CODERDOJO TRAMORE 2022 - BLENDER TUTORIAL #1 -

MODELLING A CHARACTER

This tutorial is a walk-thru of a quick guide to modelling a stylised character in Blender using various modelling and sculpting techniques.

This is drawn from a youtube tutorial at the link below , to get further details on the steps click on the link to view: -

https://www.youtube.com/watch?v=KsDe1V9Dl-0

The final goal of this tutorial is something like this: -

But this takes hours and hours of practise!, so don't be disheartened if you don't achieve this level of mastery immediately.

All the same on my first go, as an absolute beginner I achieved this which I was fairly happy with, even if its is just a tad frightening!: -

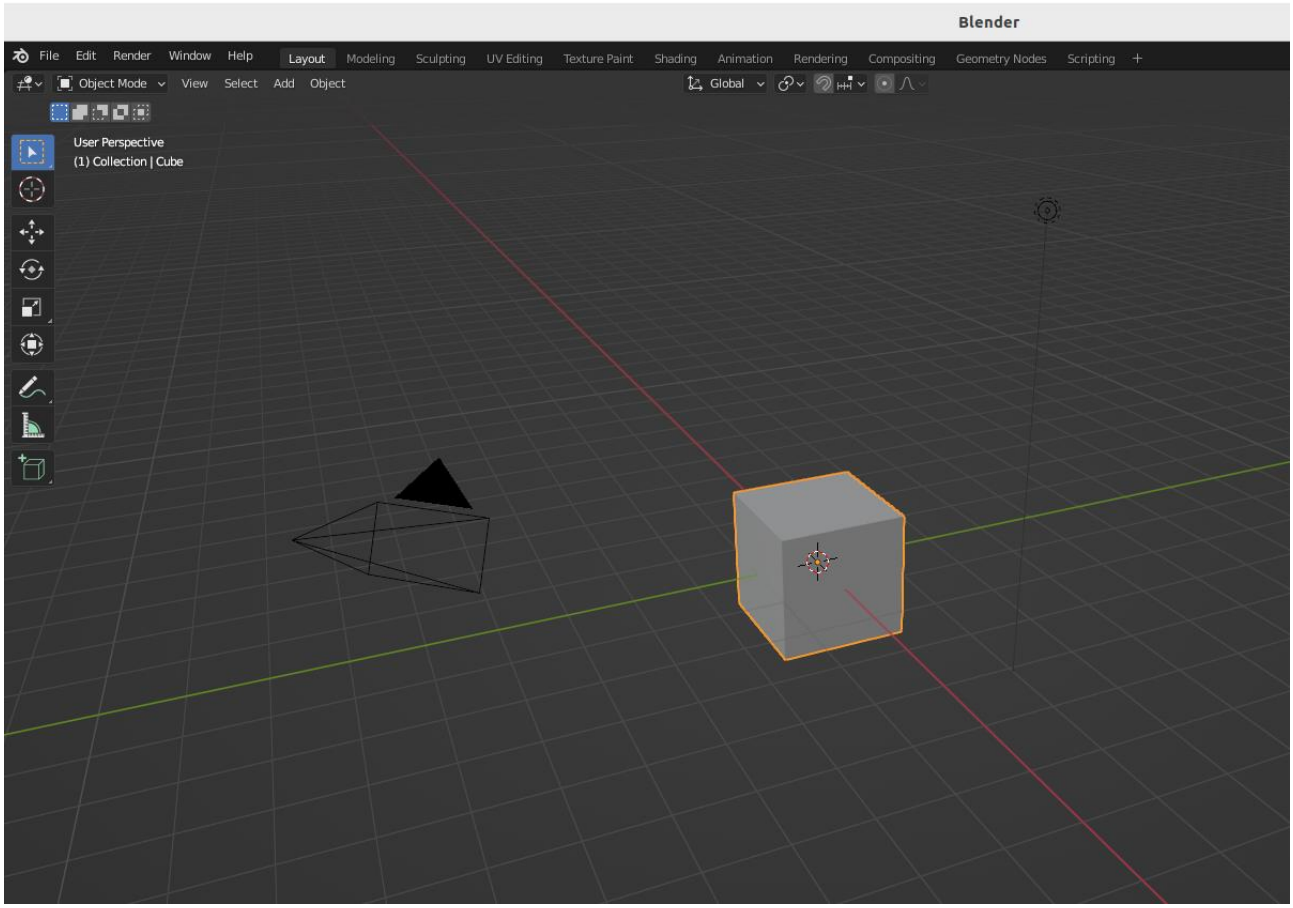
And now its time for you to have a go also :-)

"Blender" is a completely free, open-source 3d modelling and animation software package that can run on many operating systems, windows/linux/mac etc.

Start the Blender application and let's begin: -

SOME BLENDER ABSOLUTE BASICS: -

Every new Blender file starts with one object in your 3d world – a 3d cube: -



The cube is placed exactly at the center of the x-axis (think position left to right) and y-axis (think position forwards and back) and z-axis (think up and down).

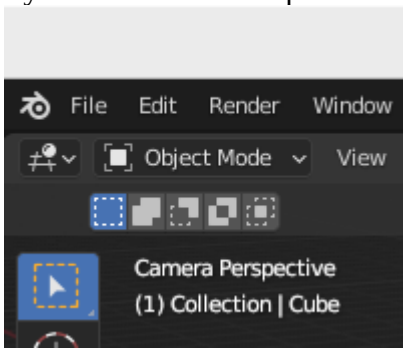
You can also see a camera in the air pointing directly at the cube and a small light source (lighting provides light and shade for your final rendered scene) just behind.

Blender is packed full of millions of **keyboard shortcuts** which pros use to speed up their work, and are really worth learning off -

For example, if you now press "0" on the numpad keyboard on your pc (if you have one) – the view will switch to show exactly what the camera sees. Press "0" again to cancel this.

Blender has several “modes” to work in as you build your 3d scene.

We are currently in **object mode** as you can see in the top left of the screen:



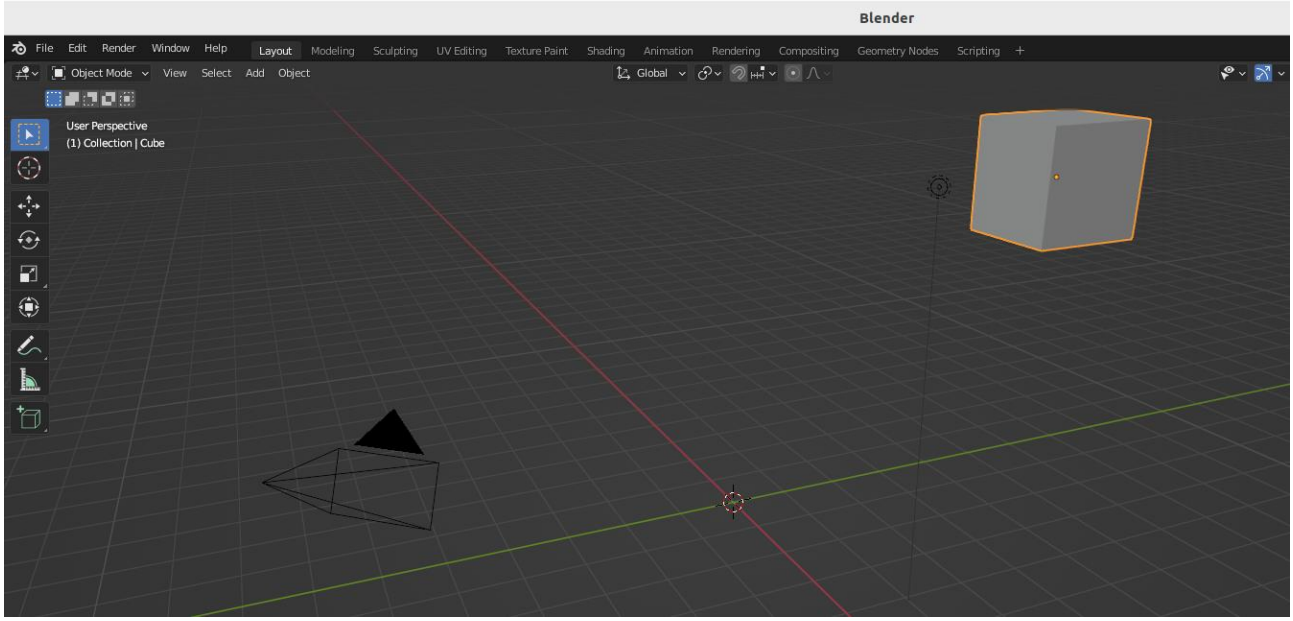
Object mode is used to select whole objects, like the cube for example. It is currently selected and we can tell this because of the orange highlighting around its edges.

Object mode allows you to perform various actions on the object **as a whole**, such as: -
*] “Grab” – picking the object up and moving it to a new location
*] Rotate – rotating the object into a new position
*] Scale – resizing the object – either in all directions or just one particular direction

And many more.

Let’s do an object mode action now, with the cube selected let’s press **“G”**, the shortcut for grab. This “picks up” the cube and you can now replace where you like by moving the mouse.

Left-click with the mouse to place the cube in its new position – well done you’ve done your first Blender action!



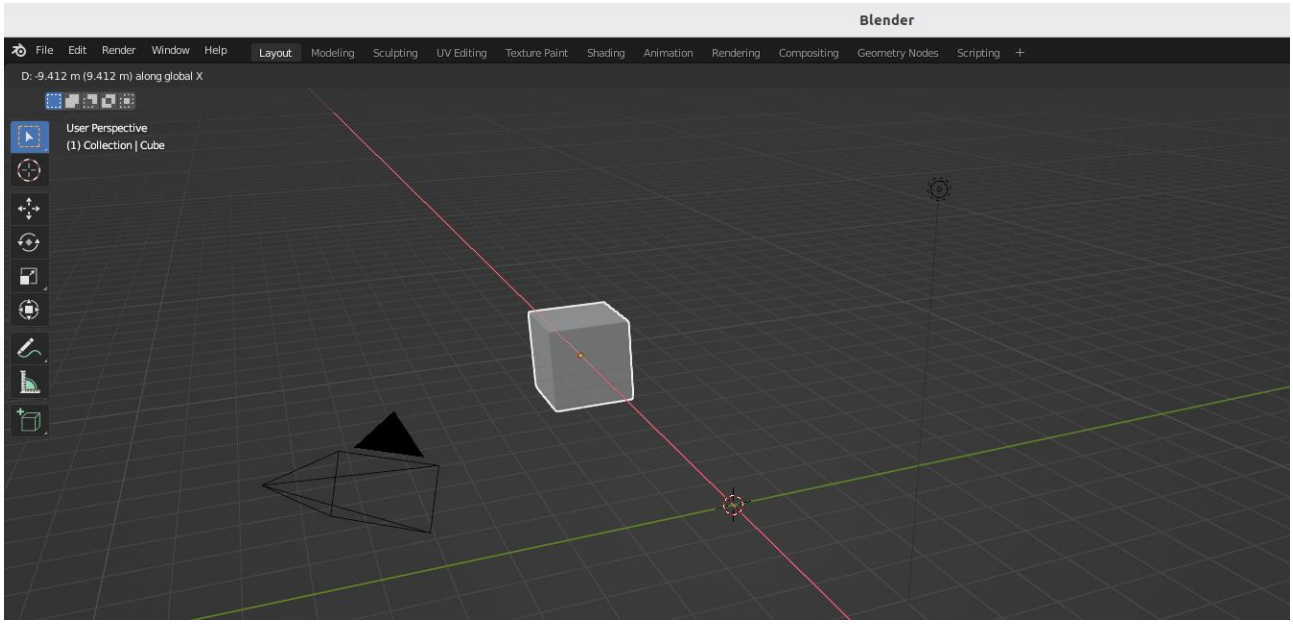
Let’s put it back where it was however by “undoing” that action, we want the cube to be perfectly centered for our actual sculpt, so to do this press and hold the “Ctrl” button and then also press Z (often written as CTRL + Z, and I’ll use this notation when I mean to press two keys at once from now on)

Because you are of course just moving the mouse on a 2d screen, it can be difficult for Blender to tell what direction exactly you wish to move the object in, so it can be really useful to move in just one specific direction at a time when moving objects.

To this, immediately after pressing “G” you then press the “axis” that you want to restrict the object to only move in, again you can think of the axes like this :-

X-AXIS – “Left and Right”
Y-AXIS – “Near and Far”
Z-AXIS – “Up and Down”

So let’s move the cube on the x-axis only – press “G” and then press X. You will see the x-axis highlight and now when you move the mouse the object will only move in the X direction as if it were on a rail. Move it to a new spot but then press CTRL + Z to undo back to the center again.



Now as we sculpt and build it is essential to be able to move around our scene and view our work from the different angles – currently we are looking down on the cube from above - let’s try to change that.

The first technique is something that is commonly known as **“Orbiting”**.

To do this, you simply press in and hold the little scroll wheel button on the mouse (so it is important to have one, most mouses these days do) and move the mouse.

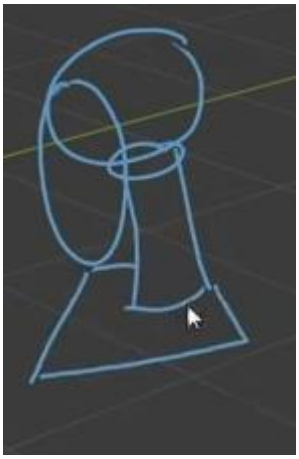
The view will spin whilst remaining focused on the cube. Its a bit like flying, with a bit of practise you can zoom around the cube and quickly view it from any angle.

