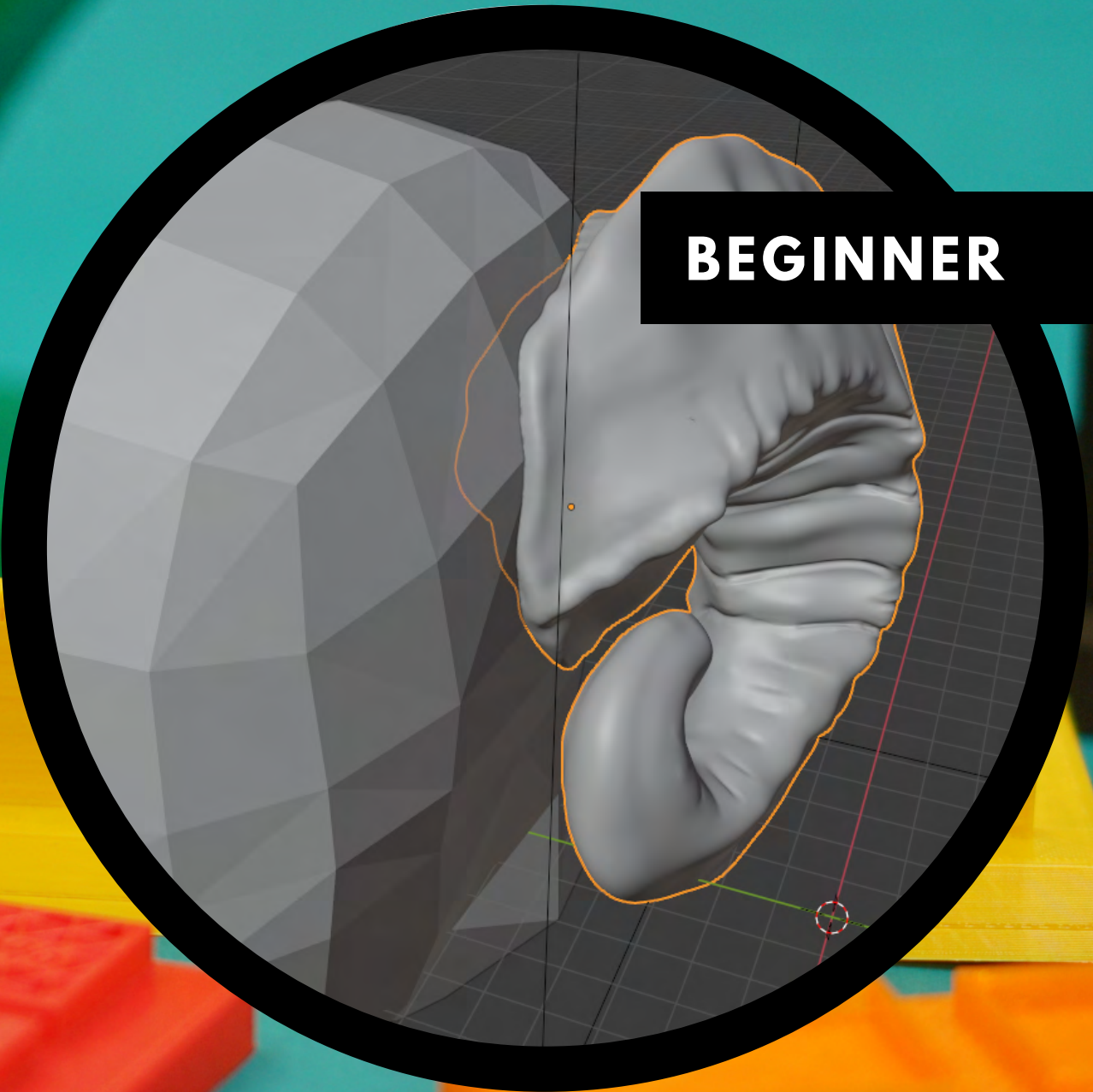


MAKER GUIDE

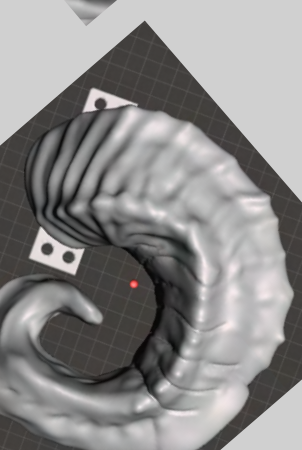
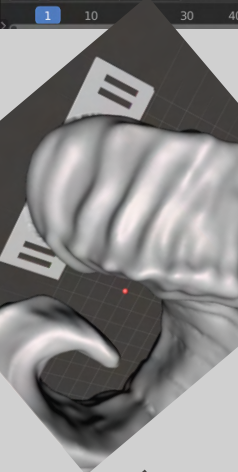
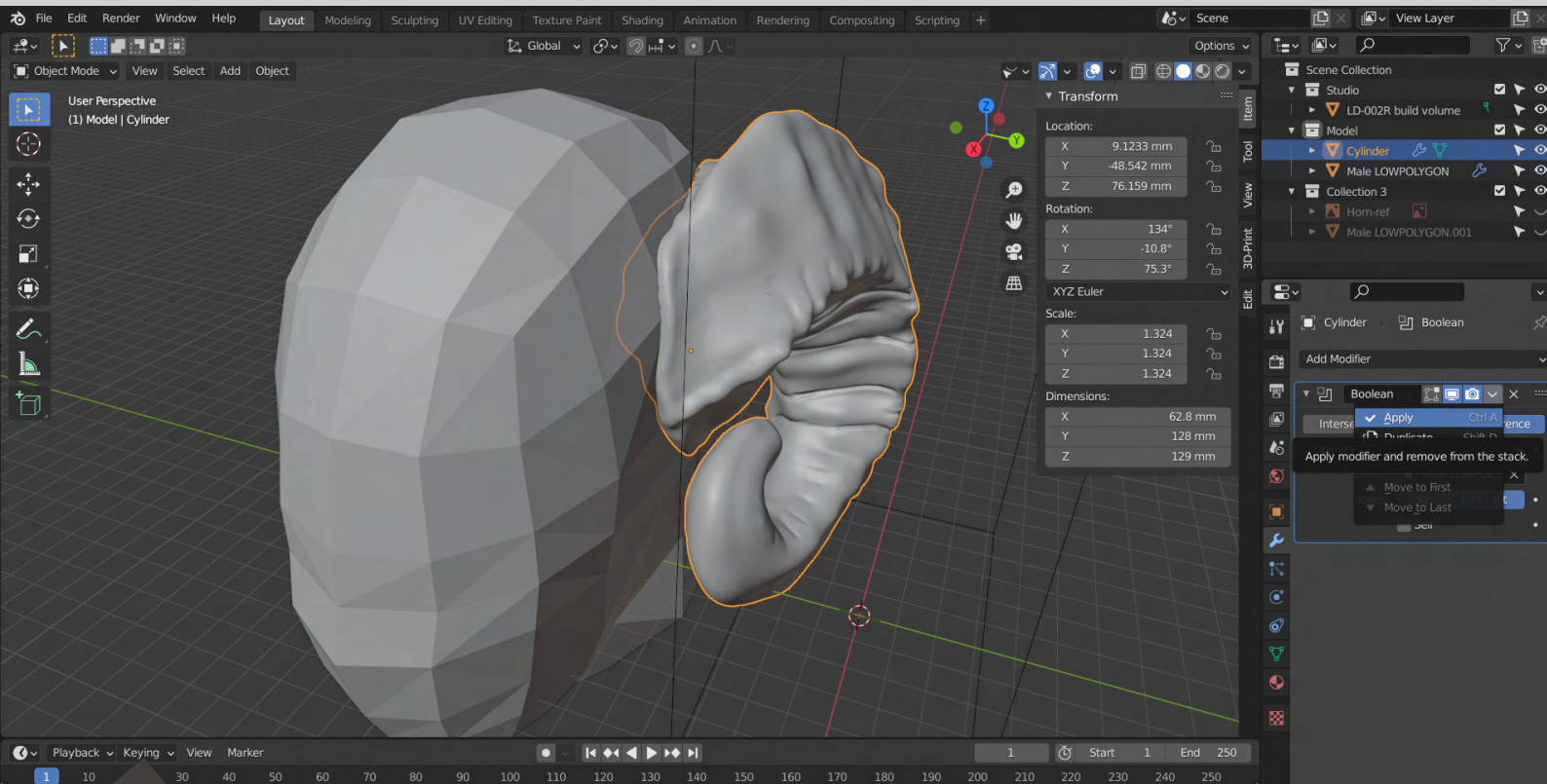
CREATING HORNS IN BLENDER

BEGINNER





PAGE 1



Welcome to Blender! It's a fantastic, free program perfect for making organic shapes for 3D modeling.

It might look a bit intimidating to begin with so this tutorial will take you through a basic but fun exercise to introduce you to the basics of modeling and sculpting in Blender.

The horns made in this tutorial could be made to light up. If you are keen to go the extra step then check out Adafruit's tutorials once you've made your horn here:

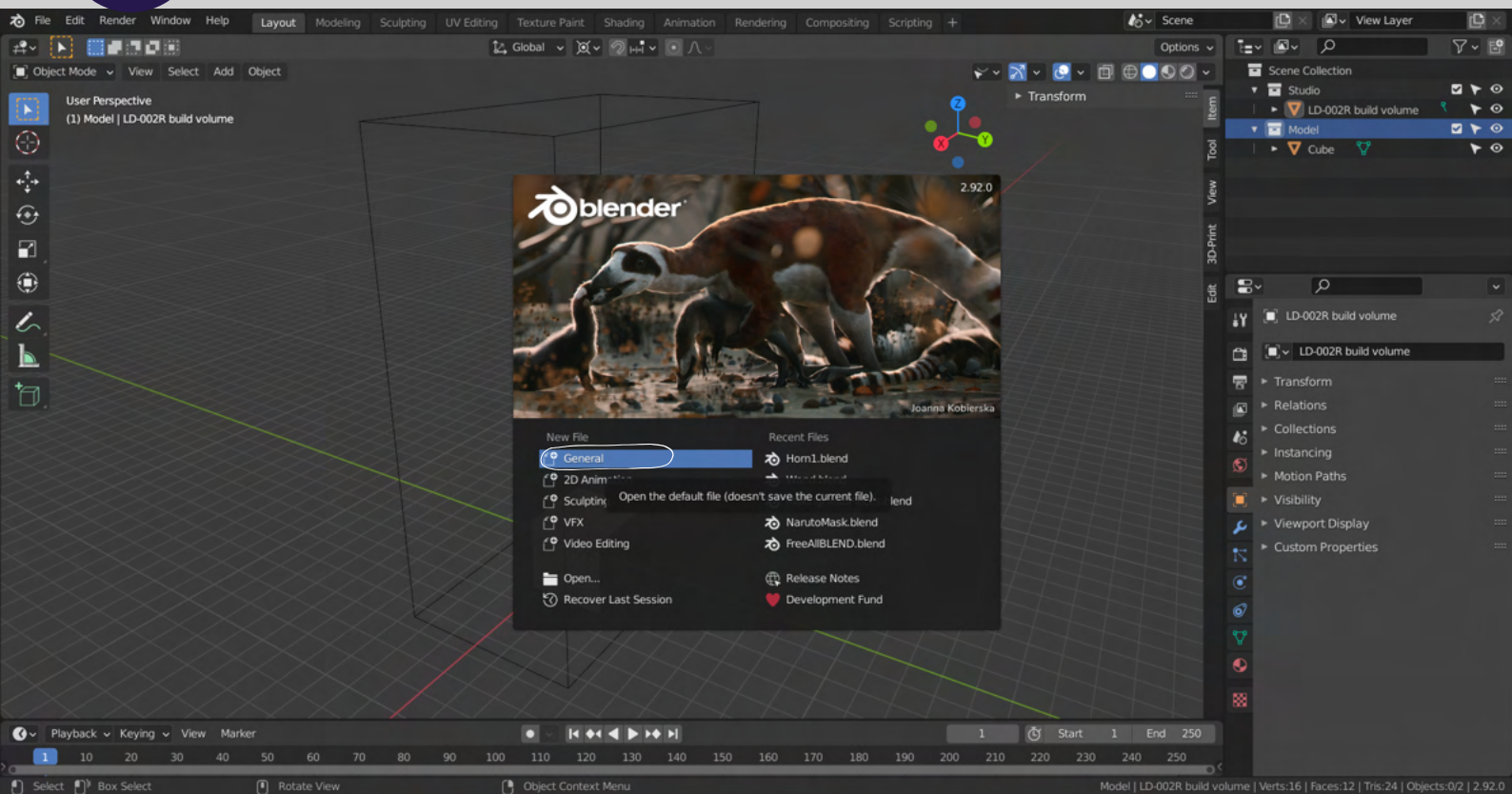
- learn.adafruit.com/3d-printed-led-fire-horns
- learn.adafruit.com/simple-led-unicorn-horn/
- learn.adafruit.com/3d-printed-unicorn-horn



