



3D & MOTION GRAPHICS > BLENDER

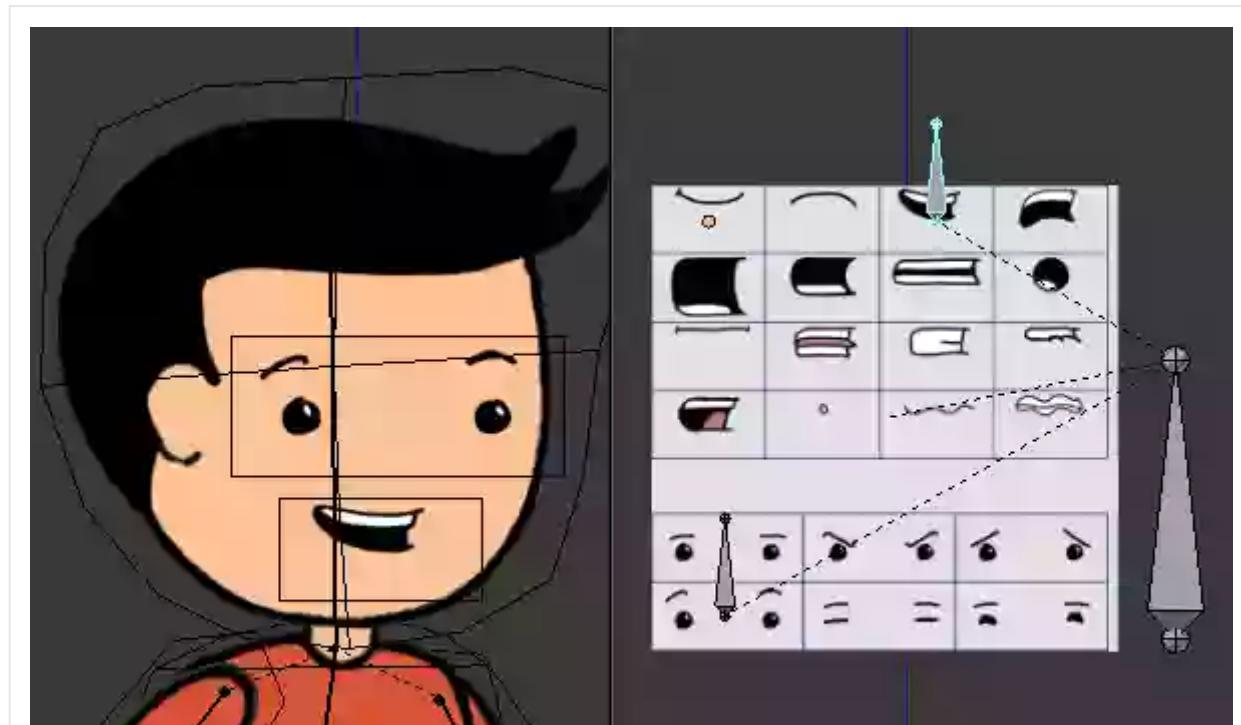
# How to Rig a 2D Character in Blender for Cutout Animation or Explainer Videos: Part 2