Next – **Zoom In and Zoom Out** – this is even easier, just spin the scroll wheel forwards and back.

And lastly it is sometimes useful once you have lots of objects in your scene, to shift your view focus left and right or up and down, a bit like taking a step left and right or standing up on a box - this is called "**panning**" and do it you hold down the "Shift" button on the keyboard, and then press the middle button just like for orbiting – the current view will now move just left right or up down according to how you move the mouse.

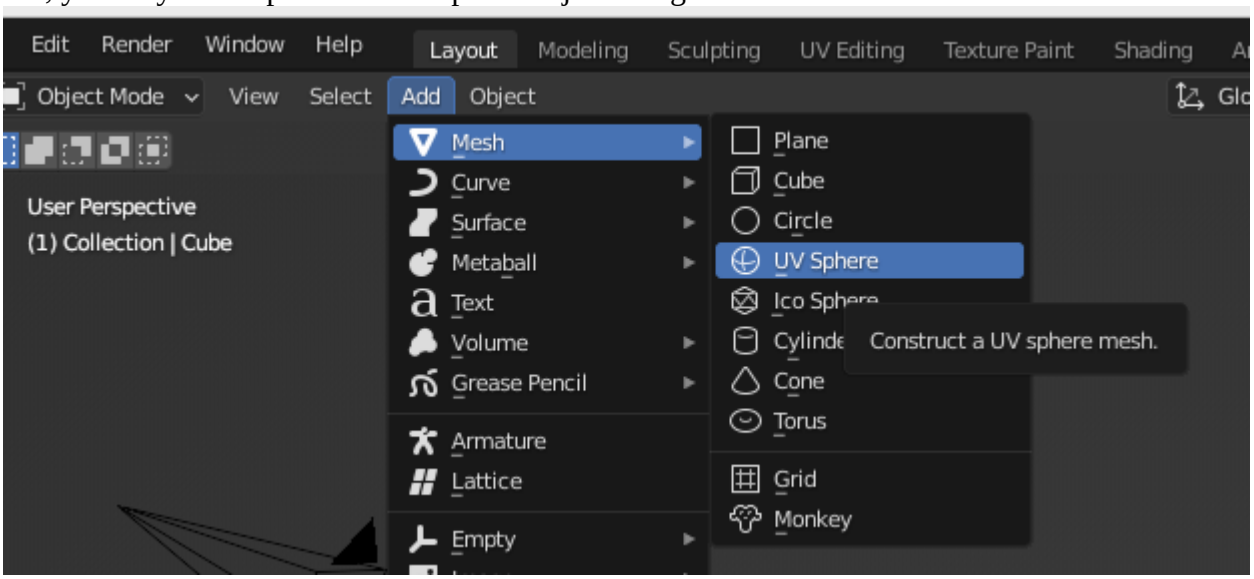
OK let's start building our character.

This is the basic geometry of our figure: -

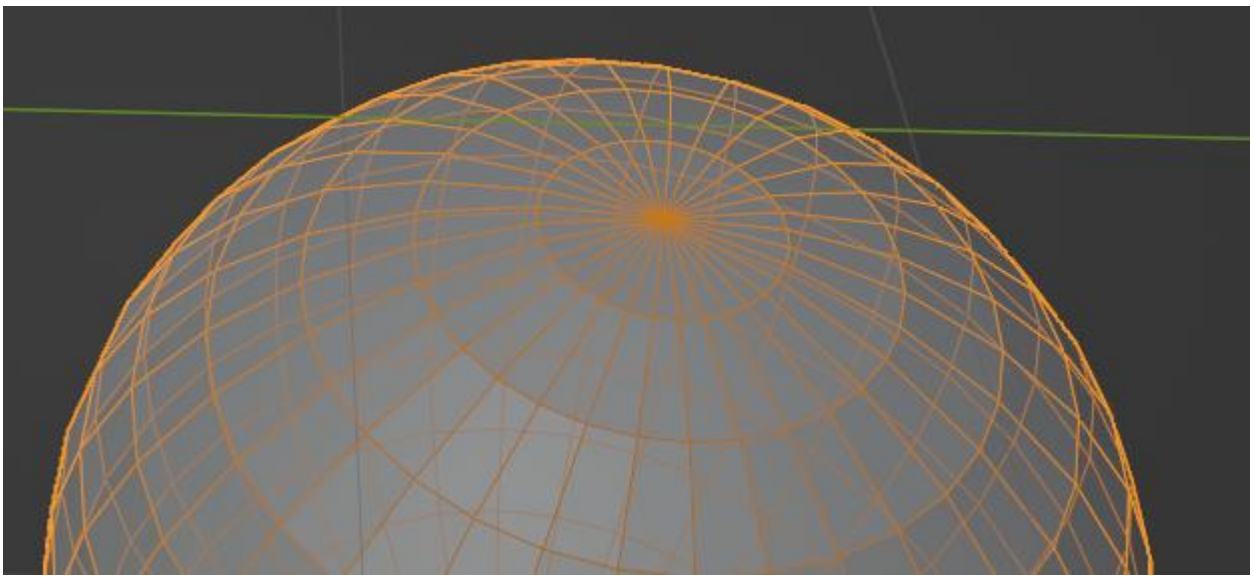


2 spherical parts to the head, a neck and a torso section at the bottom.

Now, you may be tempted to add a sphere object using:

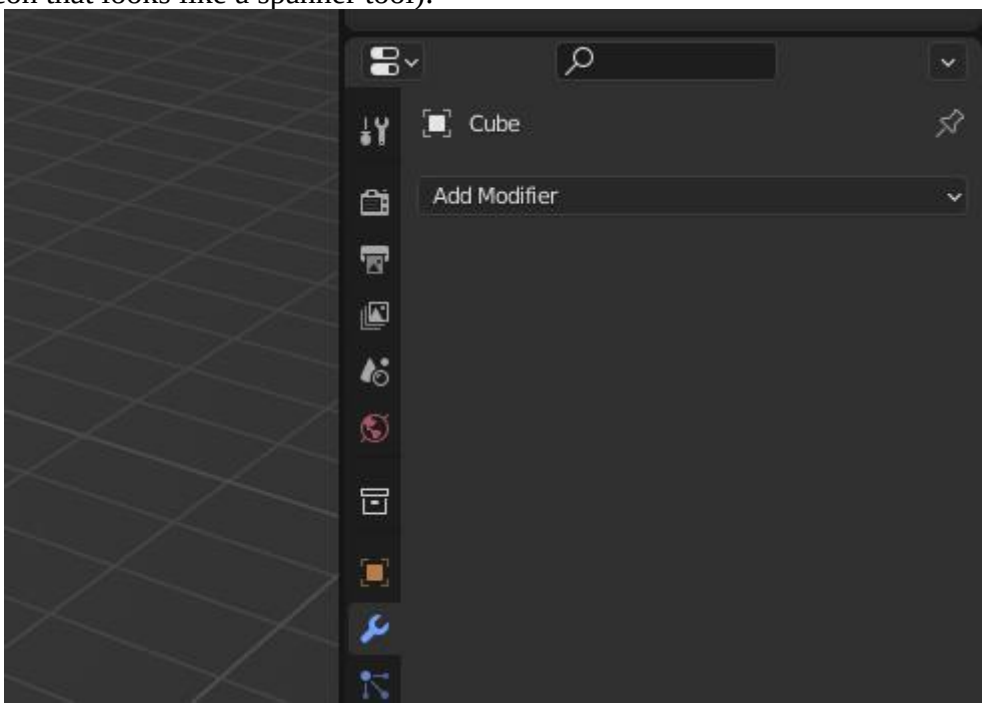


BUT there's a problem with this approach – a sphere for the head parts is not good for the sculpting process we want to do – because sphere's in Blender have these kind of triangular faces at the top and bottom : -

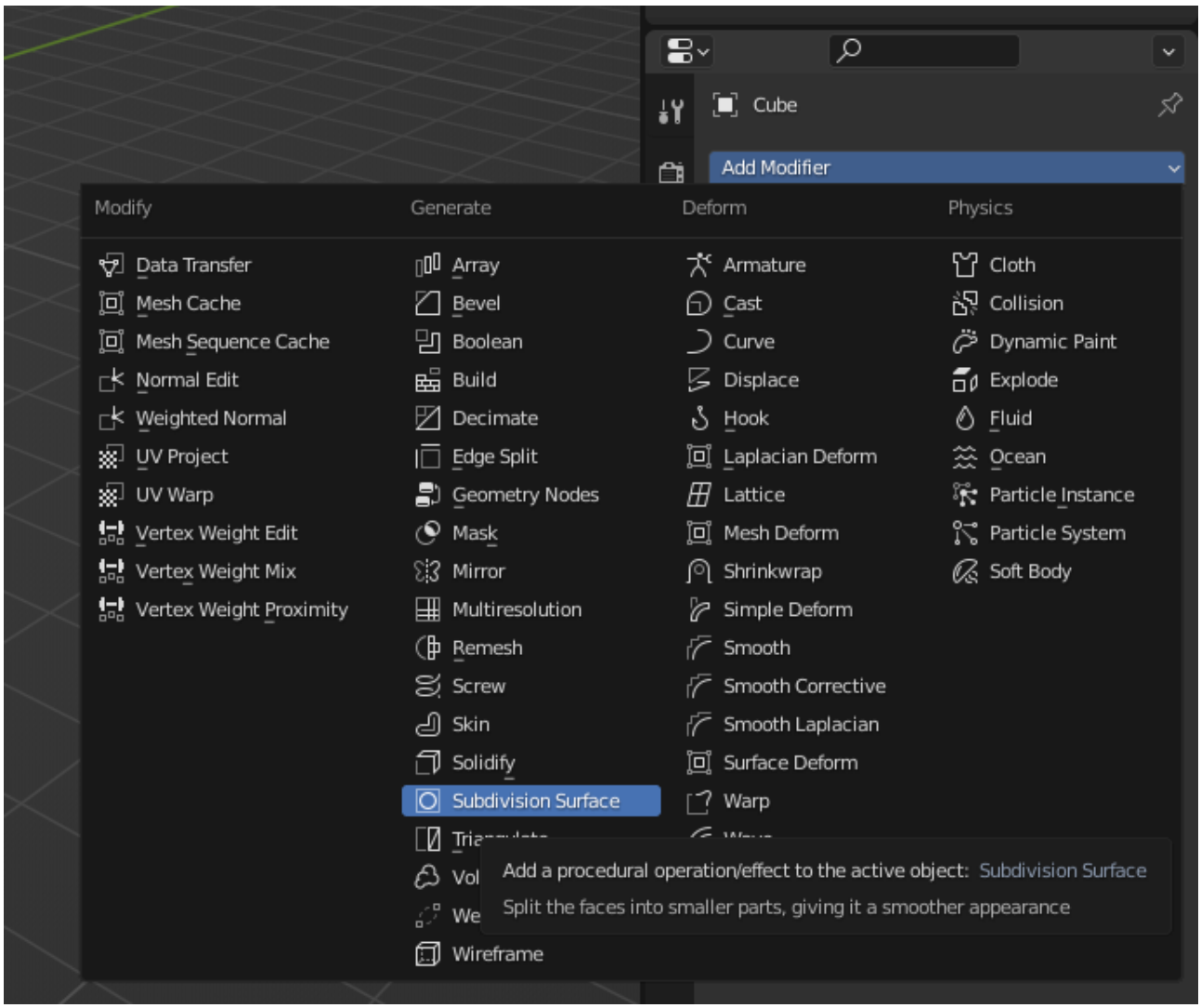


So what should we do instead? The solution is to apply what Blender calls **a modifier** to our cube. Blender comes with a rich toolkit of modifiers that you can apply to your objects to modify their shape and appearance in many different ways.