PAGE 2

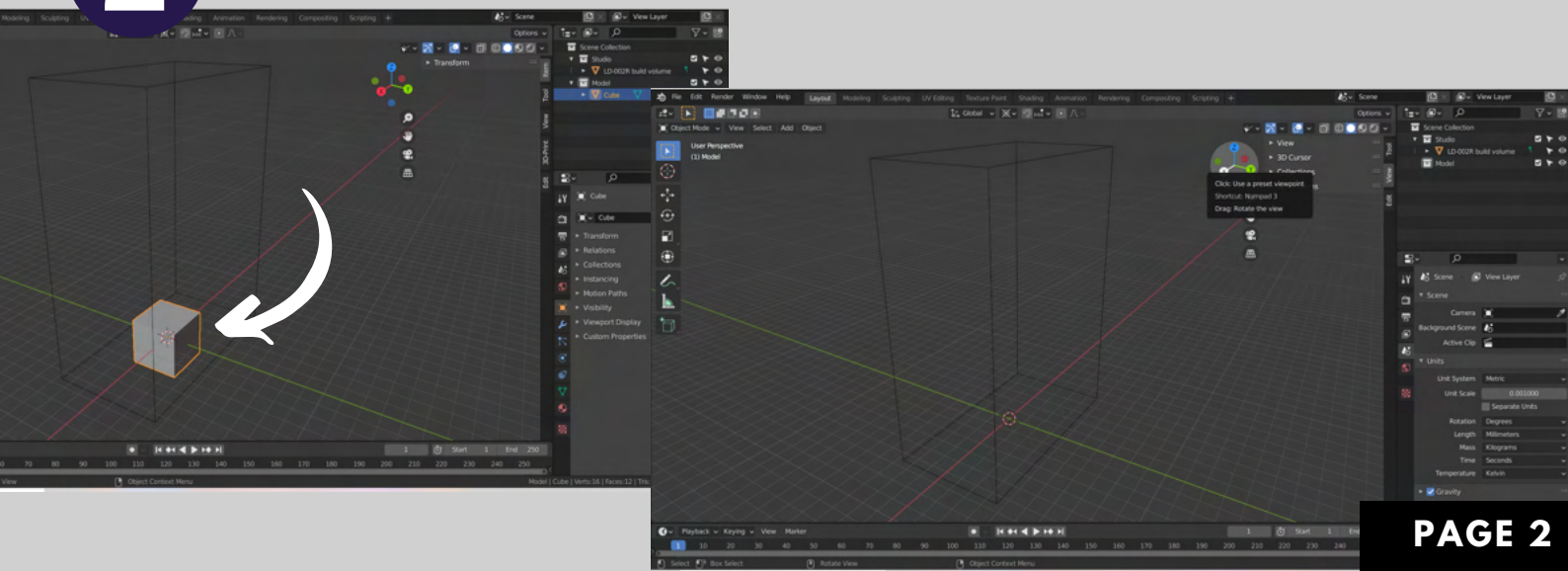
1

To begin, let's open up Blender and create a General file by pressing General.

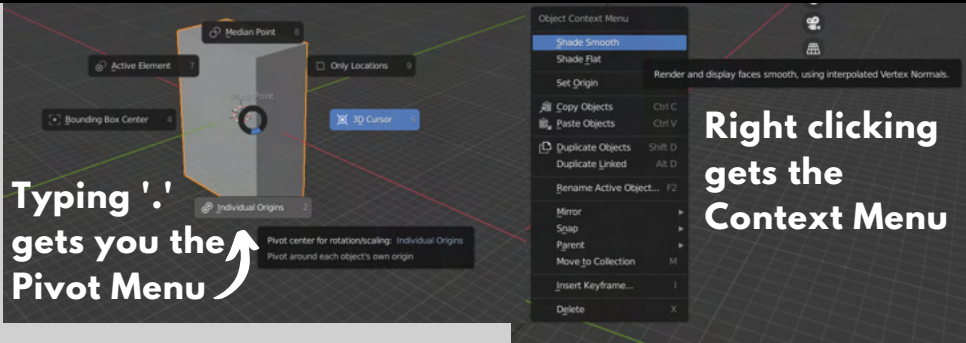


2

Select the cube by clicking on it then the **Delete** or **X** button to delete the cube



INTERFACE OVERVIEW



Navigation Pointers

To navigate in Blender you can use the Navigation Gizmo, hot keys or your mouse.

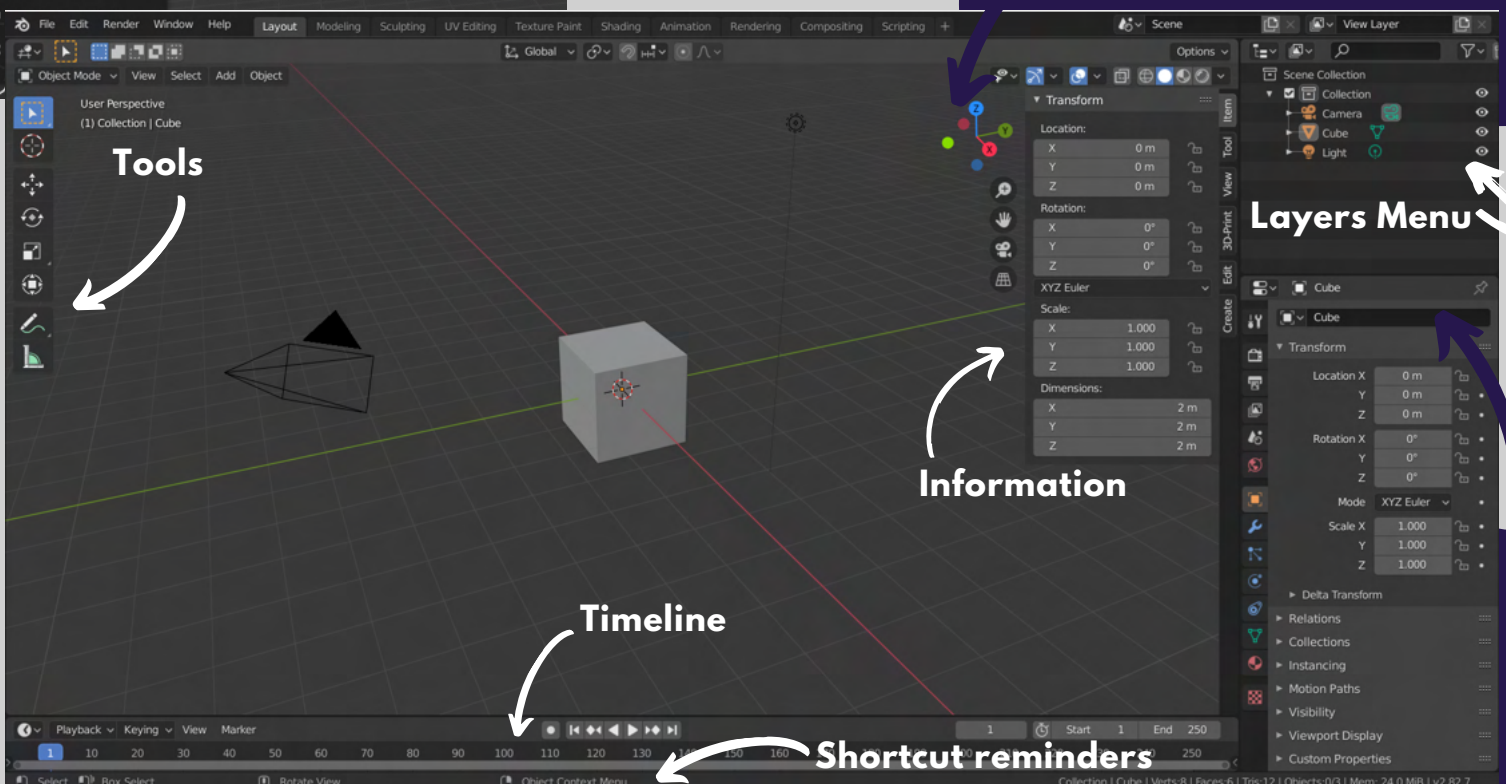
Mouse shortcuts:

Zoom - mouse wheel

Pan - hold shift and middle mouse button

Orbit - hold the middle mouse button

Modes will modify the panels, controls, shortcuts and tools available while working. Certain workspaces will automatically put you in certain modes.



Key Shortcuts

G - Grab/move

R - Rotate

S - Scale

X - Delete selection

Right-click - Context menu

Left-click - Select

T - Tools

N - Information

Shift + A - Add

Tab - change modes

Properties panel

This panel is object dependent and shows render and dimension information.

PAGE 4

3

Next let's insert a reference image to work from. Open the Add menu (by pressing **Shift + A**) and go to **Image > Reference**

Then just choose your image and position it.

Press **G** to grab and move it and use the corners to scale it

Technical Pointers

Hold **Shift + A** to get the add menu

Grab

Shortcut
G

4

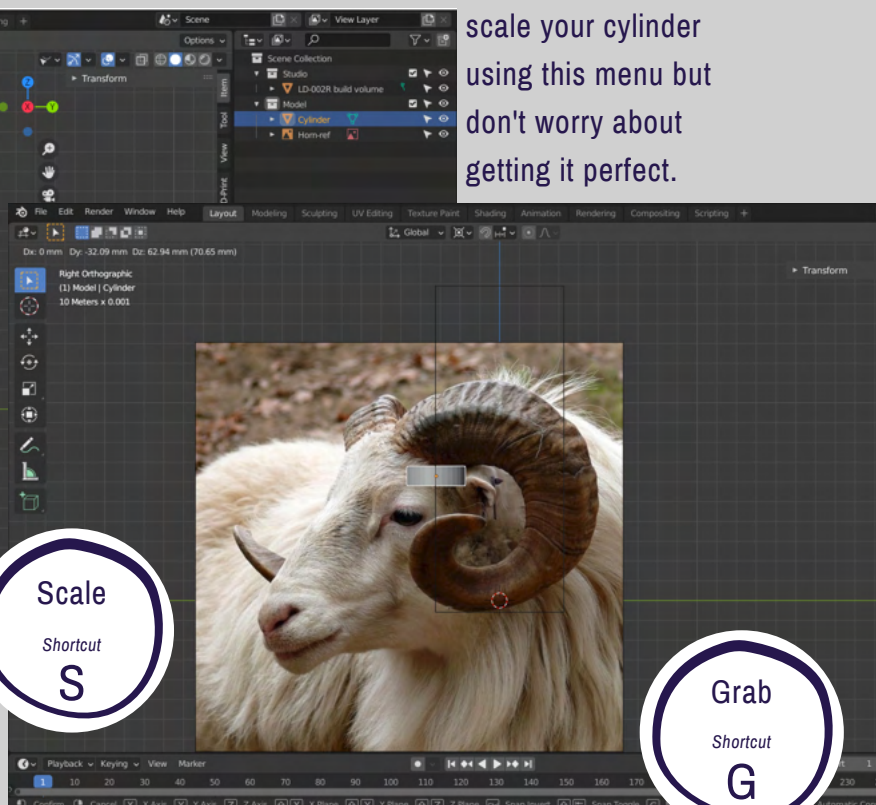
Now use the Add menu again to add a Cylinder, this will be the foundation of our horn.