by [Karan Shah](#) 28 Apr 2016

Difficulty: Intermediate Length: Long Languages: English ▾

Blender

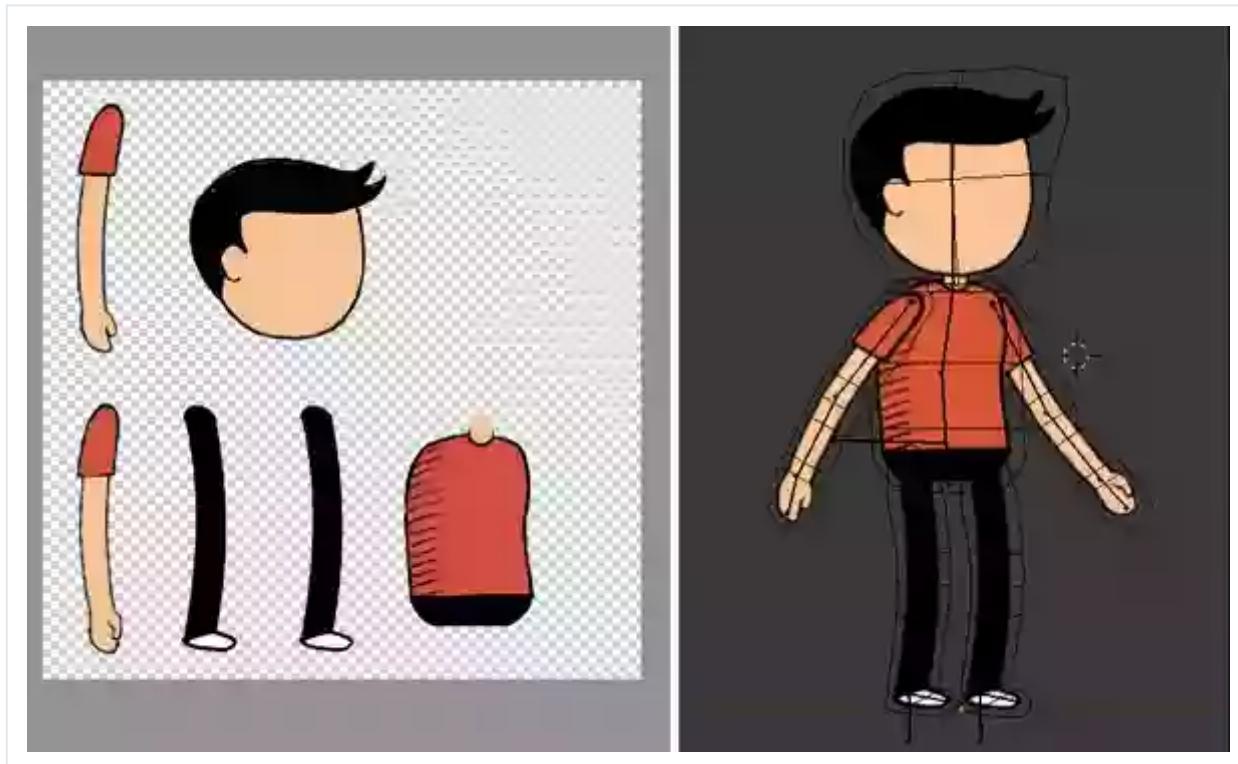
Animation



# Creating the Texture Map

## Step 1

Ensure the original character texture image don't have the mouth and eyes, as they will be a part of a separate texture map, which will then be animated and controlled separately.



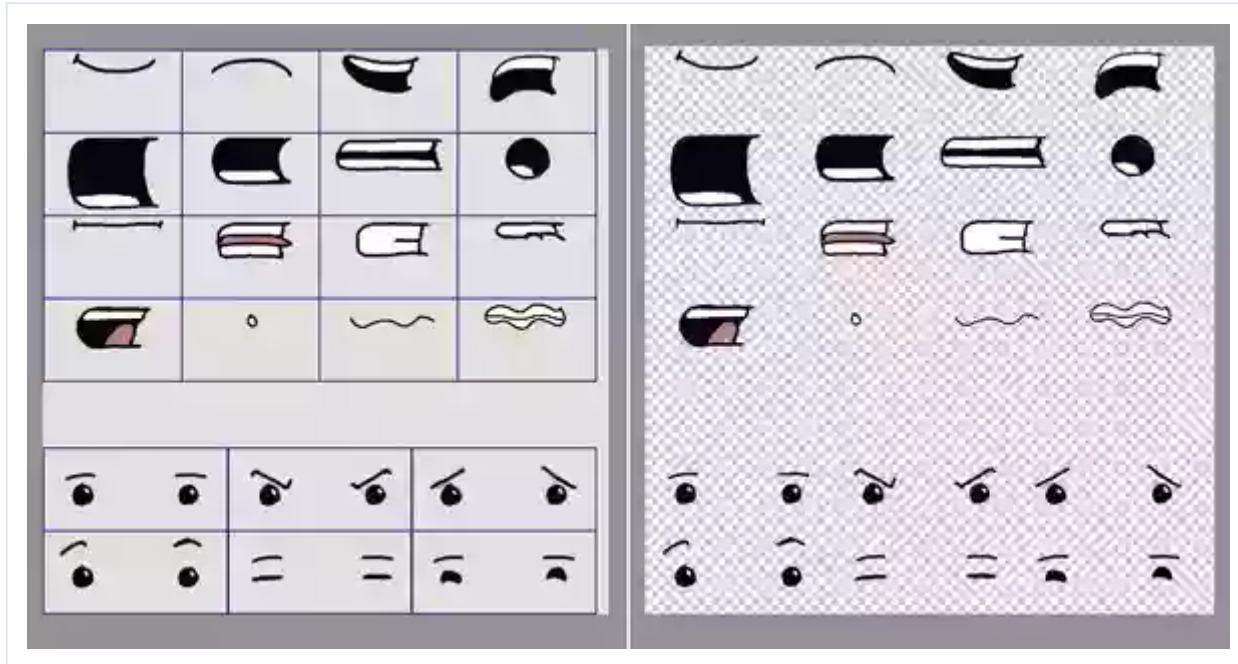
Delete facial expressions

Advertisement

## Step 2

Create a new square image, with various mouth shapes and eye variations. Place them all in equal grids. Set the background and the grid lines in separate layers so that they can be easily turned off to export transparent png.