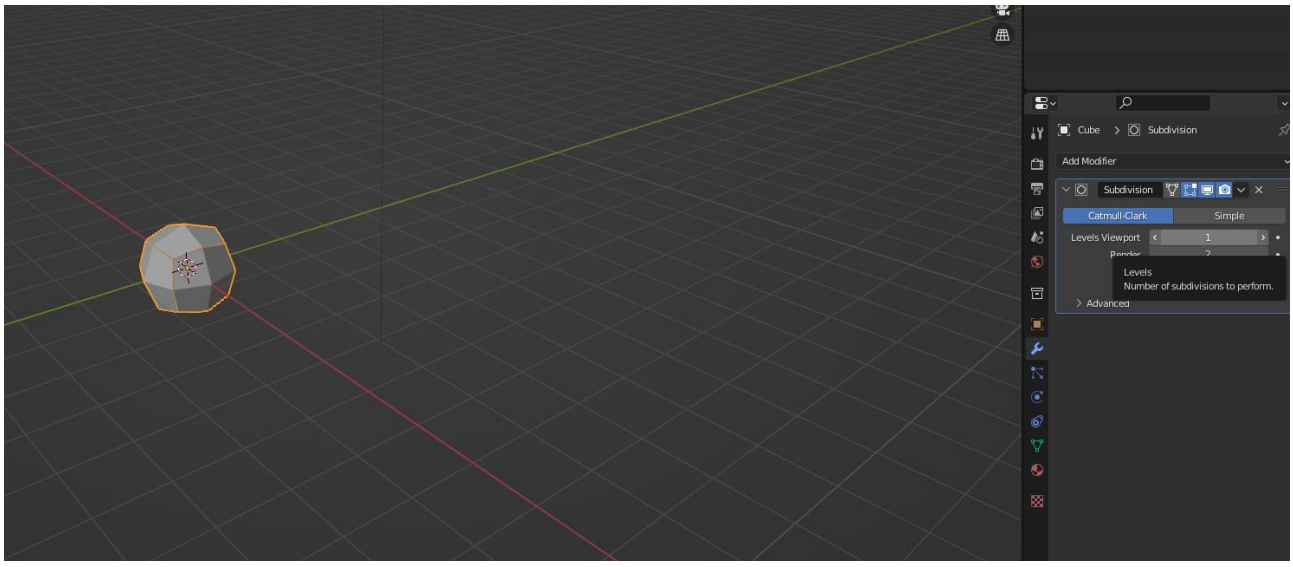
So, make sure your initial cube is selected, then on the right of the screen, select the modifier tab: - (this is an icon that looks like a spanner tool): -



You now have the option to “Add Modifier” – hit the drop down arrow to see a menu of all the possible modifiers and select “subdivision surface”: -

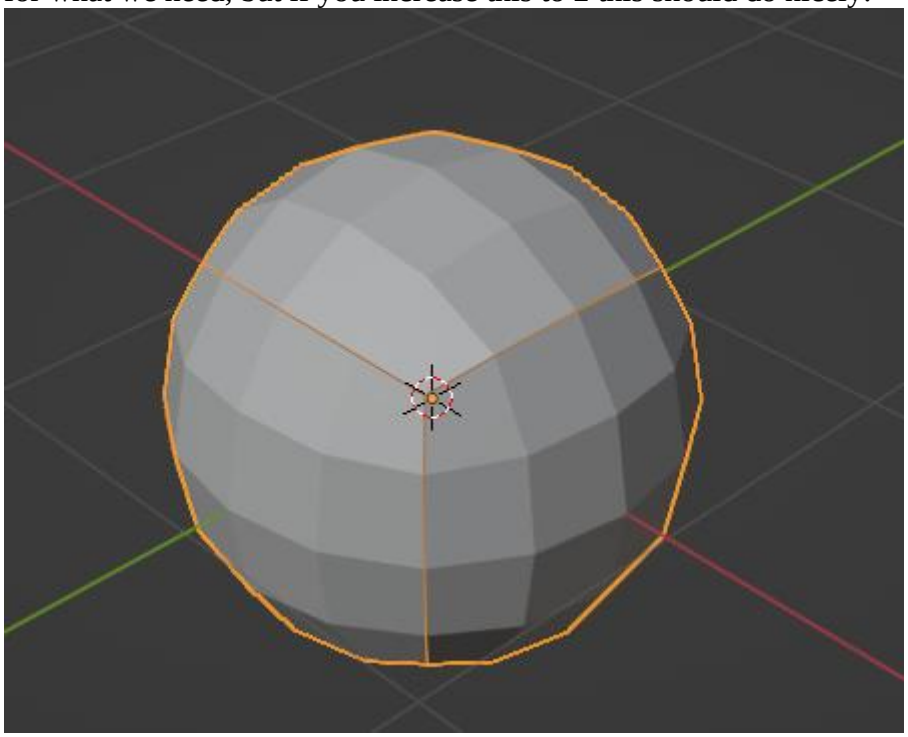


This will divide each face of your object into smaller faces and rounds it as it does so, giving a smoother more rounded appearance.



The “levels viewport” parameter can be changed by clicking the left or right arrows in the field, and controls how many subdivisions the modifier performs.

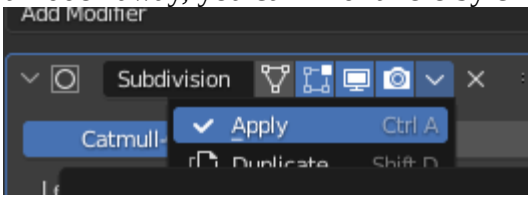
1 is too coarse for what we need, but if you increase this to 2 this should do nicely: -



Now whenever you are happy with a modifier, it is good practise to fully "apply" it. If you don't, later on when we are joining separate objects together you can get strange effects as unapplied modifiers spread. Until you apply the modifier fully – you are only seeing a virtual "preview" of the modified object.

So to apply this current subdivision modifier – simply press CTRL + A **while the mouse is over the modifier section** and you should see it disappear which means it has been permanently applied to your object. (though you can of course undo with CTRL+Z).

[aside: in older versions of Blender than Blender 3, you may need to select the "Apply" option from the menu instead and it is a bit hidden away, you can find it here by clicking the down arrow icon: -



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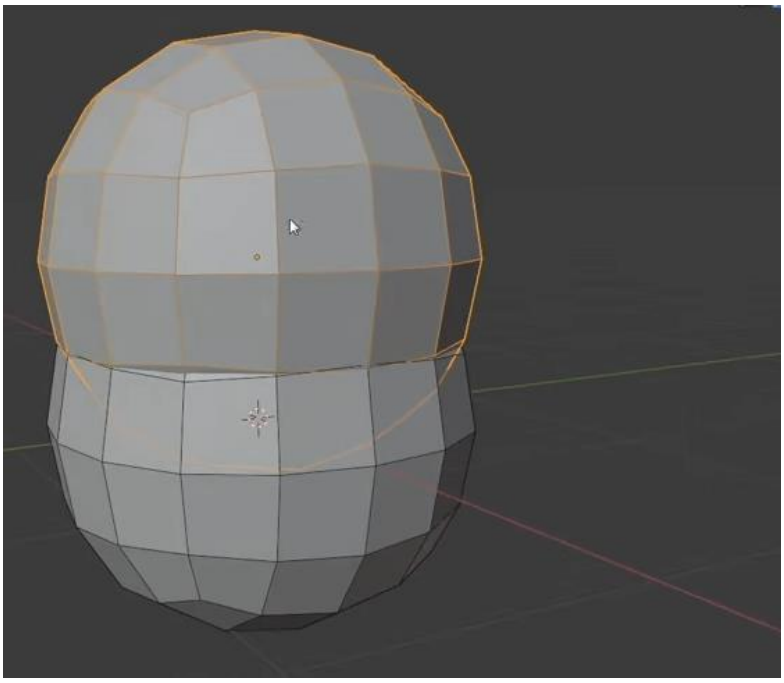
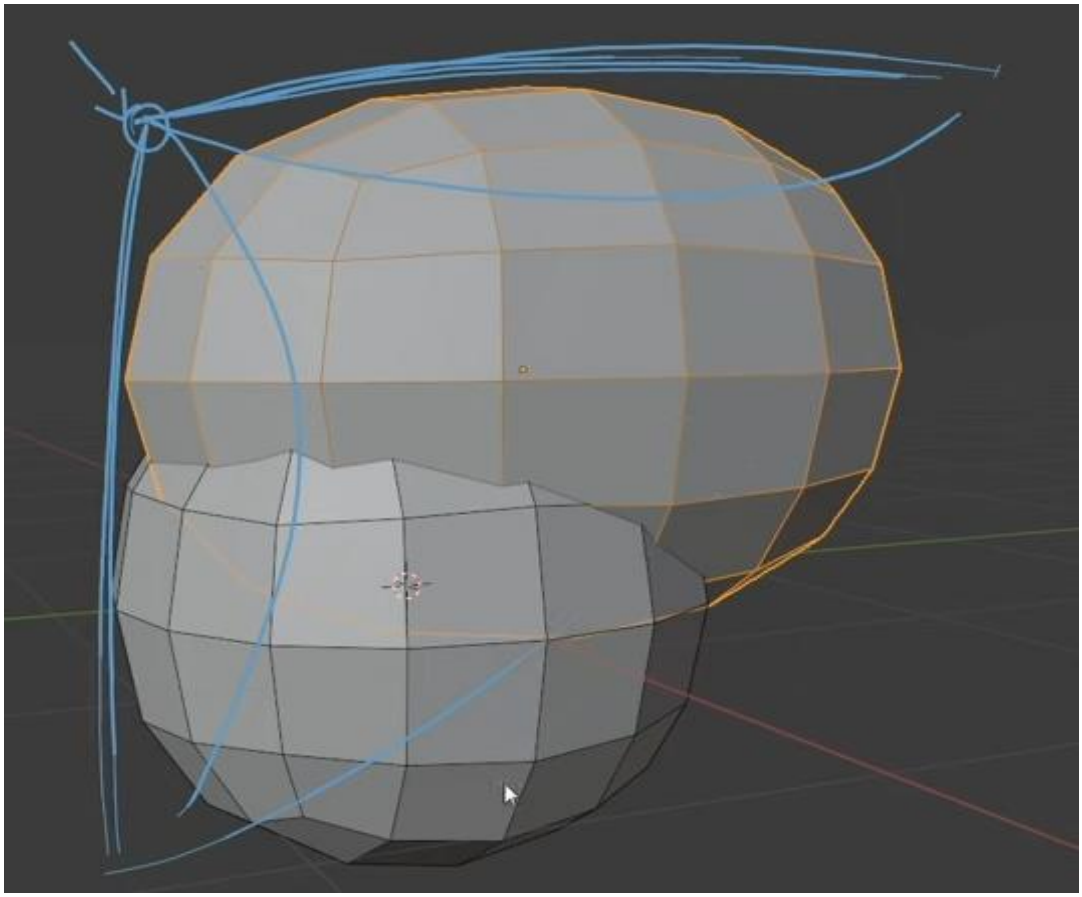
So next, as in the quick anatomy sketch above, we need **two** spheres so a quick way to do this now is to duplicate the sphere we just made – select it then press "SHIFT + D" (this is the shortcut for "duplicate" and note here we use the SHIFT key rather than CTRL. The new duplicate is automatically in move mode (like pressing G). Press Z to only move up and down and place it sitting on top of the first something like this: -



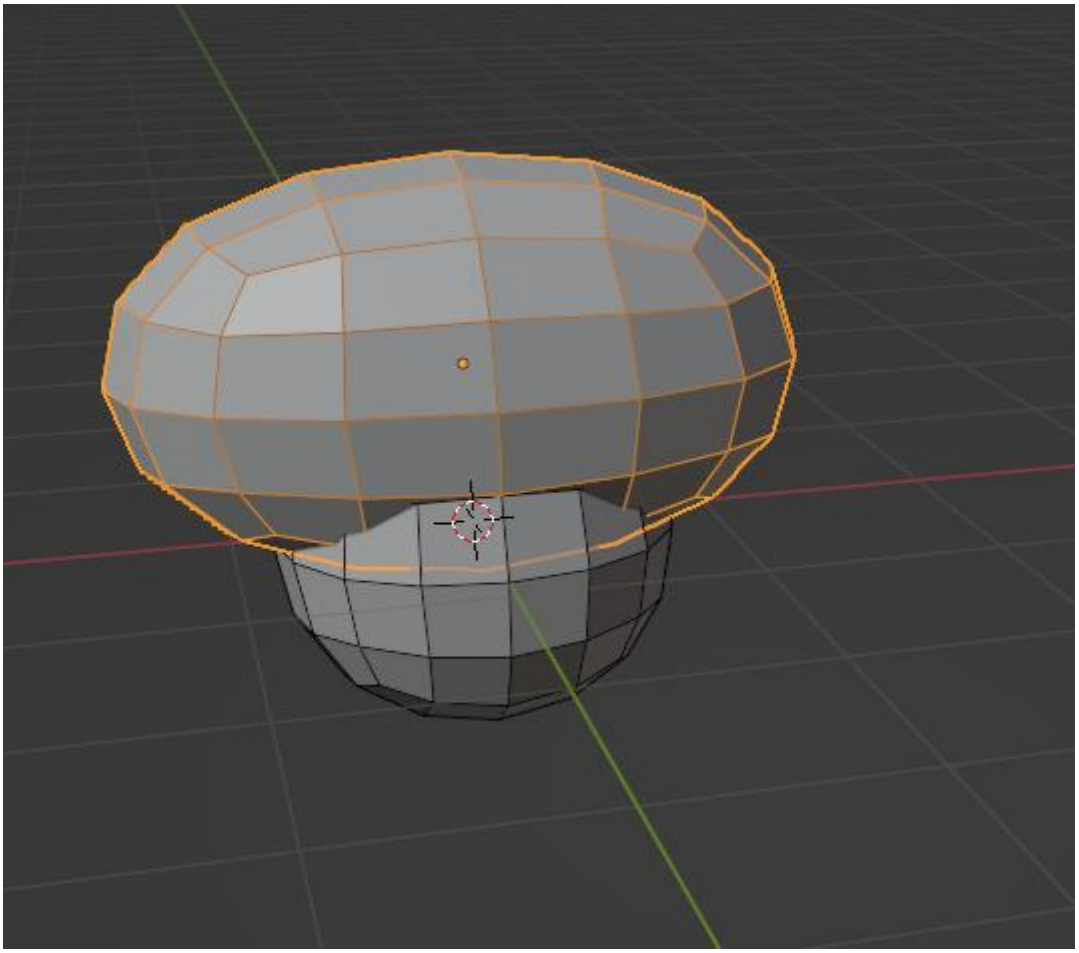
The top sphere is to represent the cranium or brain part of the head, the lower is the jaw section of the head. So we need to elongate the cranium like so : -



stretch the top sphere:

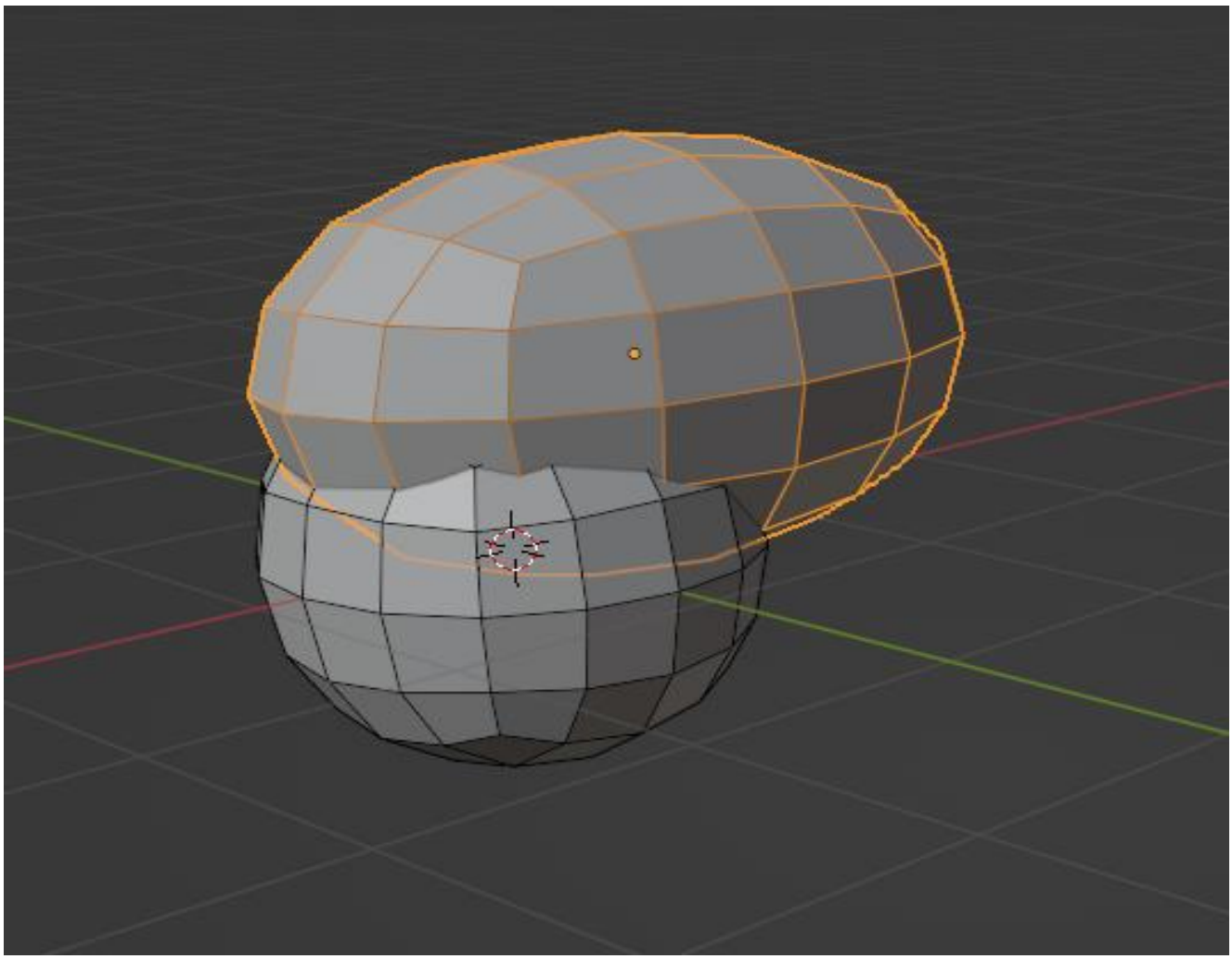
To Stretch the top sphere – first Select it.

Press “S” for Scale. Then press “X” to only scale in the X axis direction and use the mouse to stretch it out a bit, when you are happy with it press CTRL + A and select “Scale” in the apply menu that appears: -

This  is looking

This is looking good but the front edge needs to be aligned as we saw in the rough anatomy diagram above. So we use our “G” grab shortcut. Press G and again press X to only move along the X-axis. Move the top shape back until it looks something like the anatomy diagram above.

You know have a very rough head and jaw -!



We are almost ready to begin sculpting – but one final step before doing so is to “join” these two objects together, do this as follows: -

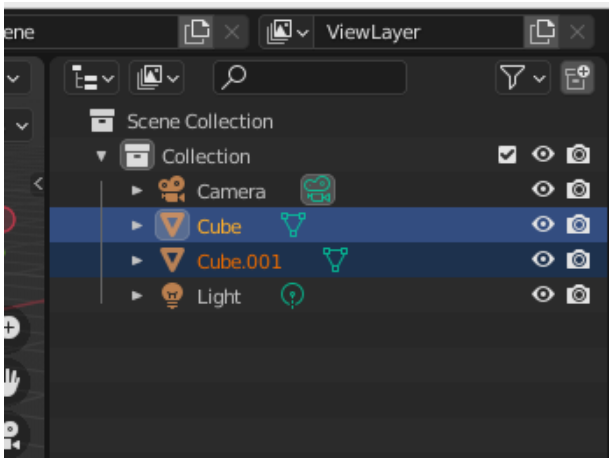
Select one of the spheres by clicking on them.
Select the 2nd one ALSO by holding down the SHIFT button on your keyboard and then clicking on the unselected sphere.

You should now have both objects highlighted in orange at once, and this means they are both now selected together.

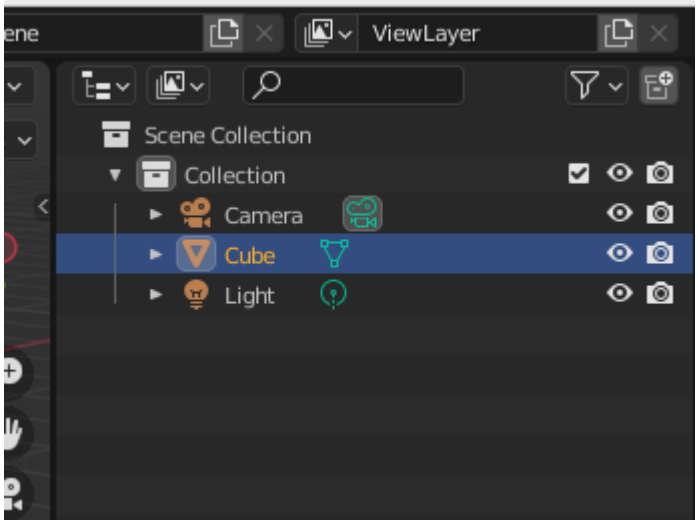
There are a couple of ways to do this, one other way is to just click and draw a selection box around them both, but this method quickly becomes trickier once you have a lot of objects in your scene.

So before we begin to sculpt, we join both these objects, simply by pressing “CTRL + J”.
From this point on Blender considers them just one unified object, the exact same as primitive objects such as cubes.

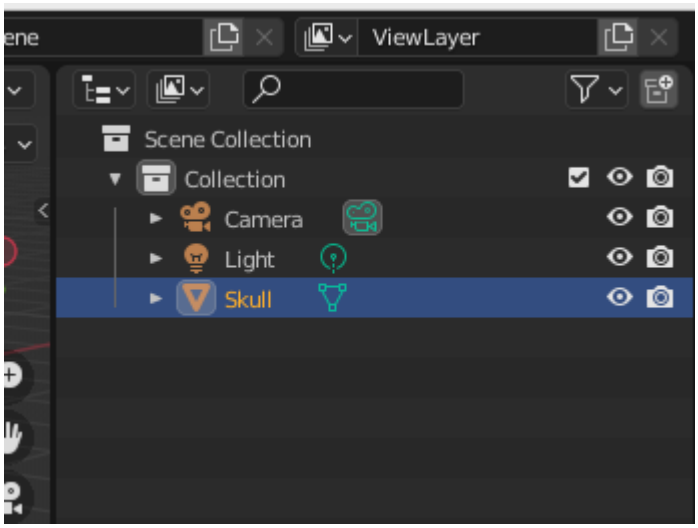
In the object navigator top right, you can see that the list of object changes from: -



Two “cube” objects .. to just one “cube” object: -



Let’s change the object name to make it more representative, let’s call it “skull”. Do this double click on the word “cube” and you can type your own name for this new unified object.



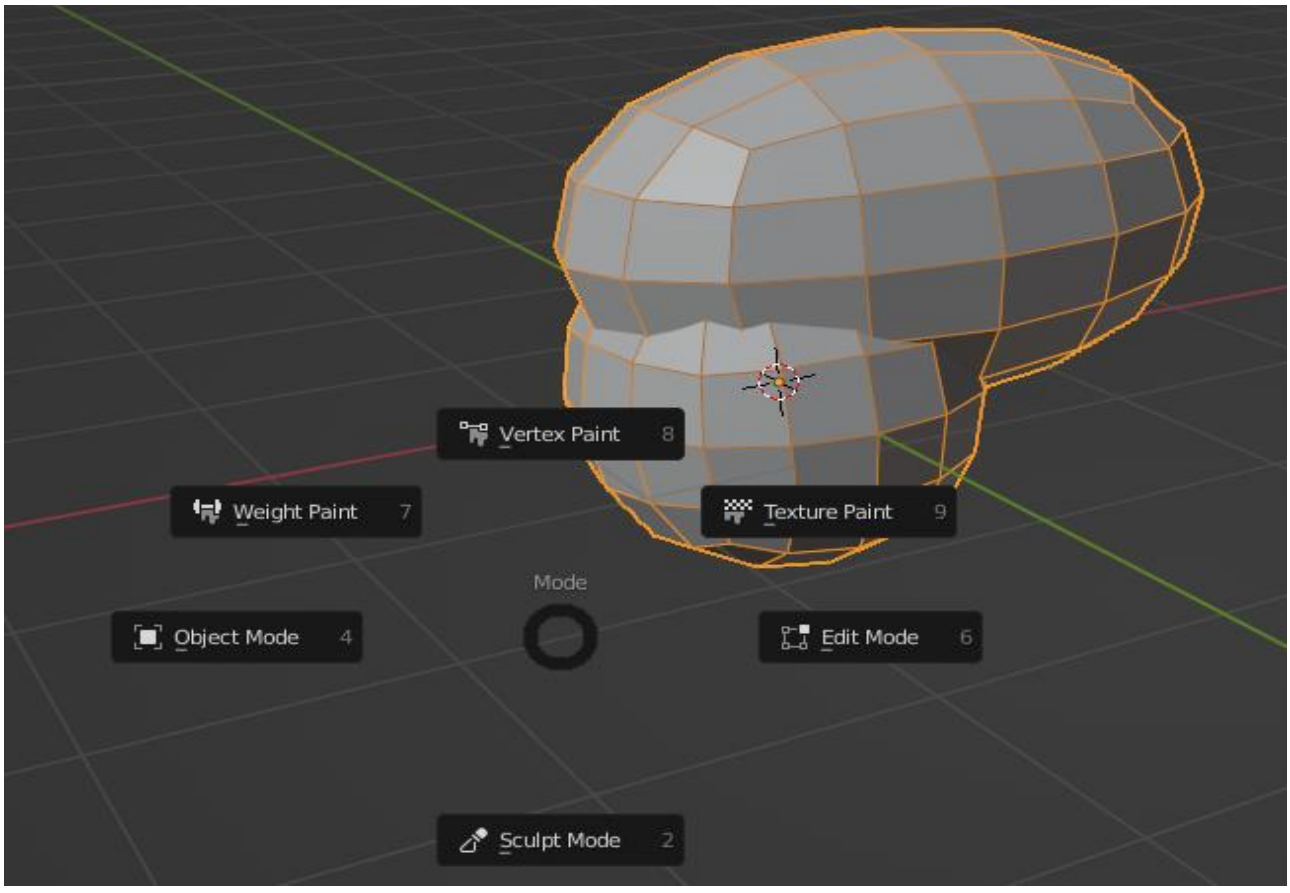
Whenever you click on the “skull” row in the object navigator, it automatically selects this object and this is now a handy way to select it when you want to work on it going forward.

AND WITH THAT … TIME TO SCULPT!!