PAGE 5

5

When you create your cylinder you'll get this Add Cylinder menu (see arrow below). Feel free to scale your cylinder using this menu but don't worry about getting it perfect.



Scale

Shortcut
S

Grab

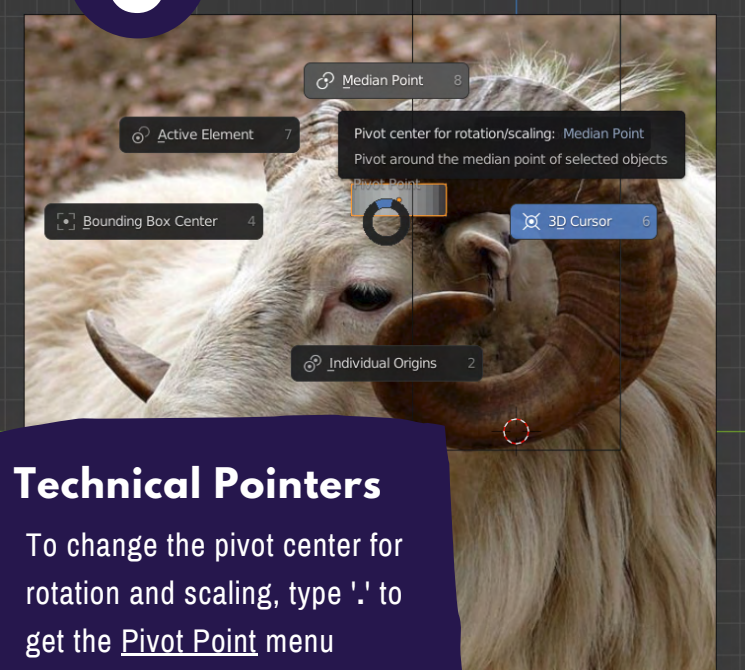
Shortcut
G

If you can't see this menu in full, it's most likely minimized at the bottom of your screen or you've already tapped of it. Either way, don't worry, you can scale your cylinder by pressing **S**

6

Press the **period** key (',' key on your keyboard) to change your pivot point from 3D Cursor to Median point. This will allow you to rotate from the center of the model instead of the 3D Cursor.

Next type **R** to rotate your cylinder so it lines up with the horn in the picture. (You may want to use the grab tool to adjust the cylinder to line it up)



Rotate

Shortcut
R

Grab

Shortcut
G



Technical Pointers

To change the pivot center for rotation and scaling, type '.' to get the Pivot Point menu

PAGE 6

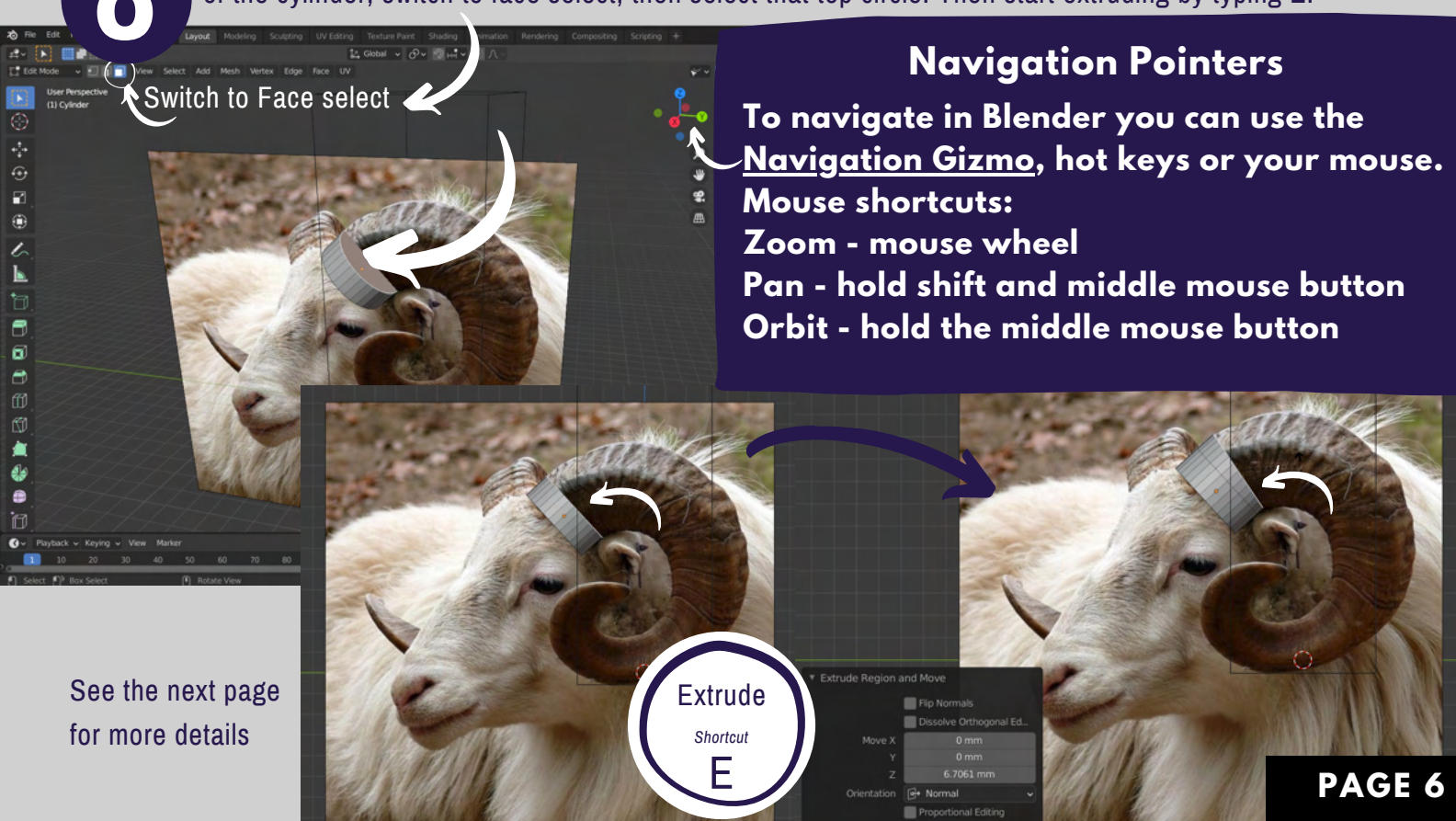
7

Next it's time to move from the Object mode to Edit mode. You can do this by using the drop down menu on the top left corner or pressing **Tab**.



8

Now it's time to start extruding the horn. Start by rotating the view point so you can see the top of the cylinder, switch to face select, then select that top circle. Then start extruding by typing **E**.



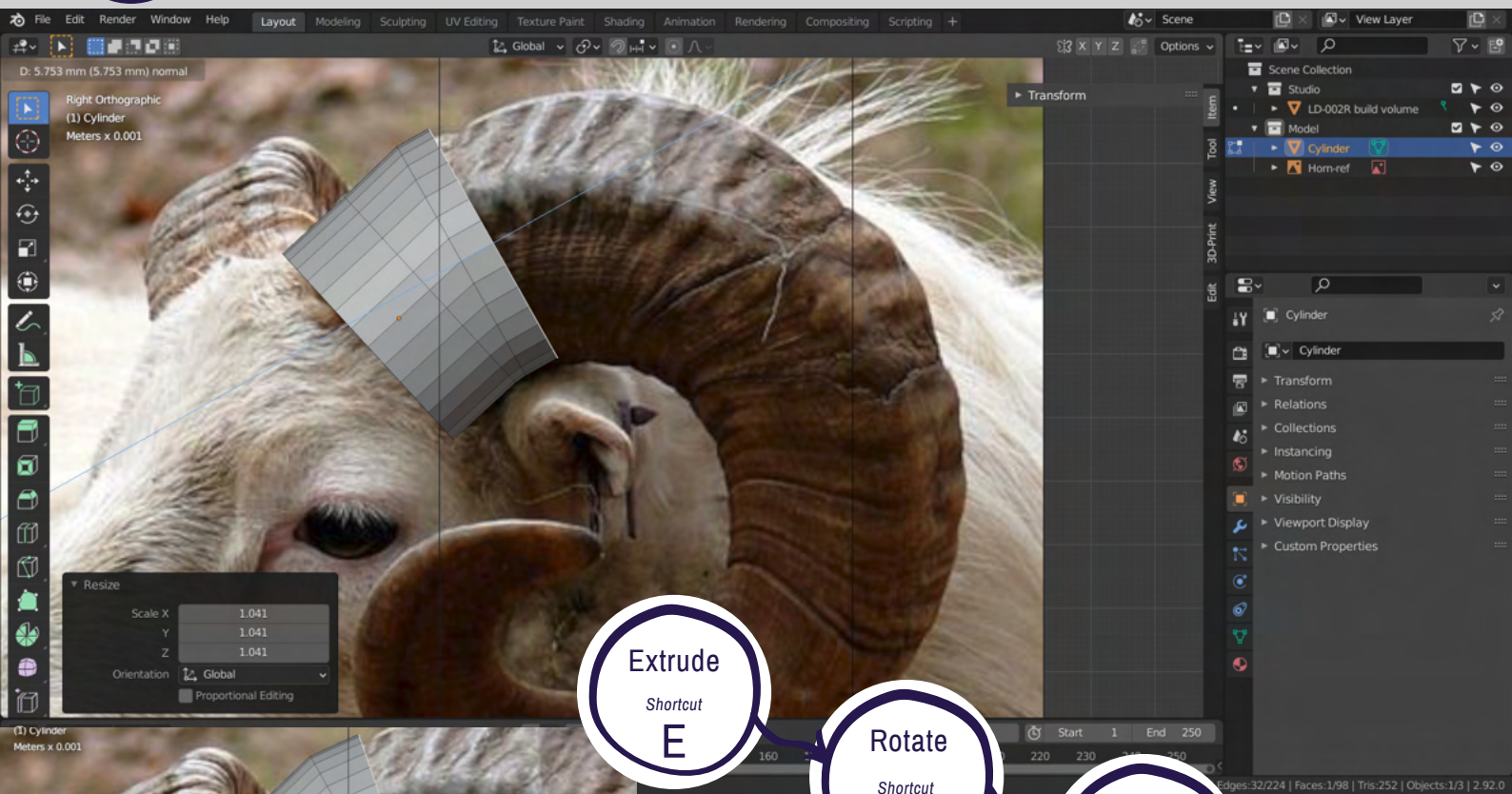


PAGE 7

9

To create the main base of the horn you'll need to continue the pattern of:

Extruding a small section of the model > **Rotating** that section > **Scaling** that section > **Grabbing/Moving** that section > **Extruding** a new section etc. See below for the process.