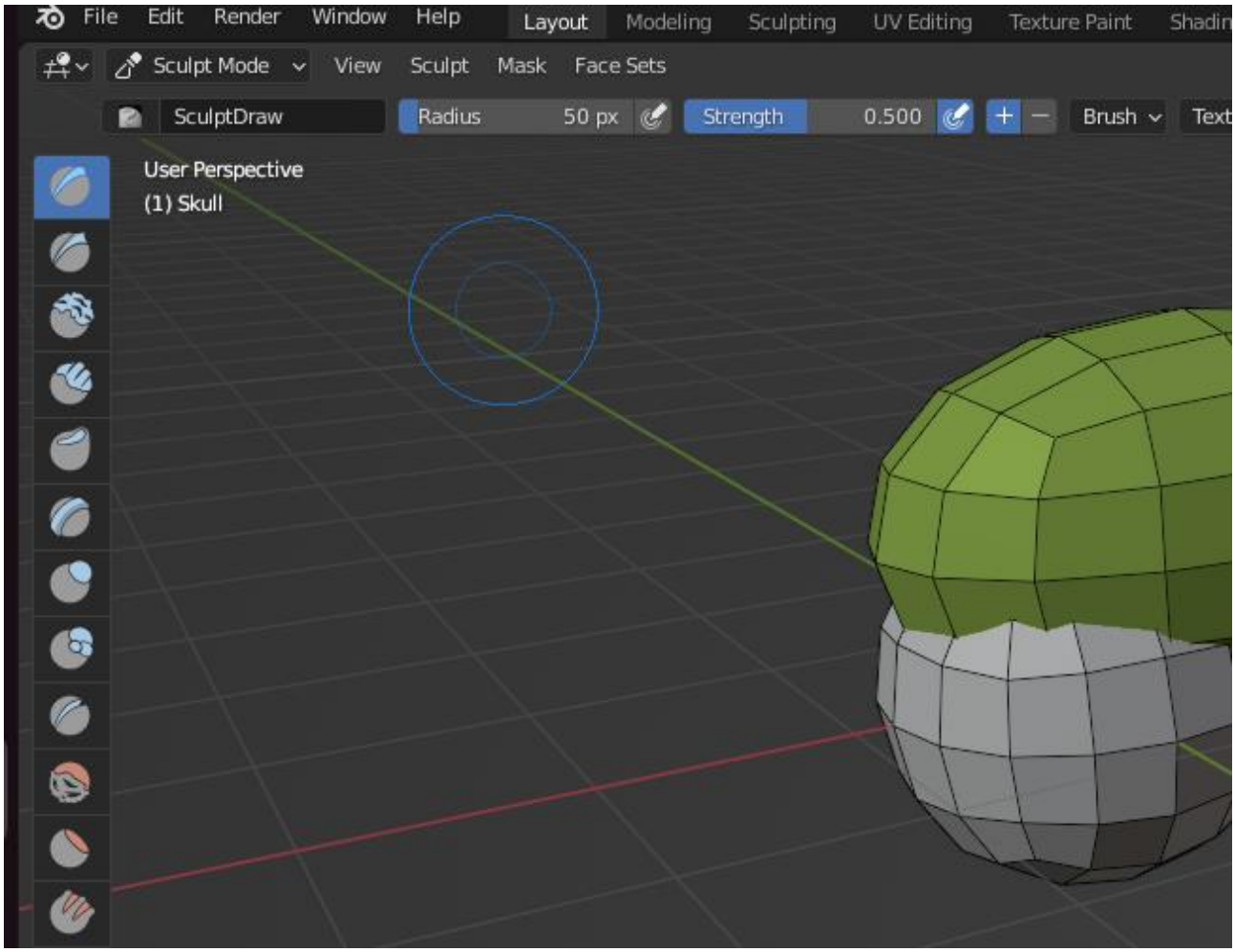
The first step is to switch the Blender mode to “sculpt mode”.

There are two ways to do this, the quick way is to press “CTRL + TAB” on your keyboard (Tab is a top left button on most keyboards, sometimes labelled tab but sometimes just a left and right arrow).

This pops up a floating menu of all the possible mode switches :-



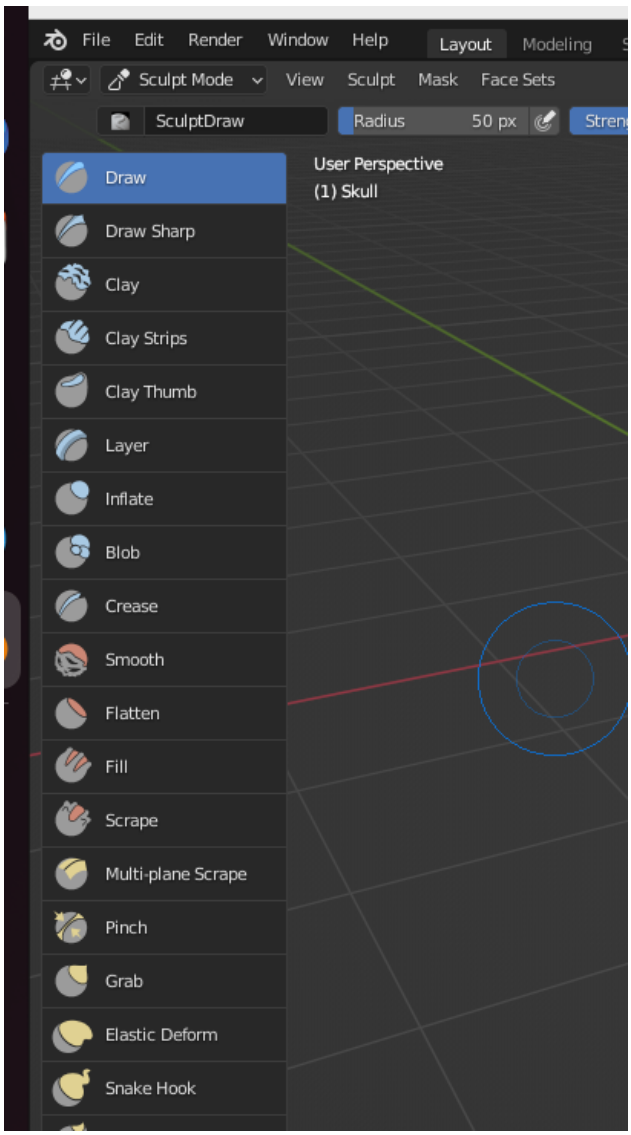
Press “2” for Sculpt Mode, or move the mouse to the box and click on it.



The mode is now showing as “Sculpt Mode” in the top left instead of object mode – and you can see numerous sculpting brush tools have appeared in the menu to the left.

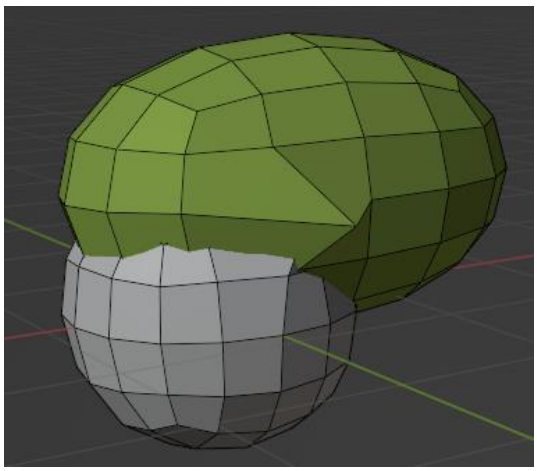
You might notice there is a drop down arrow in the box that says “Sculpt Mode” and this is the 2nd way you switch between modes, simply hit this drop down arrow and you can pick the mode you which to switch to – this is a little easier to remember if you forget the CTRL + TAB shortcut.

As a beginner, it’s very useful to have the names of the sculpting tools shown on the left – to do this simply click on the edge and pull the bar a little more over to the right until the tool labels are revealed: -



These tools allow you to sculpt just as if you were working with clay in real life – you can add amounts or scrape or dig away – and you push and pull each vertex to "mould" to the shape you require.

So we're going to use the "Grab" tool to do the initial shaping. Select this tool and then click on any vertex in the wireframe and move it gently away from the shape. You will see your shape remoulding in the direction you've moved:

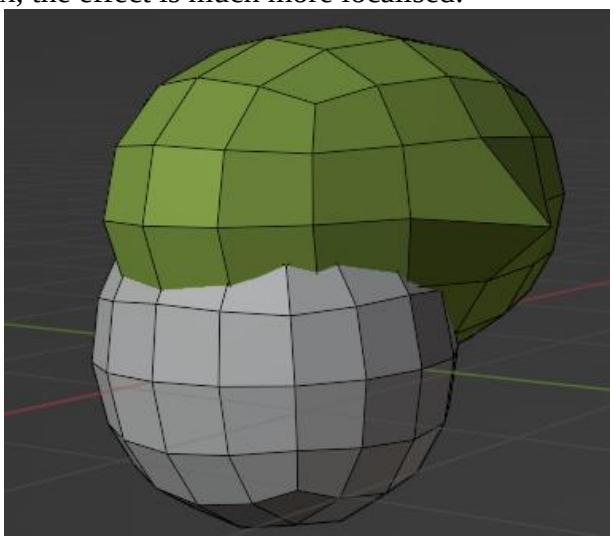


But there's a problem – you can just see there that the jaw shape is also being affected – we don't want this instead we want, even though they are now joined in the one object, for only the cranium part to be effected or only the jaw to be effected as we sculpt mould each part.

To do this, first use CTRL+Z to undo the experiment above and instead to the following : -

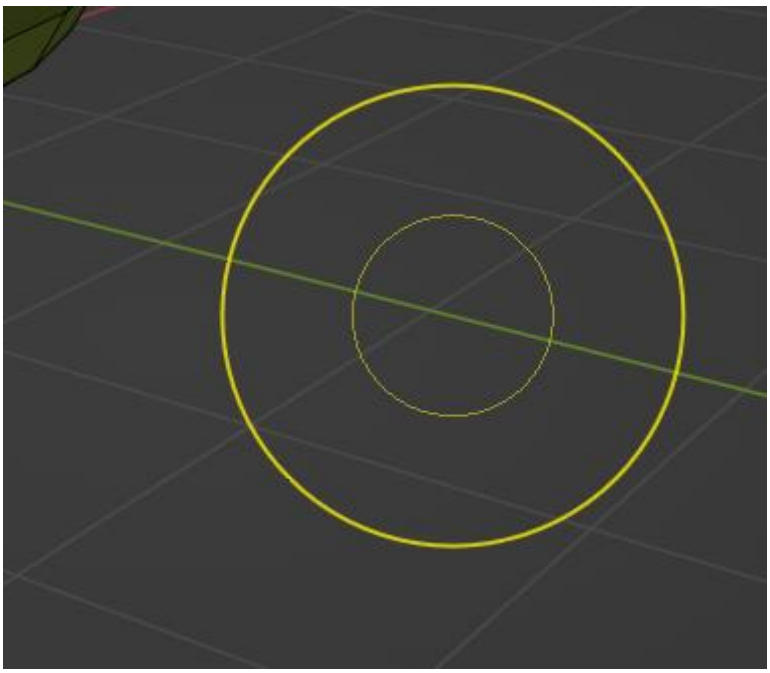
Open the Options menu in the top right and tick on the "topology" setting in automasking – this means only vertices connected to the vertices you are sculpting are affected.

Now if we pull out a vertex, the effect is much more localised: -

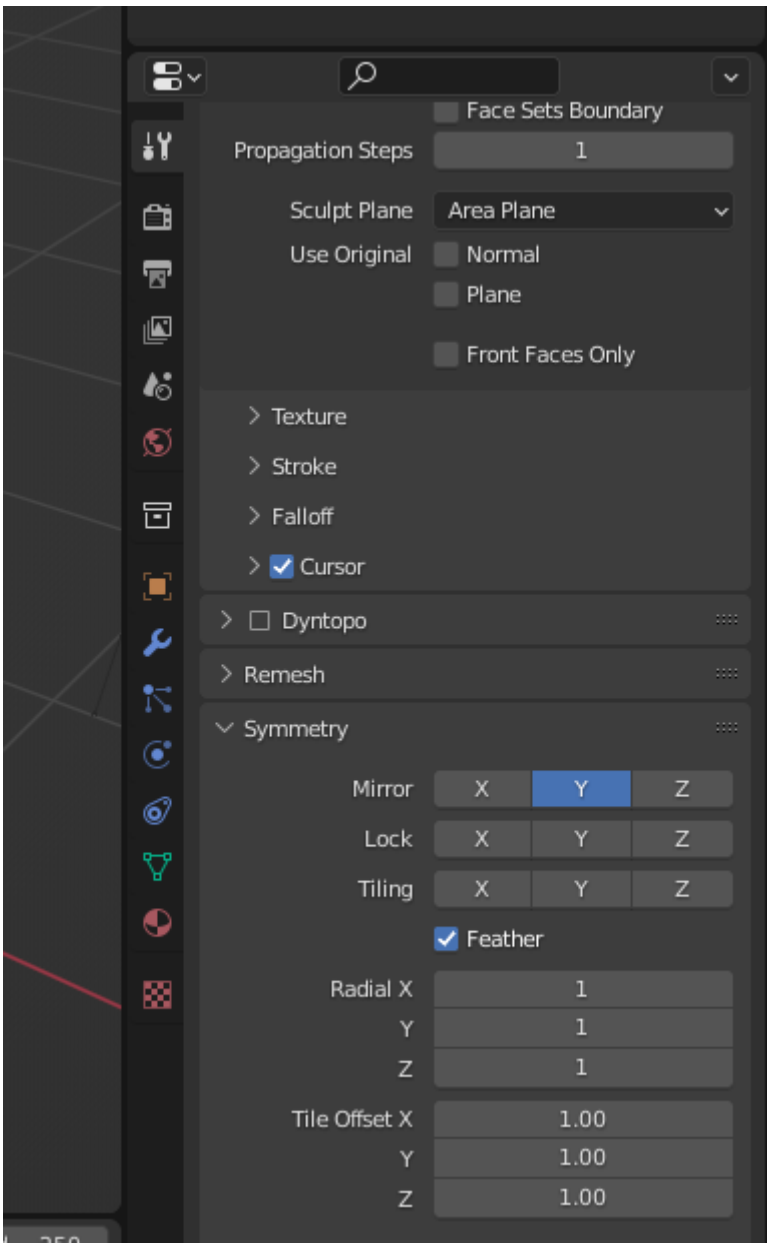


Two last things before we begin to sculpt -

1 you can change the size of the sculpt brush to affect more of an area at once when you need to, by pressing F then moving the mouse to size the radius of the brush (or you can change it the toolbar at the top directly) : -



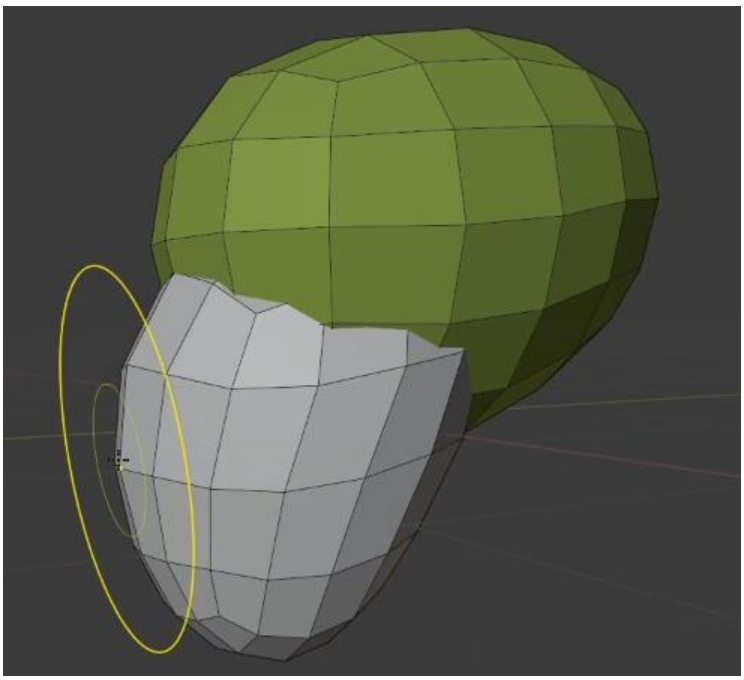
2 We can use a “mirror” function on the tool when working on the left and right to keep a nice symetry going, to do this click the screwdriver and spanner option in the right panel: -

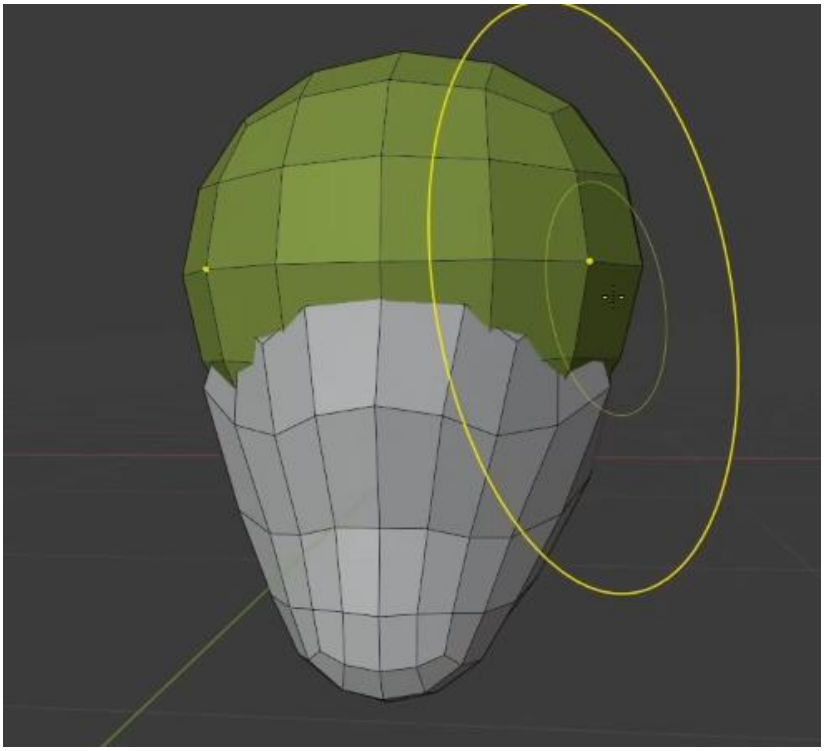


Open the “Symmetry” section (you may have to scrolldown to find it) and switch on “Y” in the Mirror row – this means mirror what you’re doing across the y-axis and in effect it means when you alter the left side of the head, the right side is changed identically.

Turn it off when you want to work on non-symmetrical sections like the front and back especially, simply by unclicking the “Y”.

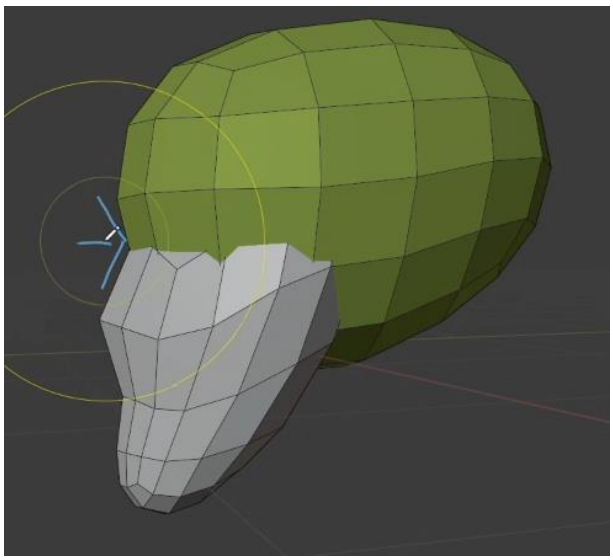
So now begin sculpting by clicking and dragging and try your beside to form a skull shape more human like, something like these: -

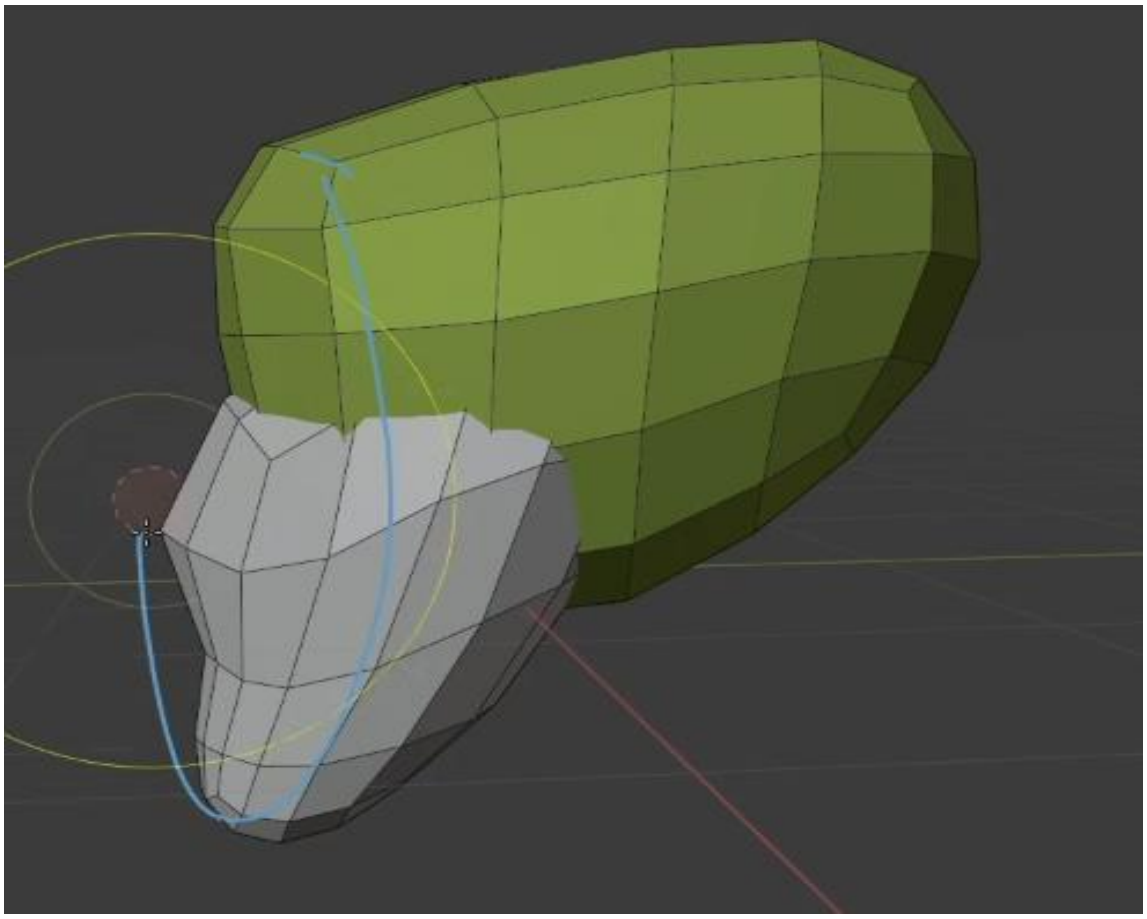




This indicates the eye line you should try to achieve: -

Top of the head flattened, eyeline sharpened: -

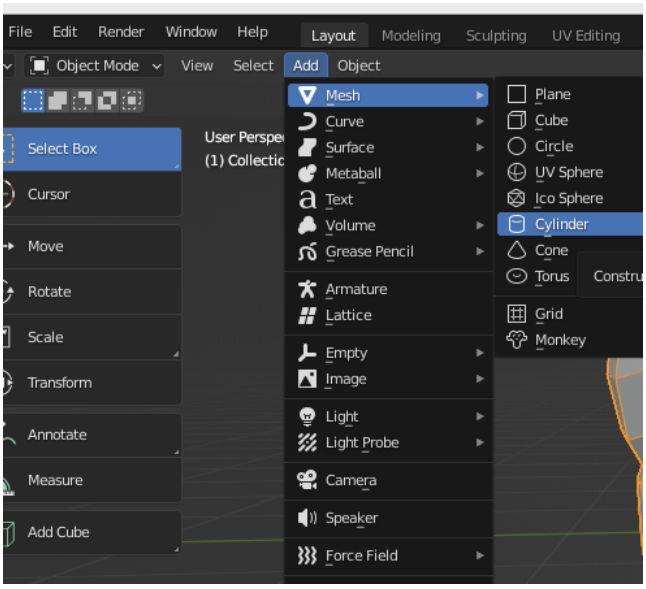




Once you're fairly happy that what you have is close to the above, next step is to add a neck.

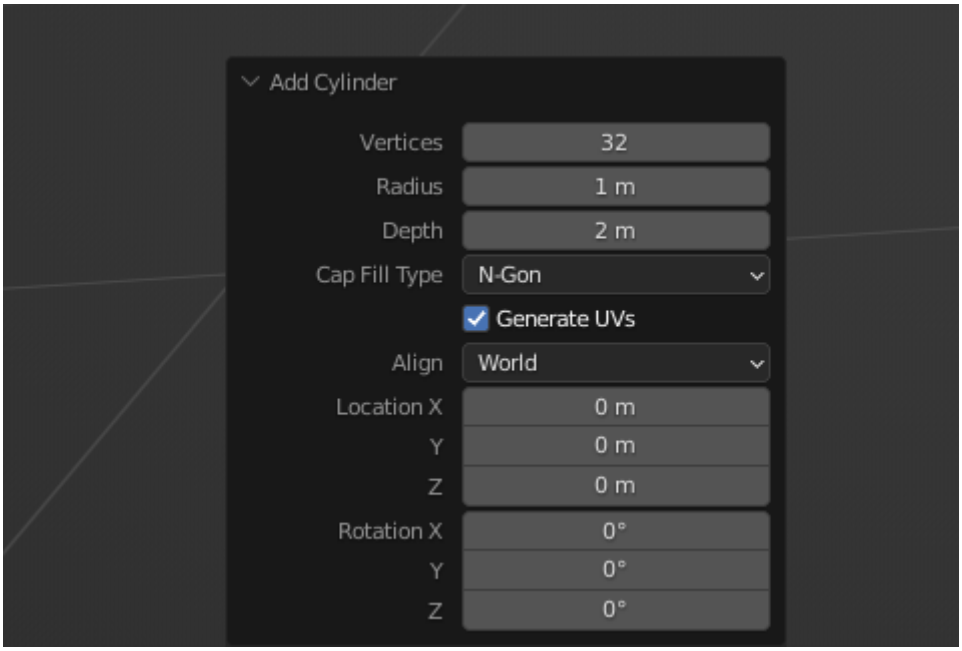
To do this we add a new **cylinder** to the scene.