Extrude

Shortcut
E

Rotate

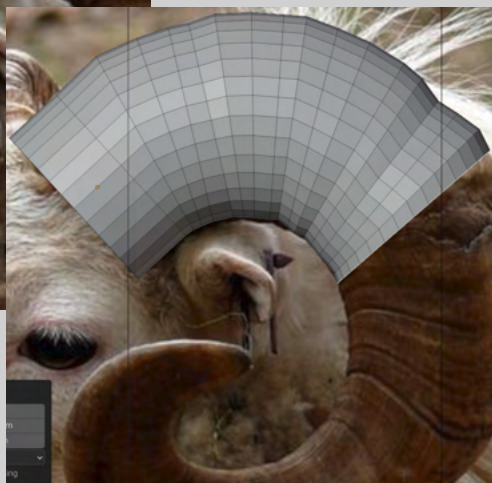
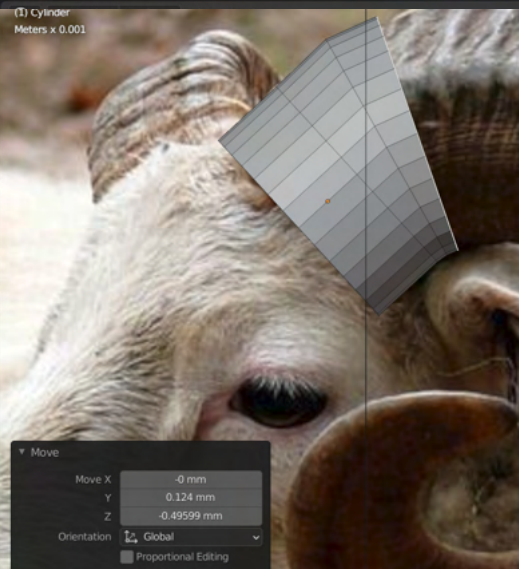
Shortcut
R

Scale

Shortcut
S

Grab

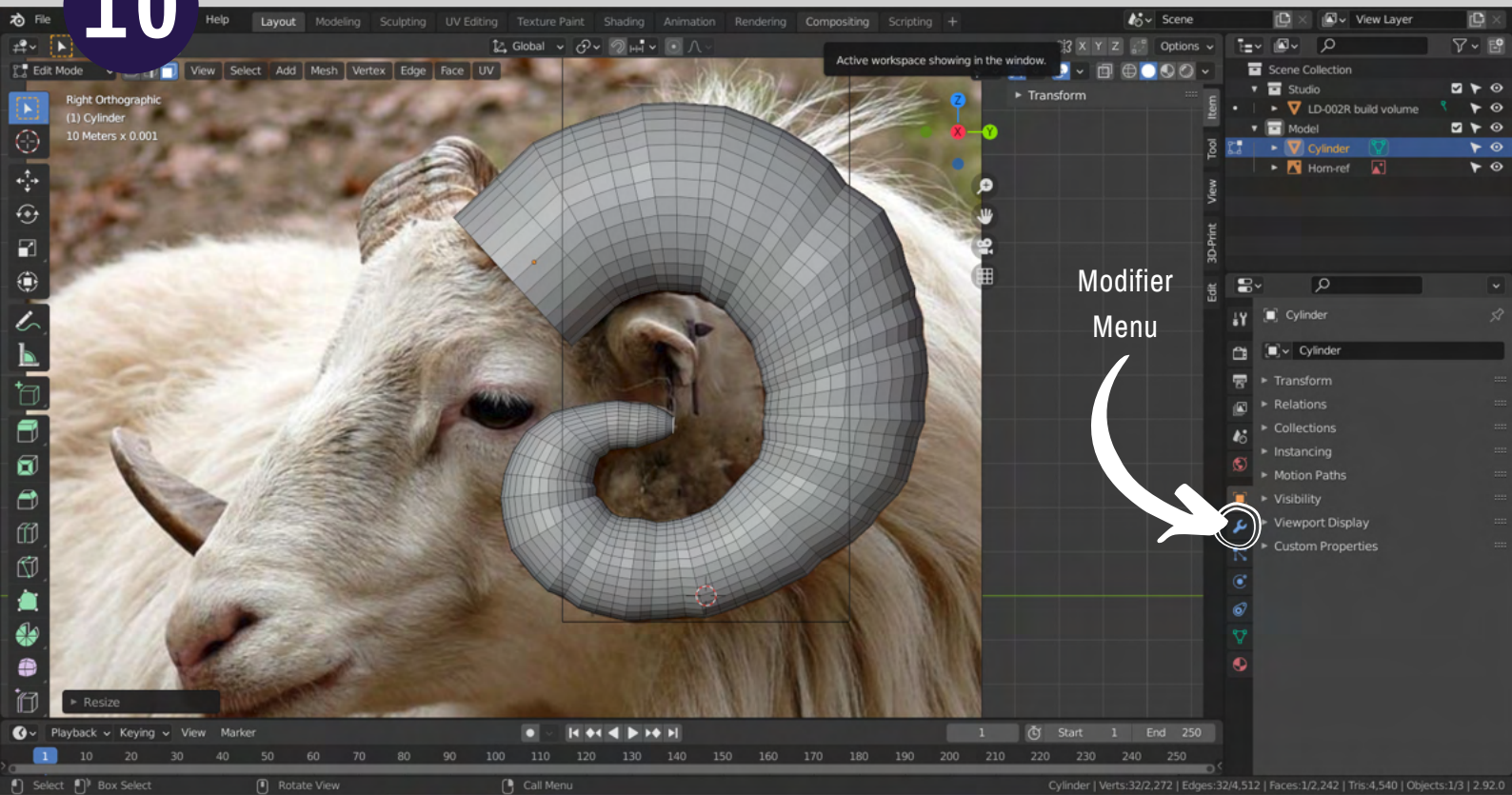
Shortcut
G



Smaller sections are better for a smoother result. Be patient with this part and take the time to practice these fundamental modeling tools.

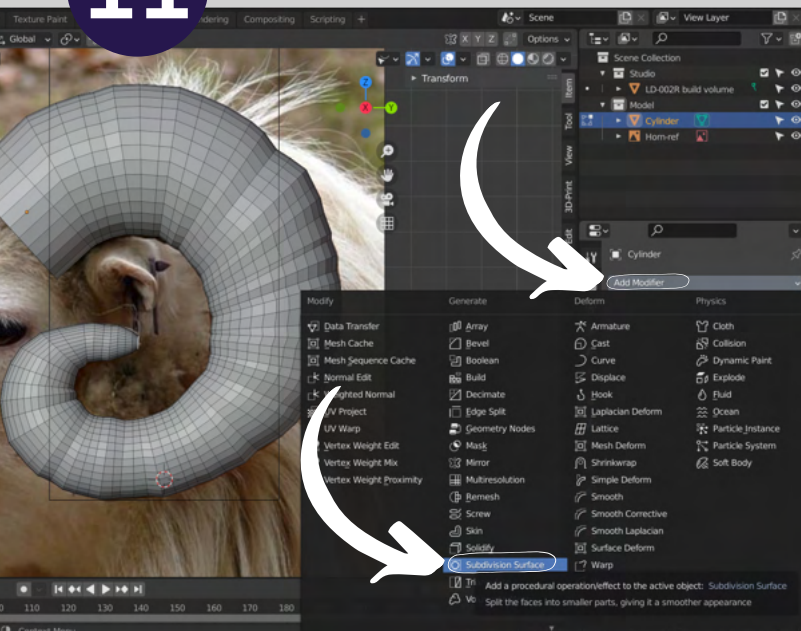
10

Once you've finished the horn you should have something like this. Next head to the Modifier menu.



11

Click the **Add Modifier** button and select the **Subdivision Surface** modifier.



Then change the Levels Viewport to 3 for a smoother model.

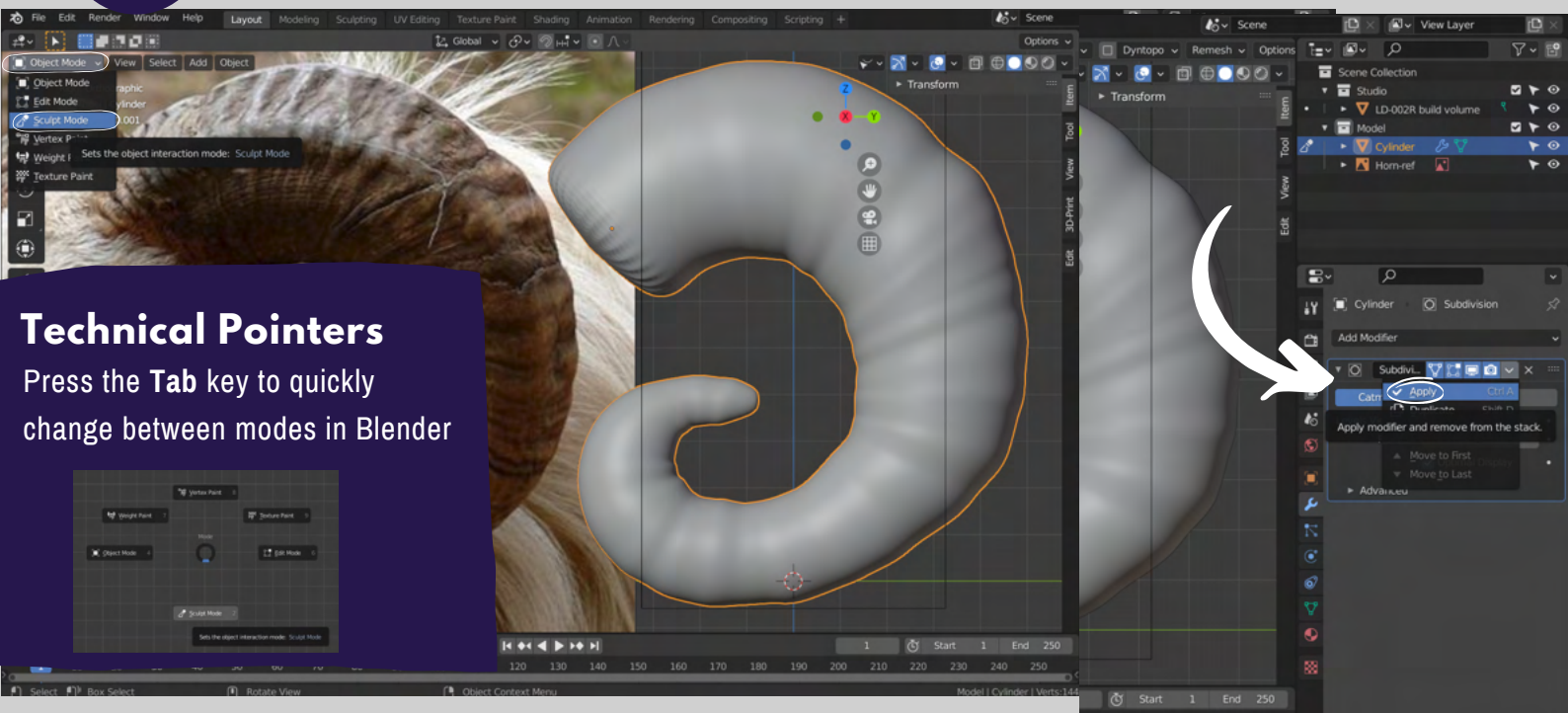




PAGE 9

10

Next change from Object mode to Sculpt mode and apply the **Subdivision Surface** Modifier by clicking the down arrow next to the modifier and selecting the Apply option.



Technical Pointers
Press the **Tab** key to quickly change between modes in Blender

11

Then turn on **Dyntopo** by clicking the tick box next to the setting and make sure the settings are the same as below.



Technical Pointers

Dyntopo will ensure Blender creates geometry while we sculpt leading to smoother sculpting



PAGE 10

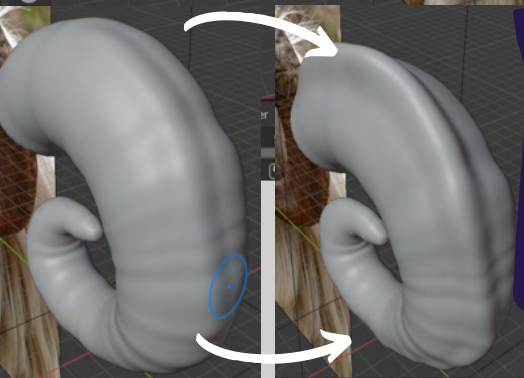
12

Now the horn is smooth and ready to sculpt. Start by zooming out a bit so you can see the whole model and sculpt the larger areas. Use the **sculpt draw** tool to create the ridges of the horn.