Return to object mode and uses the "add" menu to add a new cylinder mesh object: -

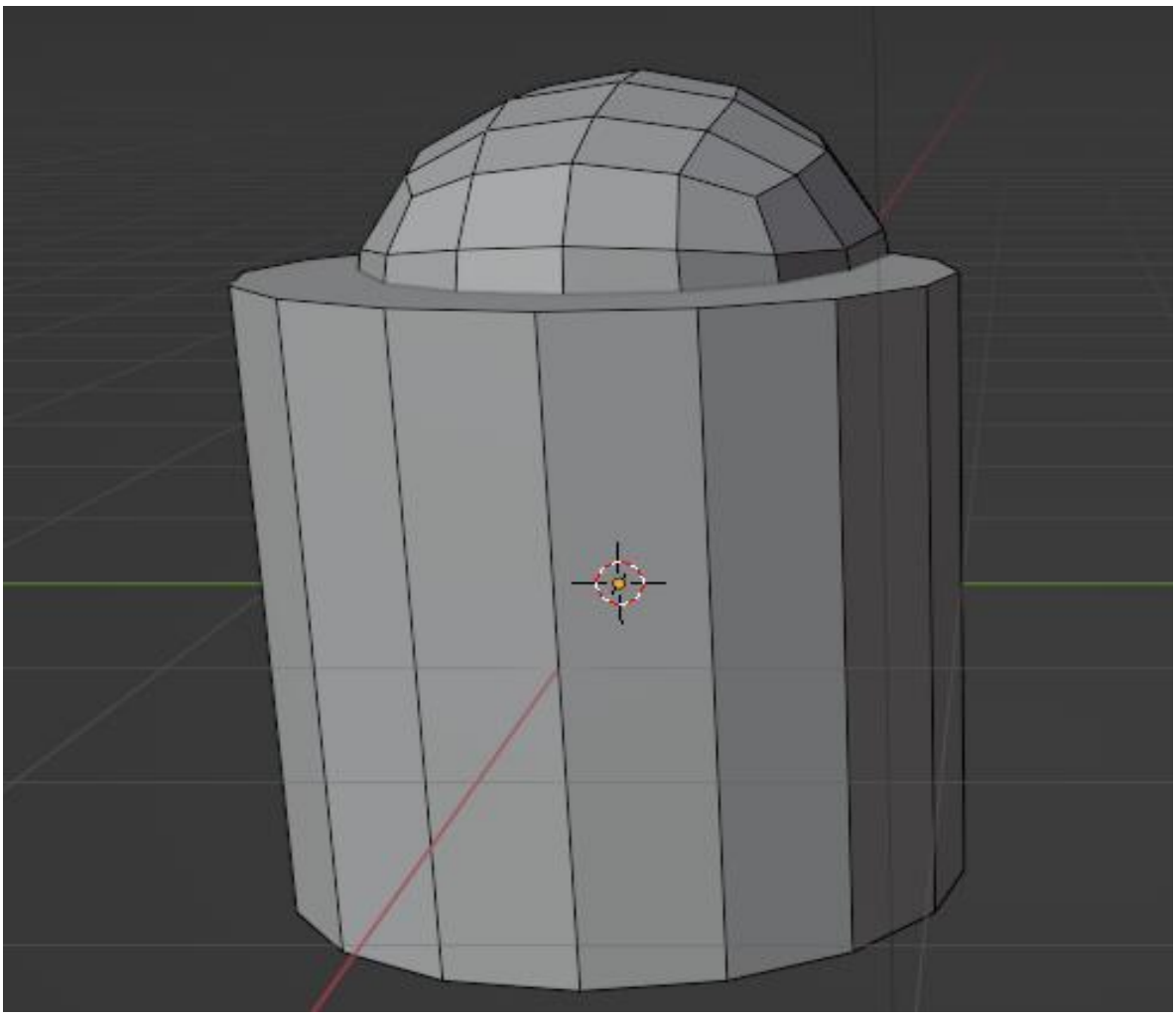


In the cylinder creation popup menu that appears, turn the number of vertices (= to number of sides) down from 32 to 16 as this is a better number of sides for sculpting a neck: -

C

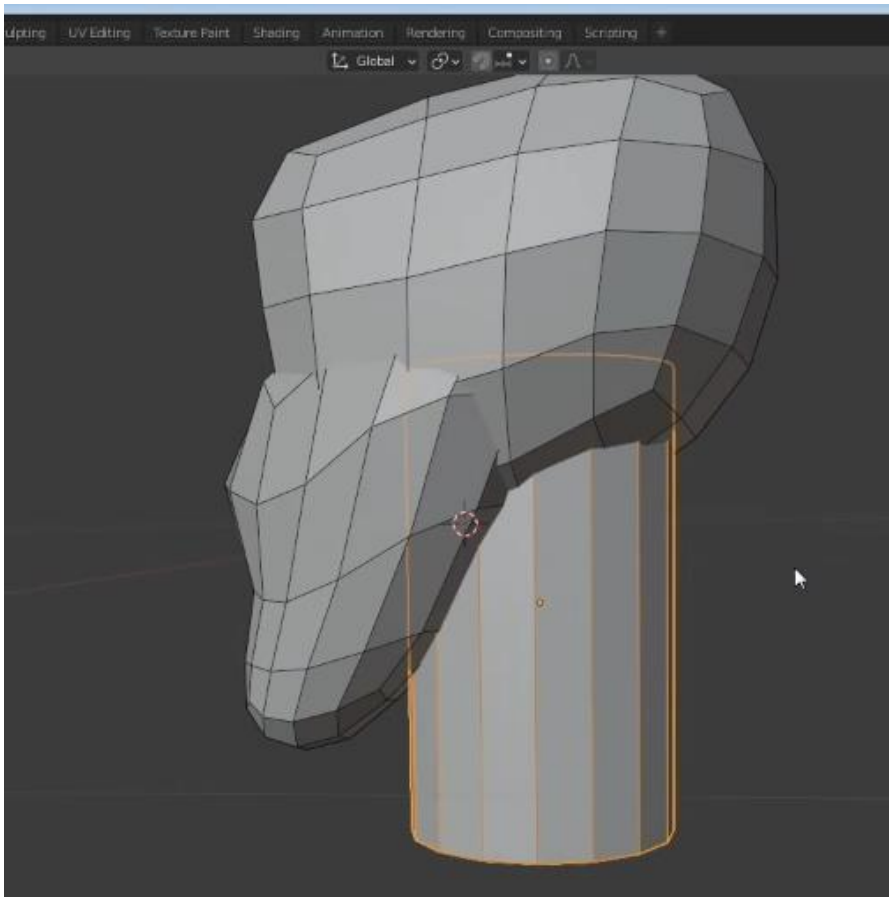


As you change the number of vertices, you will see the number of visible sides on your new cylinder decrease. Once you have reduced to 16, click anywhere in the scene and the object creation parameter box will disappear and you have completed adding your cylinder:-



Use “S” to Scale then “G” to move the cylinder into the neck position

something like this : -



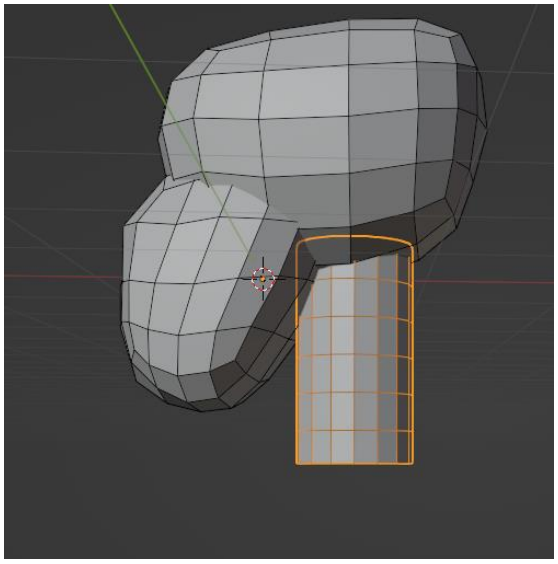
Now, unlike our skull object, the cylinder does not have multiple roughly square faces on it, each side is currently just one long rectangle. To be able to sculpt it like with the head, we need to use a technique called the **loop cut**.

A loop cut allows you to insert a number of “slices” along an object and that is perfect for what we need here.

With the neck selected, press tab or use the mode box in the top left to switch to **edit mode**. Edit mode allows you to make changes to individual parts of the object in question, i.e. allows you to edit the object directly.

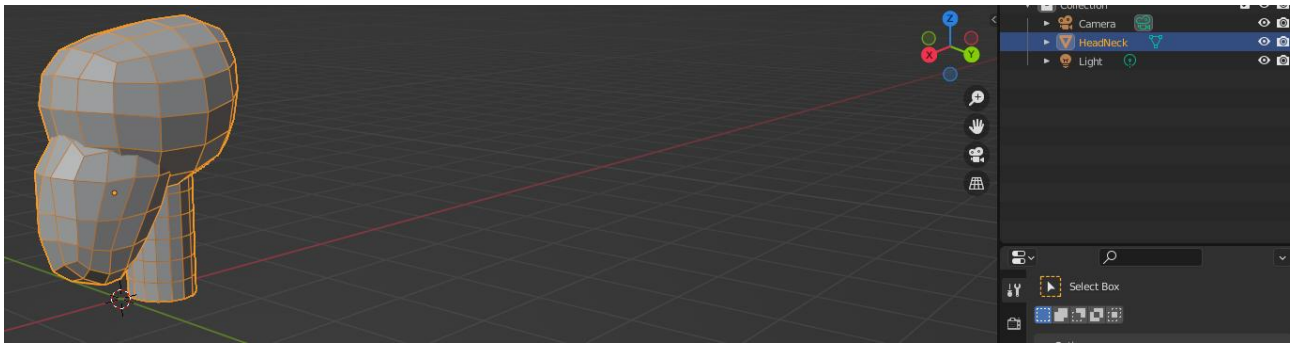
Press “CTRL + R” to launch the loopcut tool. If you now move the mouse over the neck, you will see a single cut to start appear in the middle of the cylinder. Now scroll the mouse wheel up and new cuts will appear – add 4 or 5, just enough to make regular near square faces in the neck object. Then click away to place.

Return to Object Mode and you should now have something like this, and we can begin the neck sculpt:



Select both the cylinder and the header objects and use CTRL+J to join them into one object.

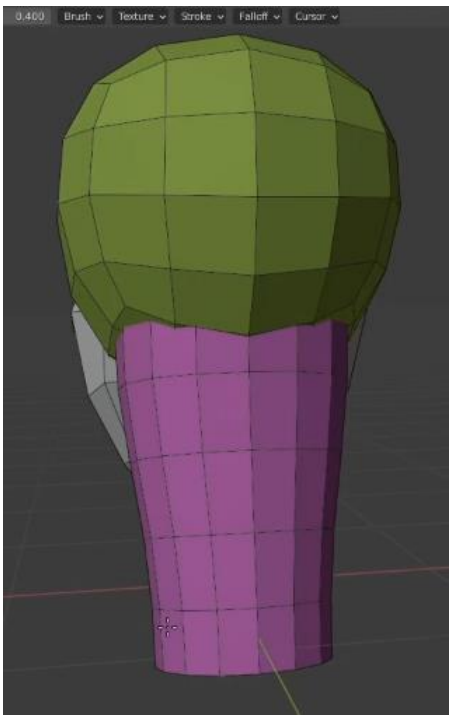
Use “G” followed by Z to move the joined head object up a bit so that the end of the neck is roughly on the floor of the 3d world: -

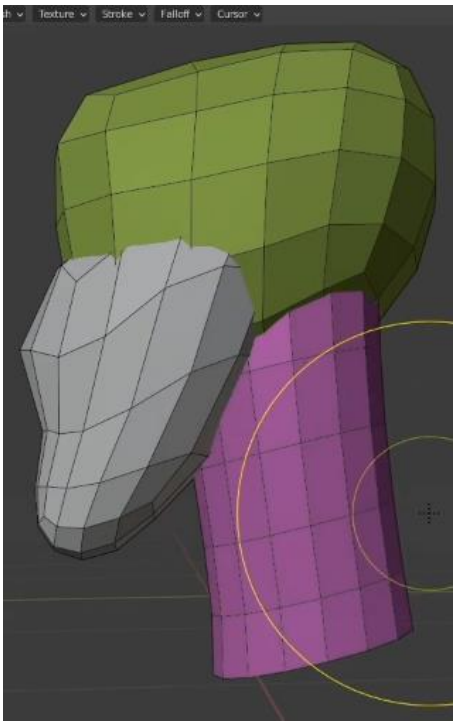


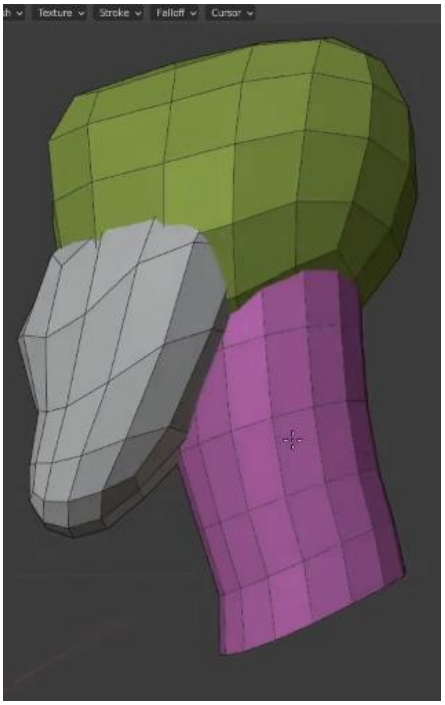
You can also rename the new joined object structure something meaningful – I’ve gone for a literal “HeadNeck” here..

Now enter sculpt mode and begin sculpting the neck. The most important goal is that the neck slopes forward up in to the base of the skull and that it tapers to a little more narrow at the bottom.

To try to achieve something like these examples: -


0.400
Brush
Texture
Stroke
Falloff
Cursor

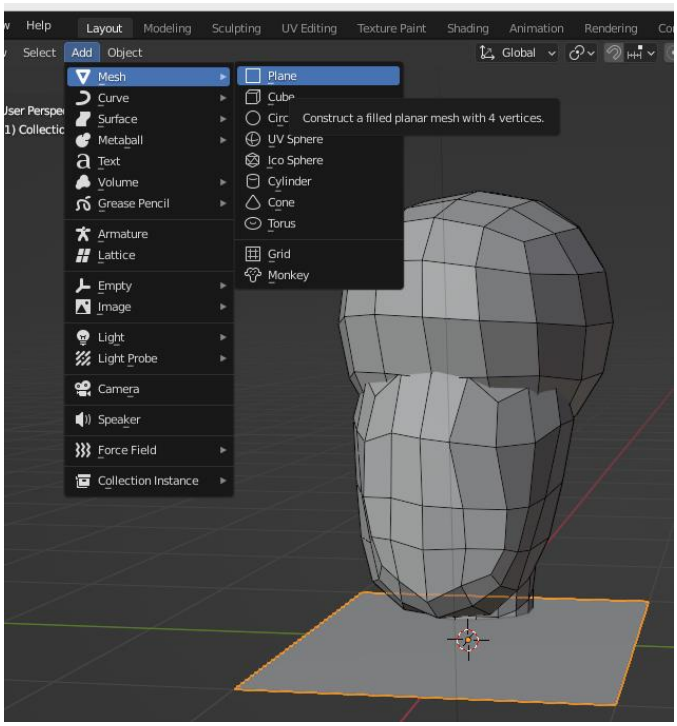

Texture
Stroke
Falloff
Cursor



EARS

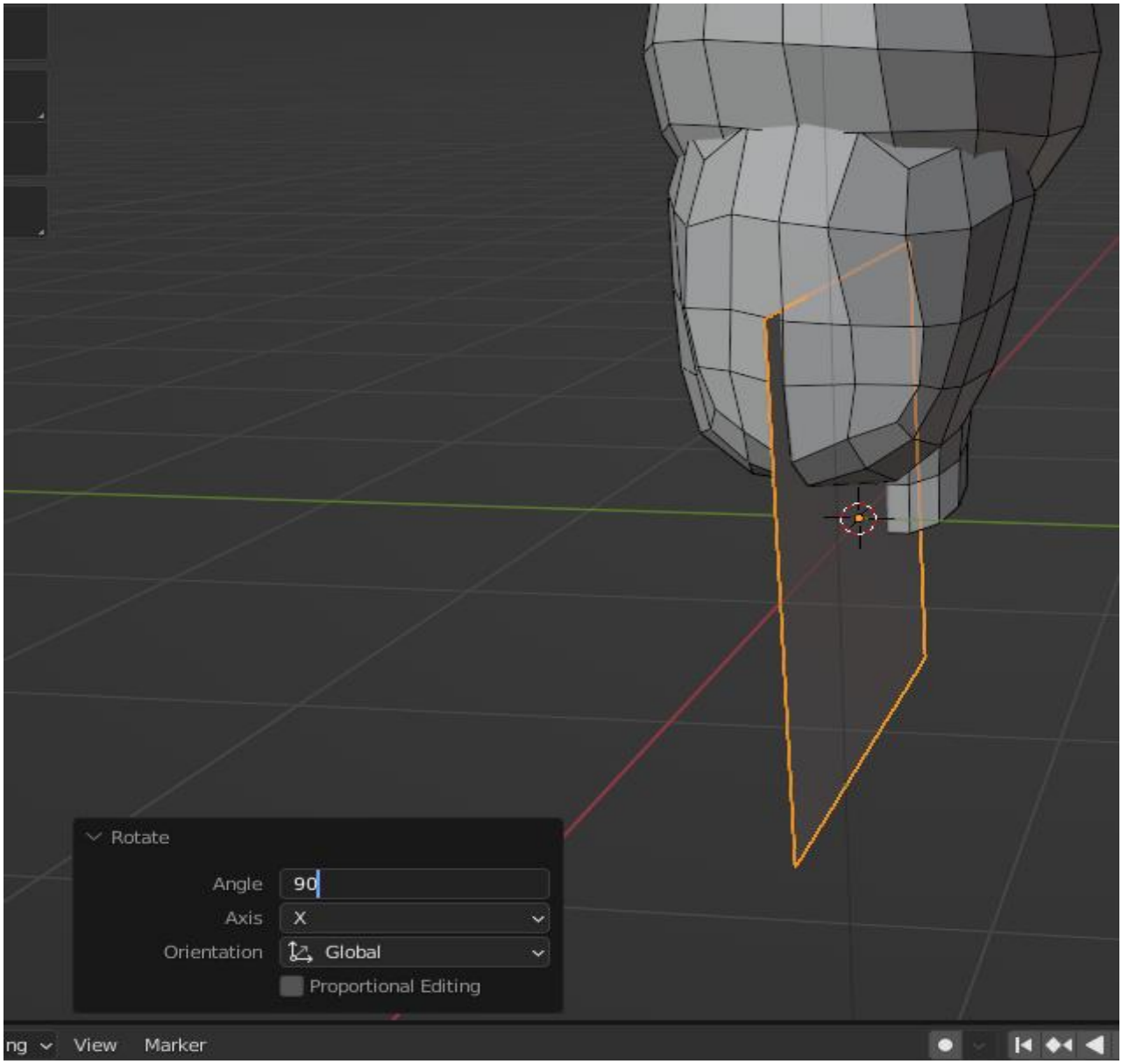
The next stage is to add ears. Now for most people, ears are identical mirror images of each other so we're going to use a special technique here to work on one ear and magically mirror it on the other side at the same time.

Go to Object Mode and select Mesh > Plane from the "Add" menu:

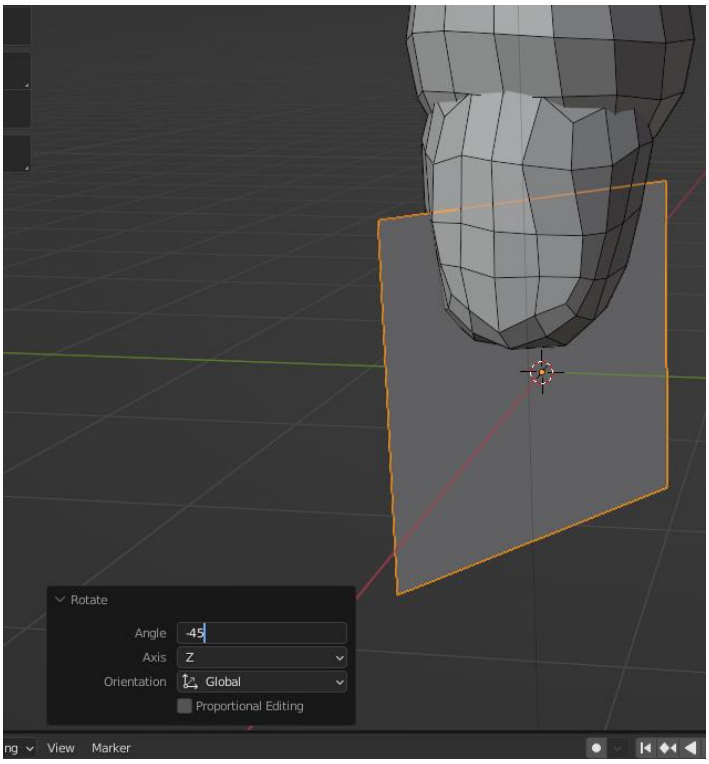


With this new object selected press “R” which is the shortcut for rotation. Then press X so we only rotate on the X-Axis and rotate through 90 degrees so the plane is standing straight up: -

Tip – After you complete eyeballing the rotating with the mouse – you can set the angle to exactly 90 if you are a little off by typing it directly into the rotation parameters box before clicking away to complete the rotation transformation.

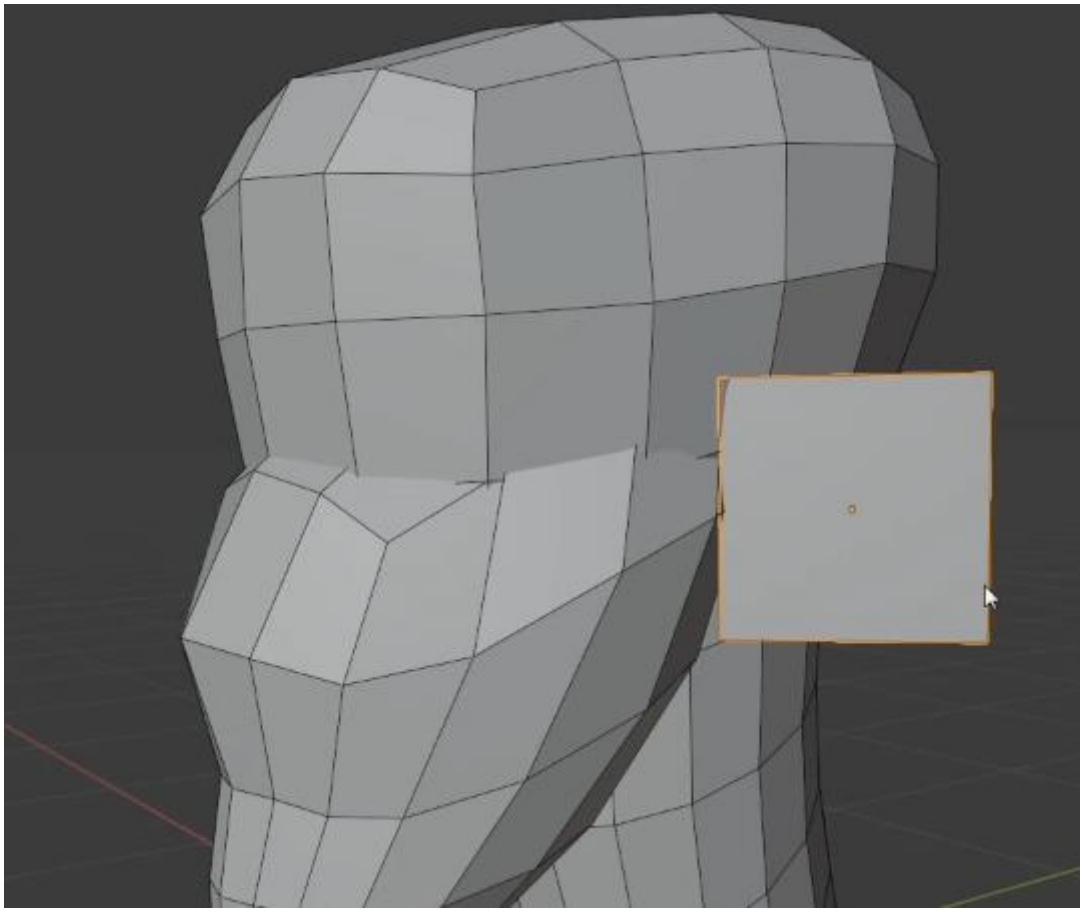


Next rotate the plan back by 45 degrees (minus 45 degrees), this time around the Z axis: -



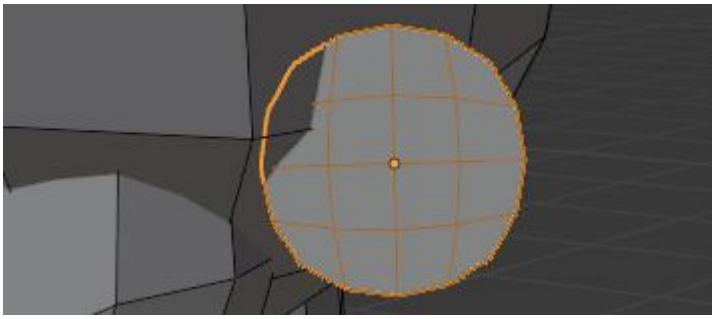
And finally scale it to roughly ear sized and move it in to position where the ear should be (you should know how to do both by now) :-

We are looking to achieve something like this: -

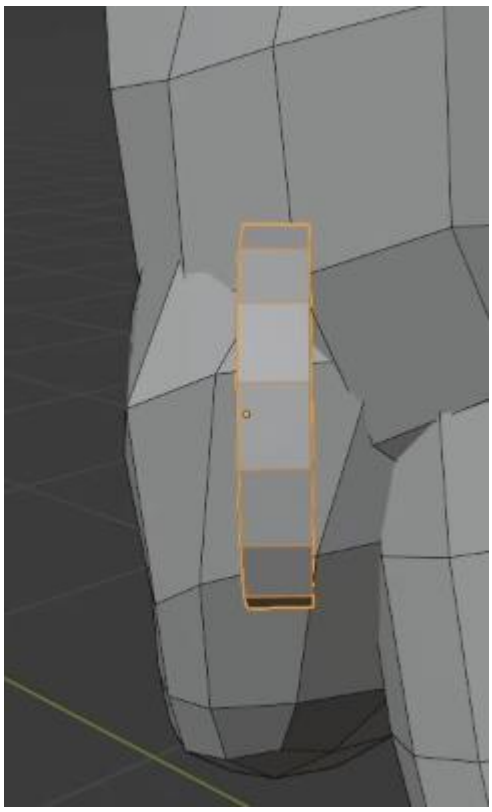


Now, as we did above we add a level 2 subdivision modifier to make our plane collapse into a subdivided round vaguely ear like shape,

remembering to use CTRL+A to full apply the modifier: -



Next we apply another modifier, a new type, this one is “solidify” – it thickens the given surface by a variable amount, increase the thickness slider until you have something like the following: -



And now for the mirror magic, next apply a “mirror” modifier: -

Switch the mirror axis to “Y” and press ctrl + A and select “Apply all transforms”.

You should now have a magic 2nd ear reflection. And from now on what you do to one ear is automatically reflected on the other!