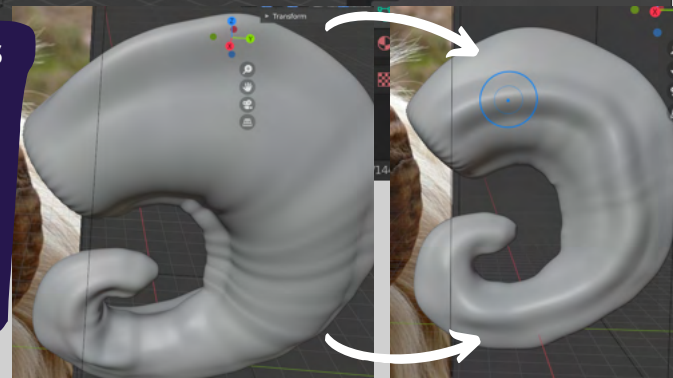
Technical Pointers

Start large then zoom in for detail
Dyntopo will create geometry based on how close you are zoomed in - the closer you are the 'tighter' the sculpt

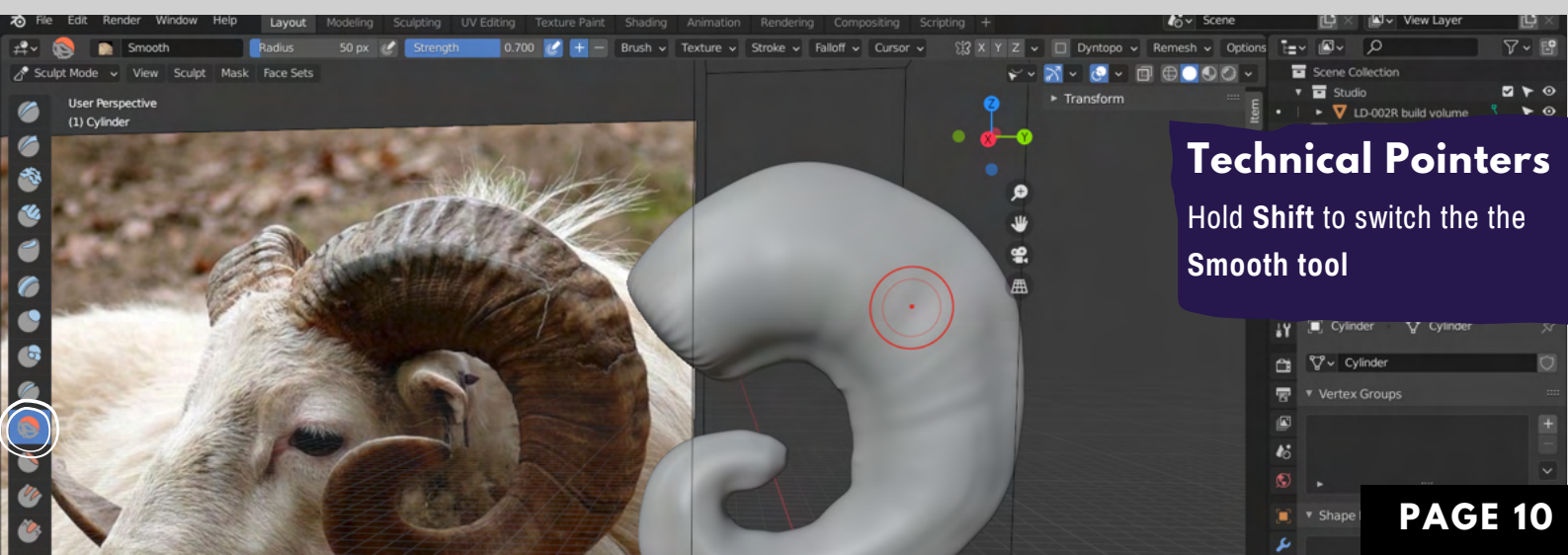


Technical Pointers

The best thing to do when sculpting is to start with big shapes and slowly whittle down to a more detailed and defined version



During the sculpting process you'll want to jump between drawing and smoothing



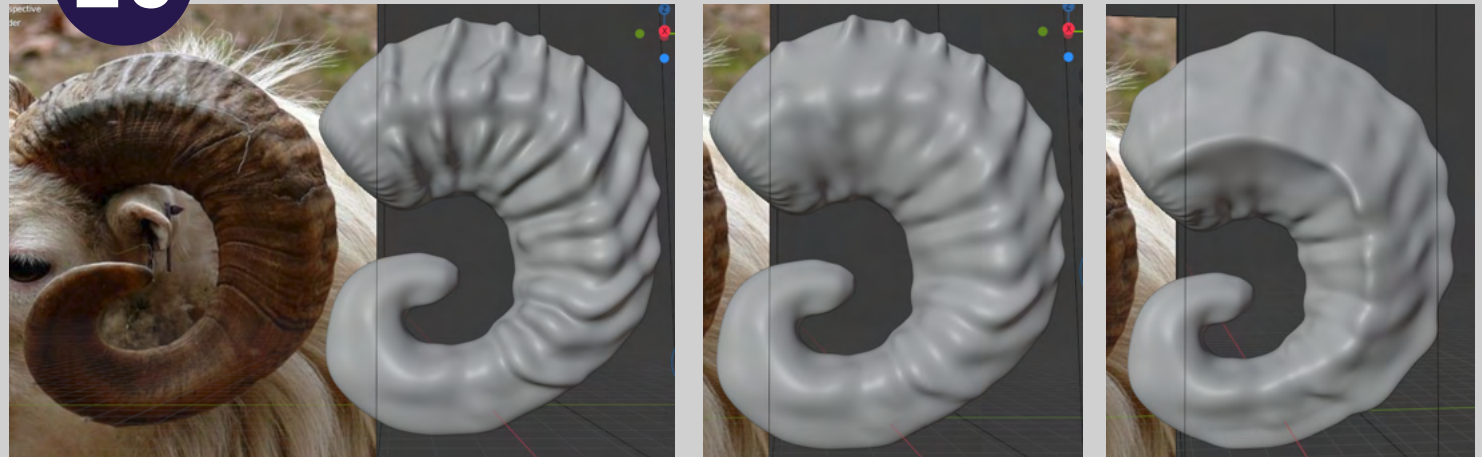
Technical Pointers

Hold Shift to switch the the Smooth tool

PAGE 11

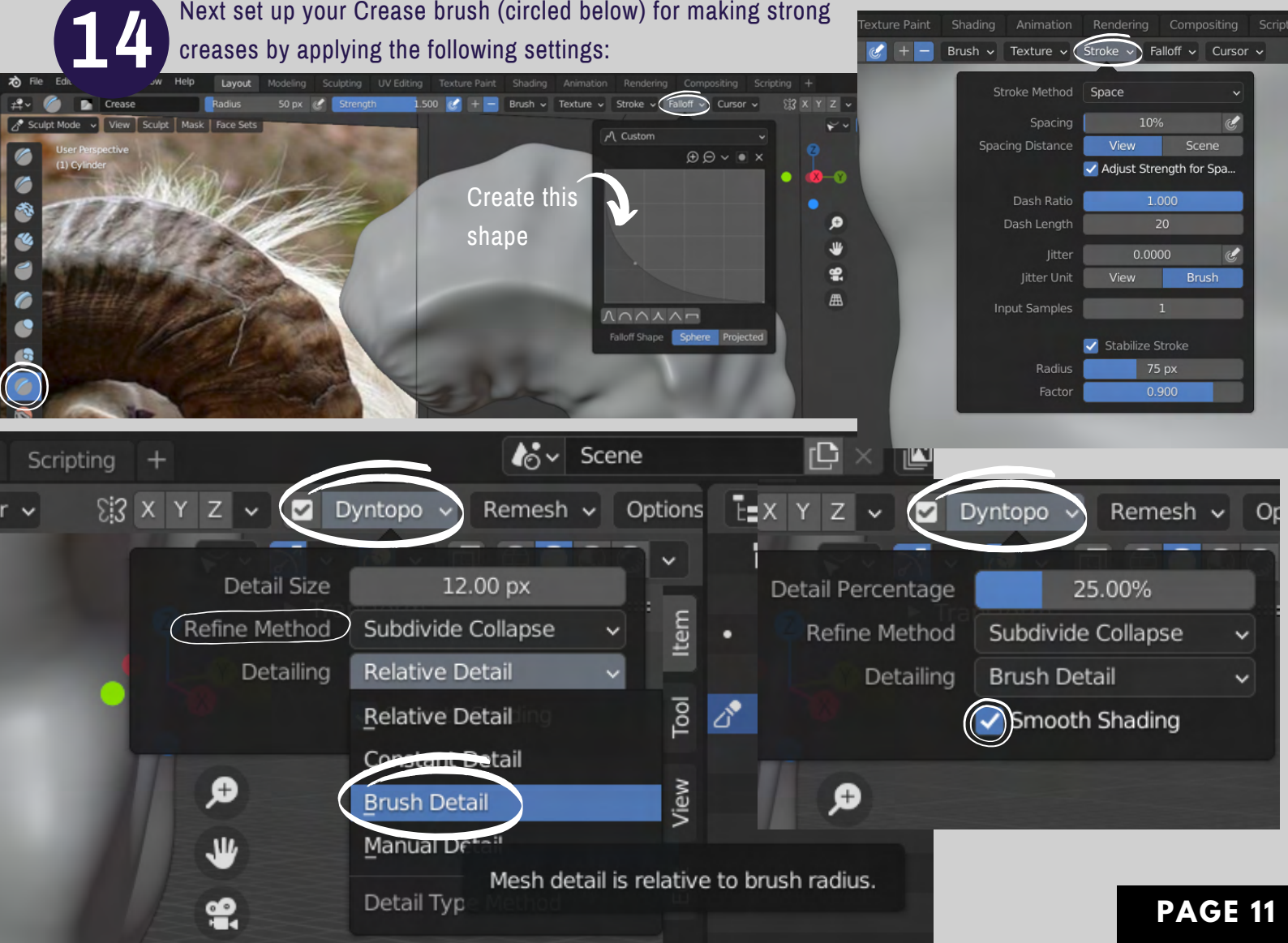
13

You may find yourself drawing then smoothing shapes and then drawing them again. Sculpting is all about slowly building up the shape you want. Here ridges are drawn then smoothed for effect.



14

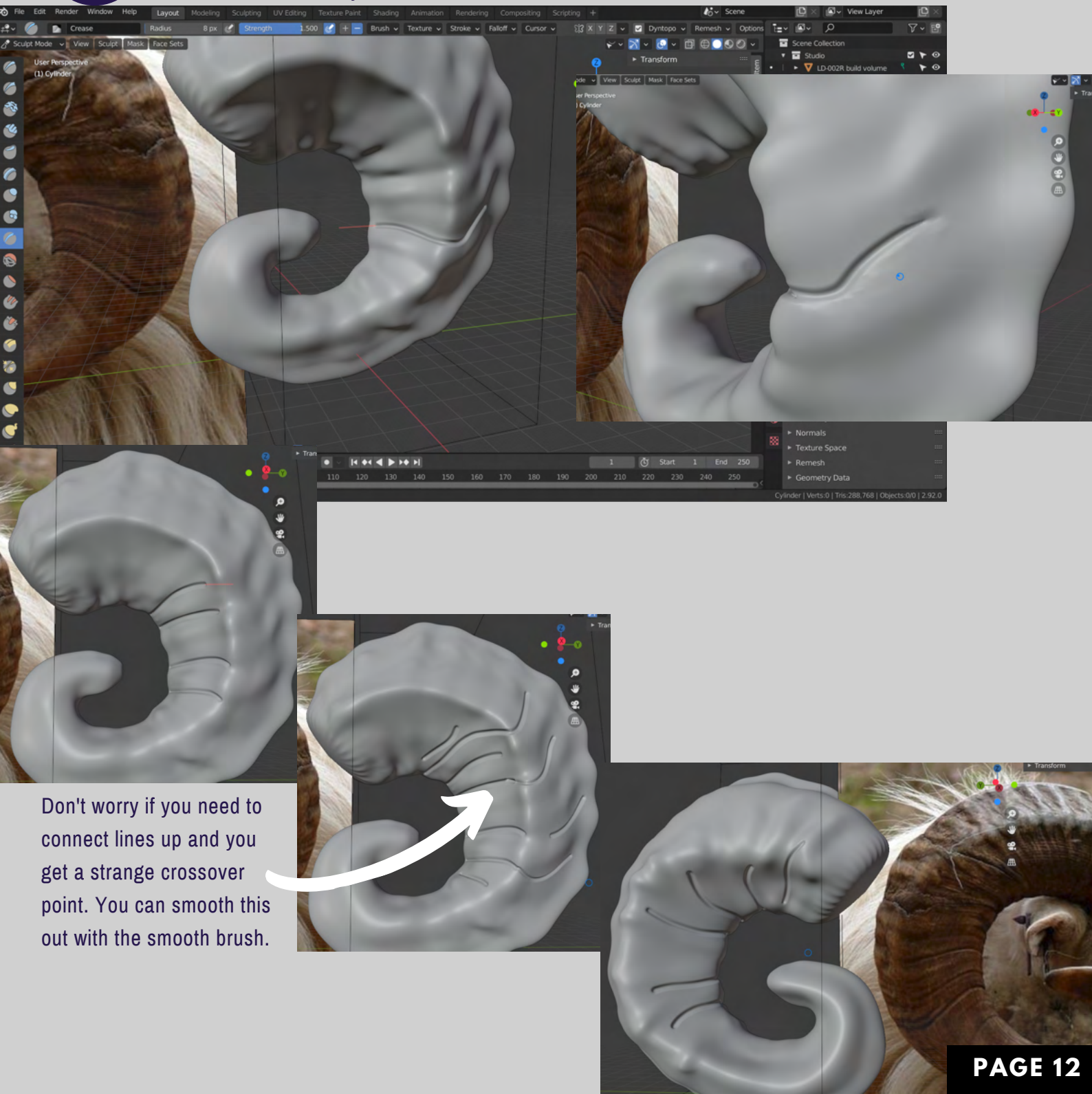
Next set up your Crease brush (circled below) for making strong creases by applying the following settings:



PAGE 12

15

Next draw the creases on the horn. You'll notice the brush lags after your mouse, this lag effect helps stabilize your shape to give a smoother effect. It may take a little getting used to so don't be afraid to undo lines you don't like.

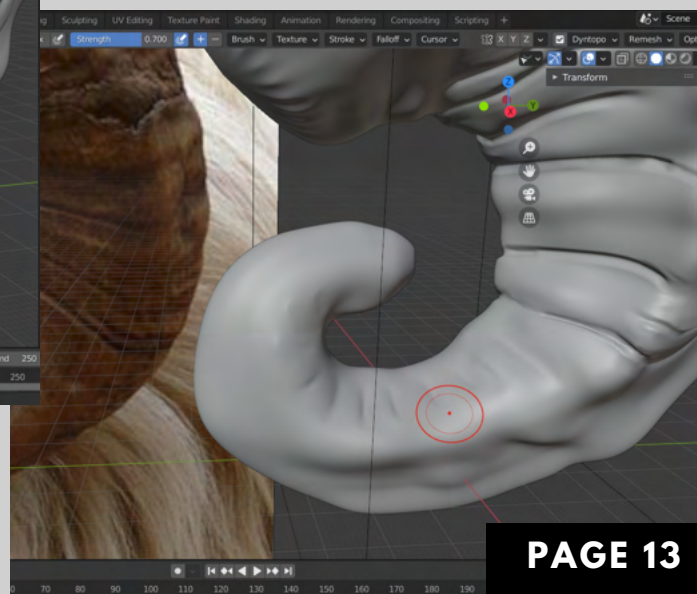
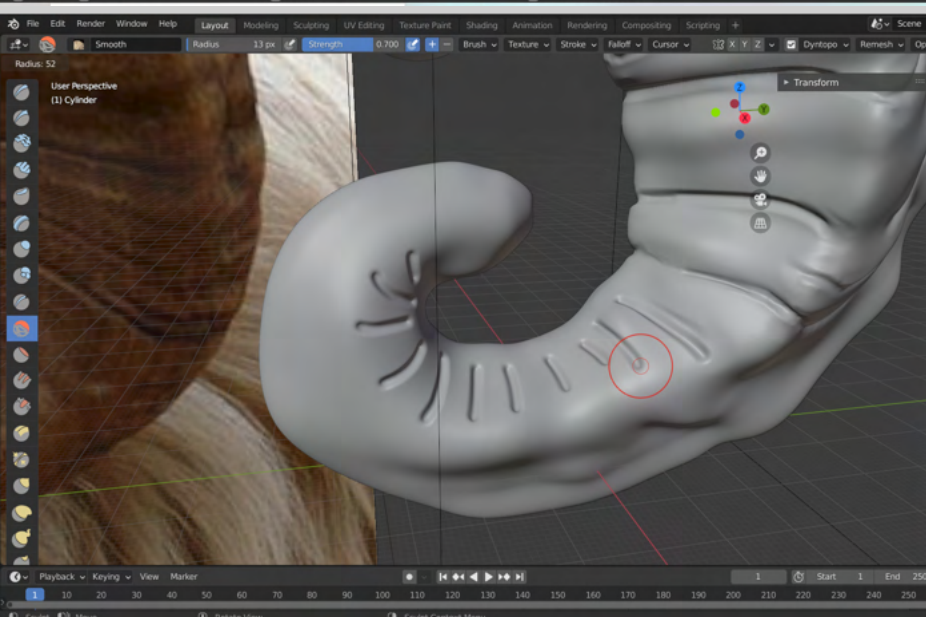




PAGE 13

15

Continue to draw and smooth lines...





PAGE 14

15

And continue to draw and smooth lines. This might take a while but the aim is to build up the shape through the sculpting tools. Don't worry if you make a mistake, just smooth it over.



Technical Pointers

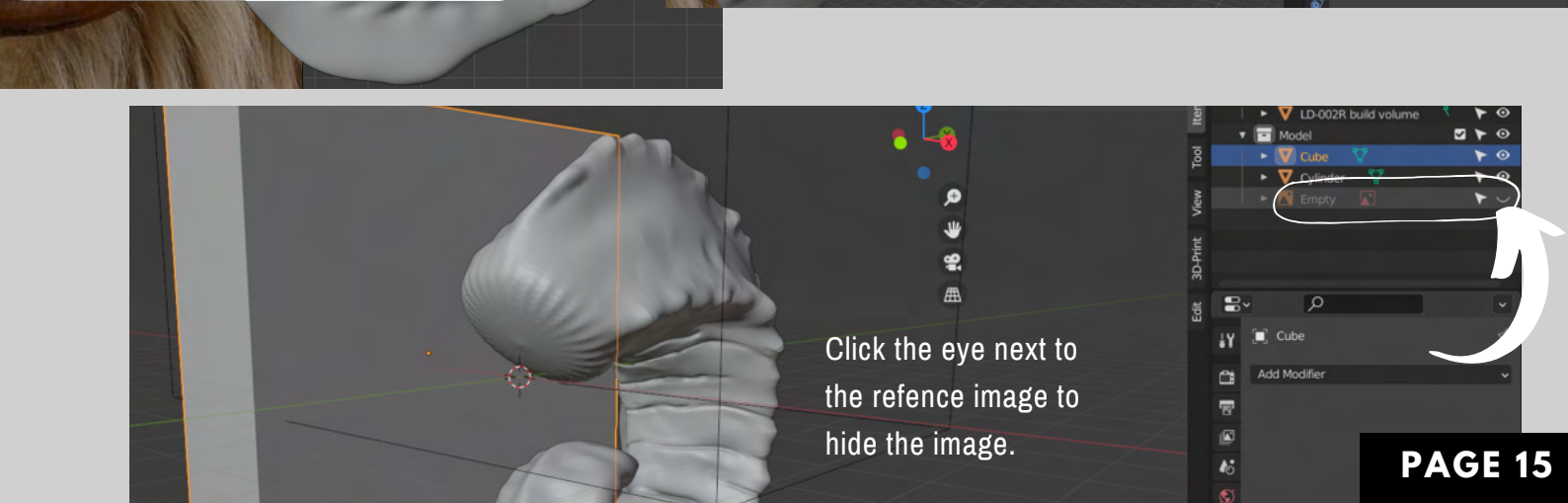
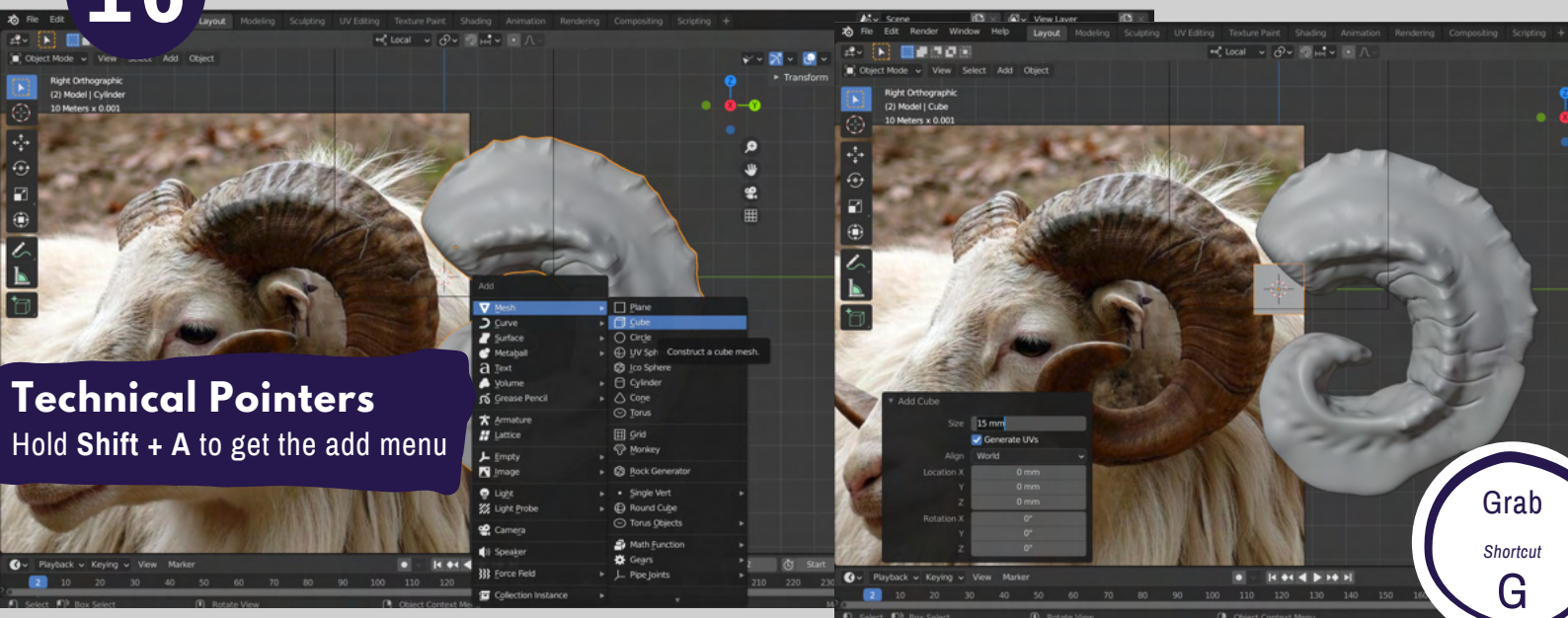
Hold the **shift** button to quickly swap to the Smooth brush



PAGE 15

16

Once you like the look of your horn go back to Object mode and add a cube using the Add menu. Then adjust the cube so it's sitting next to the horn, about where the reference image is.

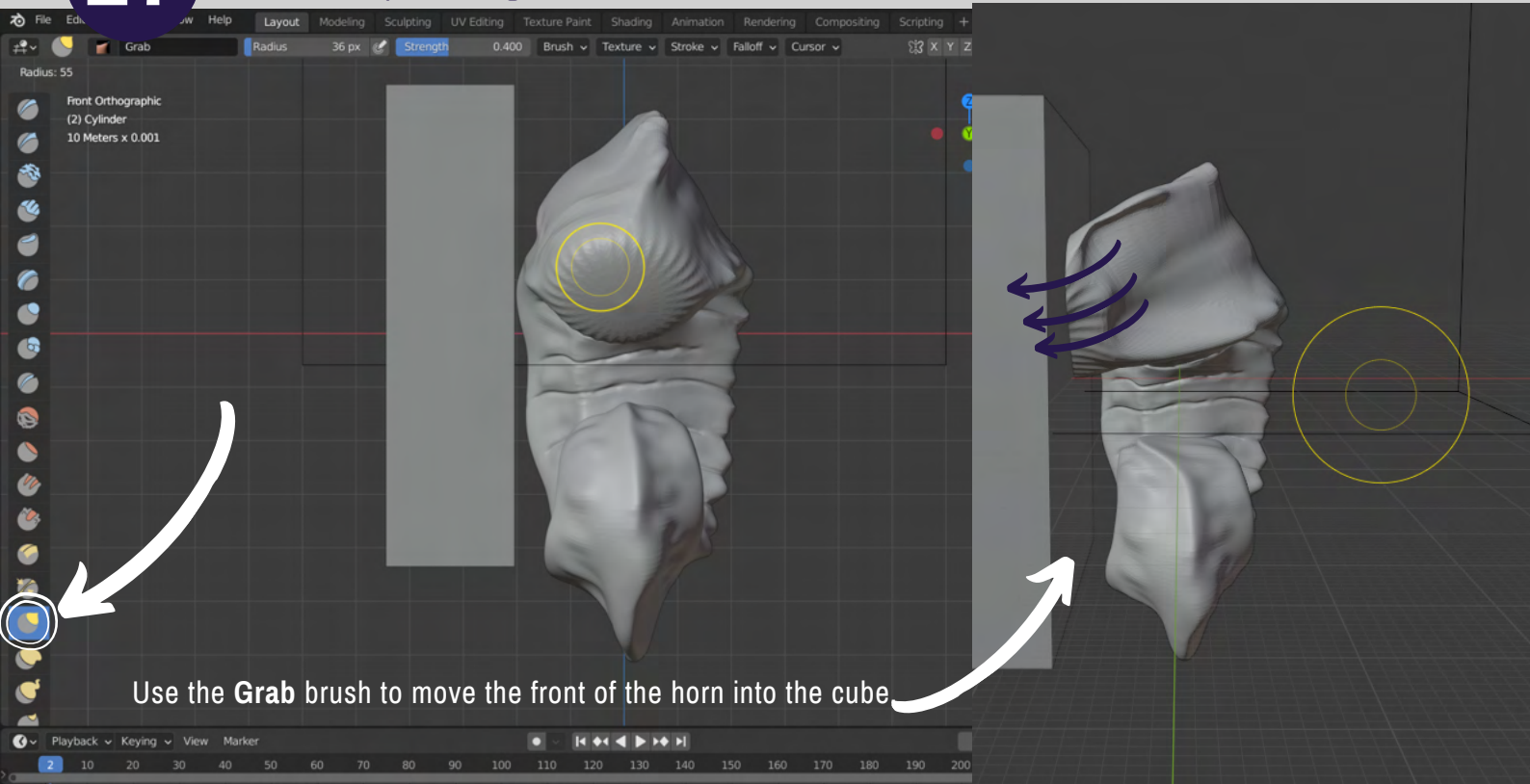




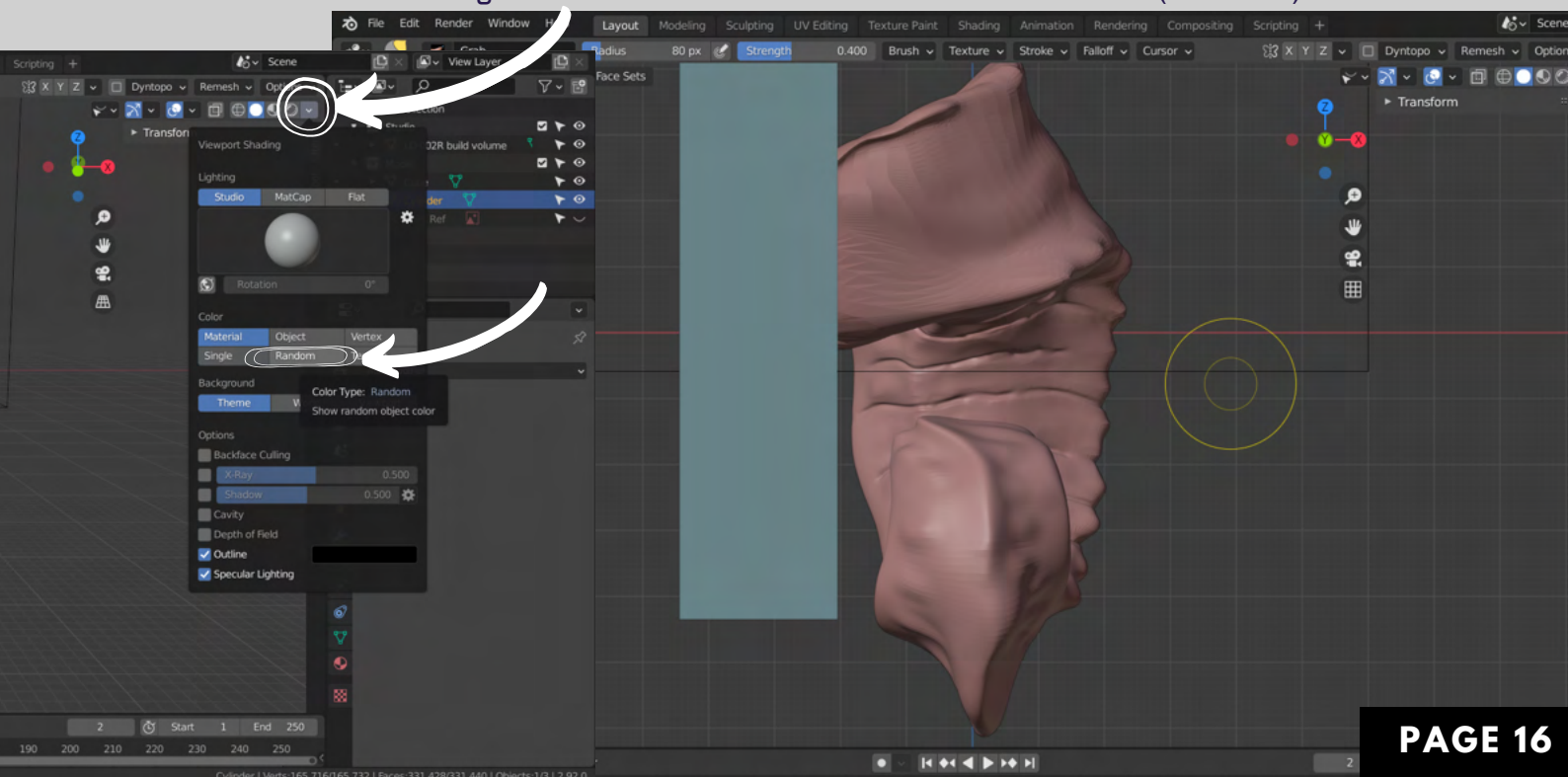
PAGE 16

17

Switch to Sculpt mode again and select the **Grab** brush.



To make it easier to distinguish the horn from the cube I randomized their colors (see below)



PAGE 17

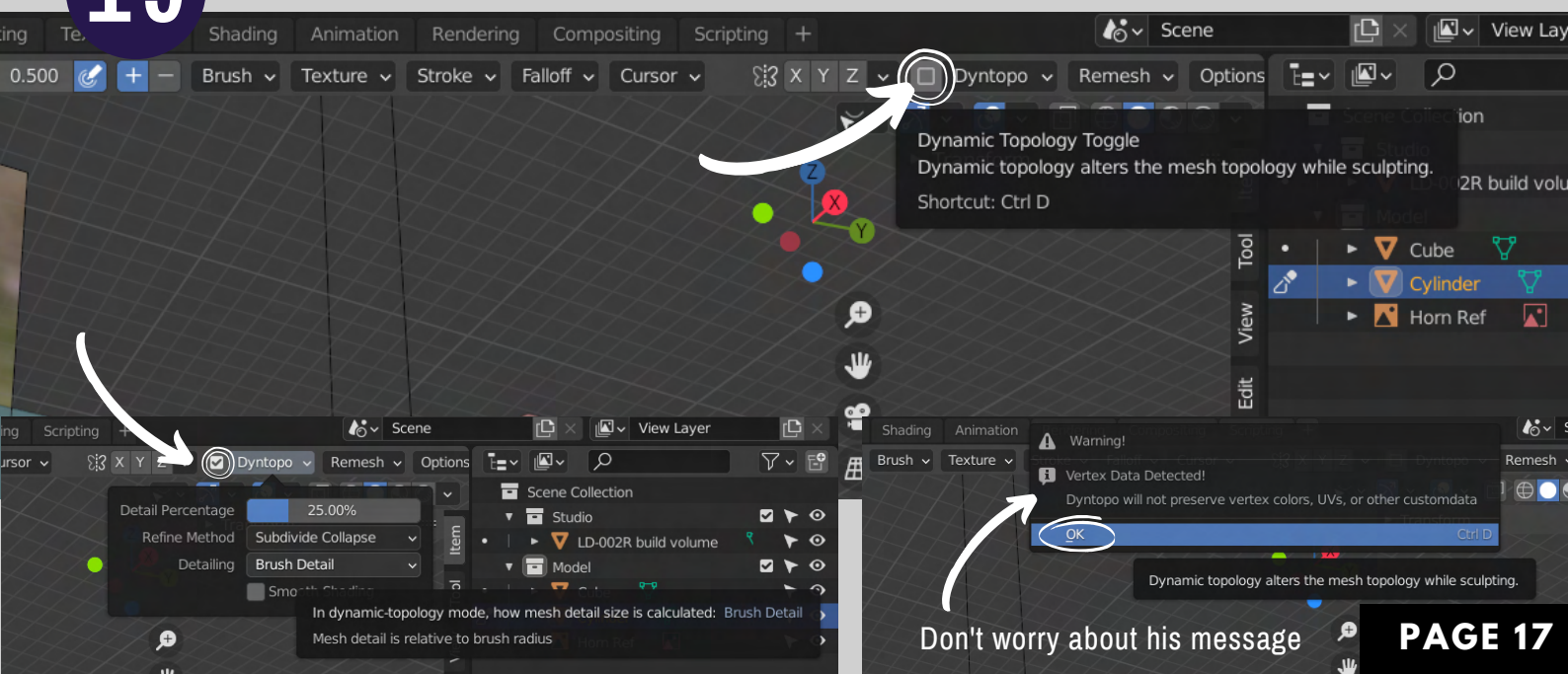
18

Next unhide the reference image (by clicking the eye icon next to the image) and adjust the image so its opacity is low enough that you can see the model. Also move the depth to back.



19

Next head to Sculpt mode again and turn on Dyntopo.



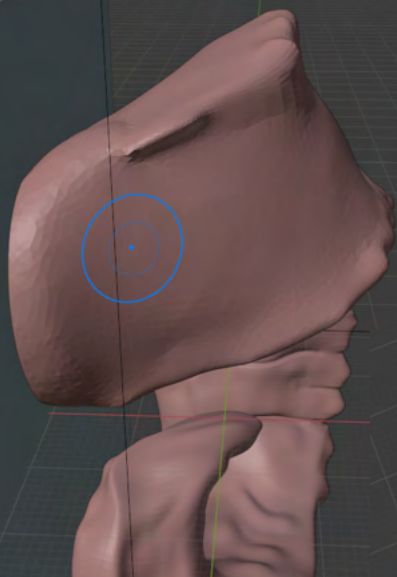
Don't worry about his message

PAGE 17

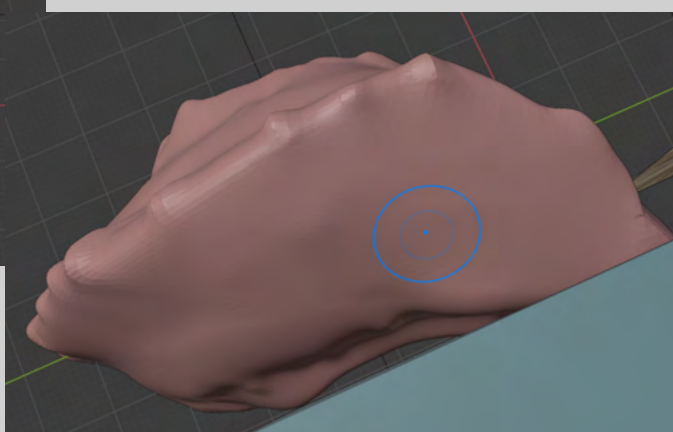
PAGE 18

19

In Sculpt mode use the **Clay** brush to add volume to the stretched out part of the horn that was moved towards the cube. You can see below how the brush was used to add a 'lip' to the horn.



You may need to add multiple layers with the **Clay** brush and to build up a shape that you like.





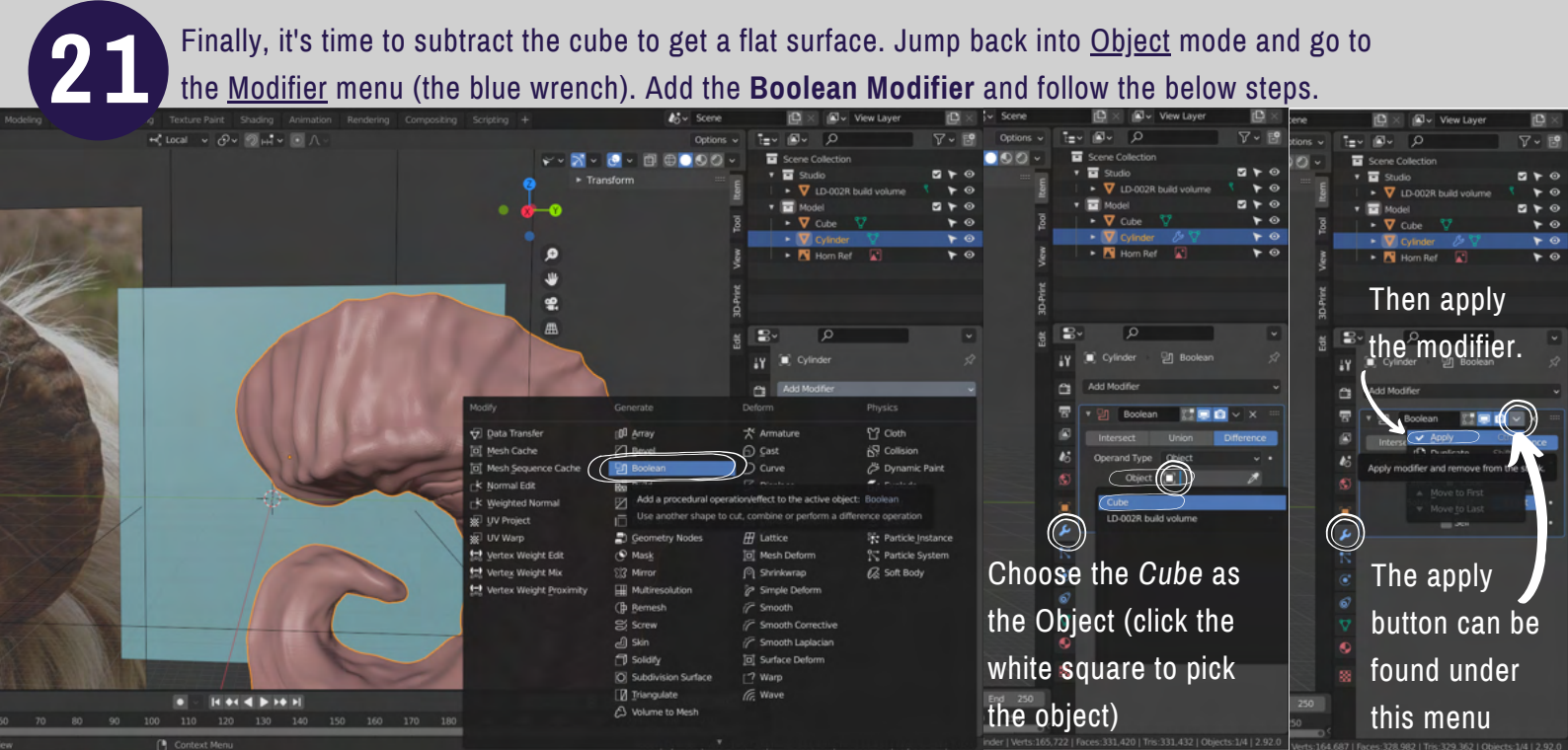
PAGE 19

20

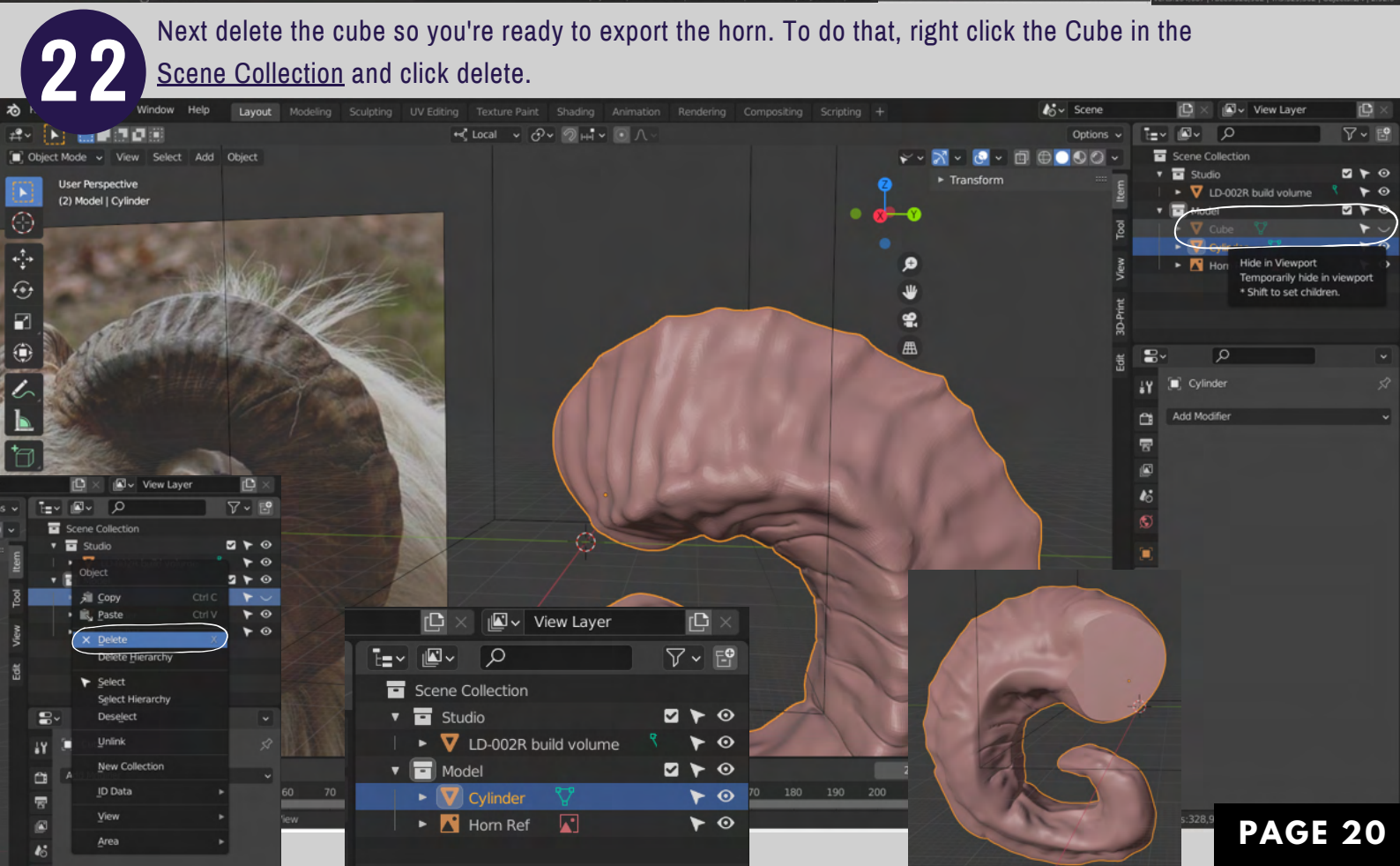
Next use the **Draw** brush to add in the details that get erased. Below you can see the 'bumps' being added back in to make the horn look more organic.



Finally, it's time to subtract the cube to get a flat surface. Jump back into Object mode and go to the Modifier menu (the blue wrench). Add the **Boolean Modifier** and follow the below steps.



Next delete the cube so you're ready to export the horn. To do that, right click the Cube in the Scene Collection and click delete.

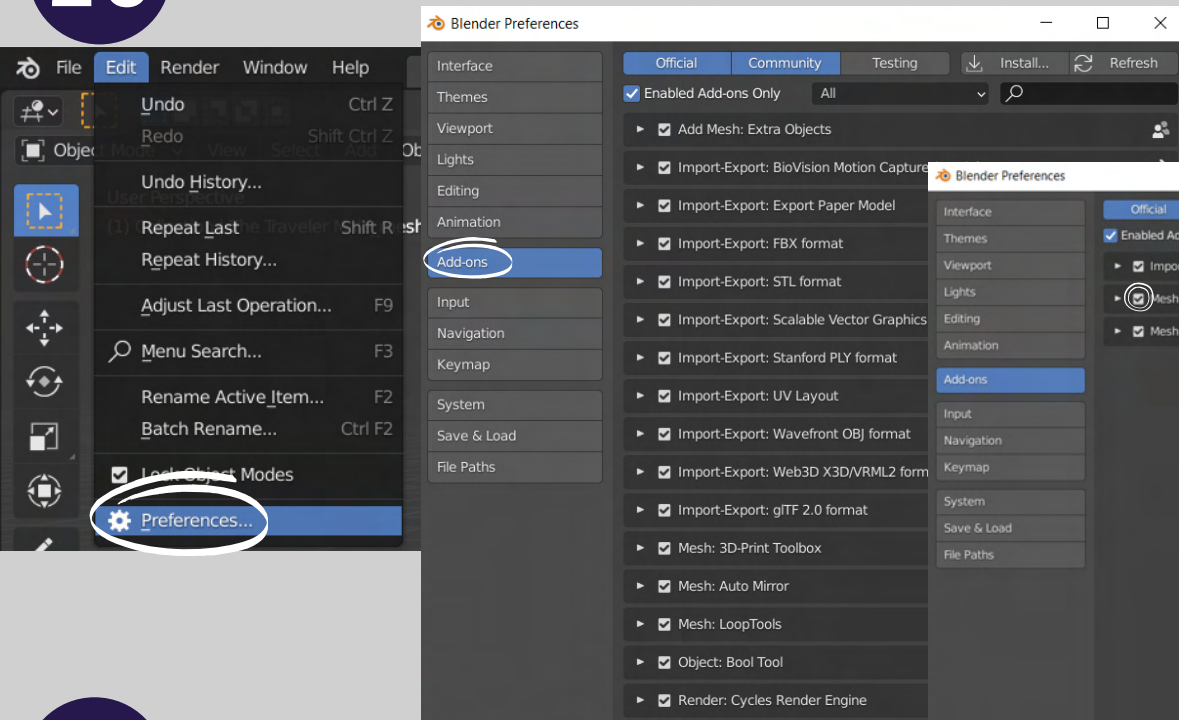




PAGE 21

23

Before exporting the model make sure you have the **Mesh: 3D-Print Toolbox** add-on. To get it head to Edit > Preferences > Add-ons and search "3D" then tick the box next to **3D-Print Toolbox**



24

Finally open up the **3D-Print toolbox** sidebar.