The grid can be of any shape but the whole image should be square in proportion. For mouth shapes arrange them in groups of expressions , for example smile, laugh, crying and so forth. And phonemes such as a, aa, o, ee, f, v, m b, l.



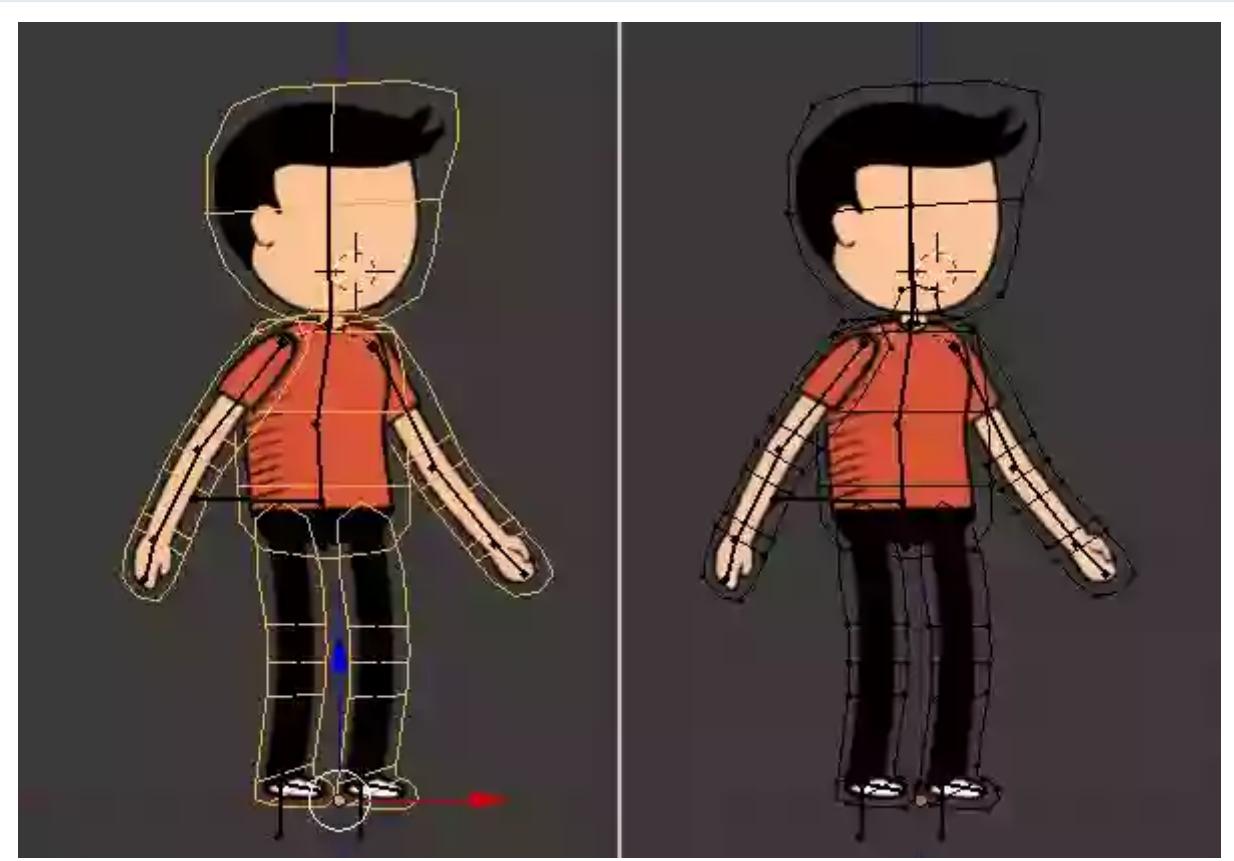
Creating mouth and eyes expression library

## Face Object and Texture Setup

### Step 1

In **Blender**, open the file in which you made the character. Secondary-click on the character object to select it and press **Tab** on the keyboard to enter edit mode.

Ensure you're in front view. Press **1** on the numpad to get into front view.

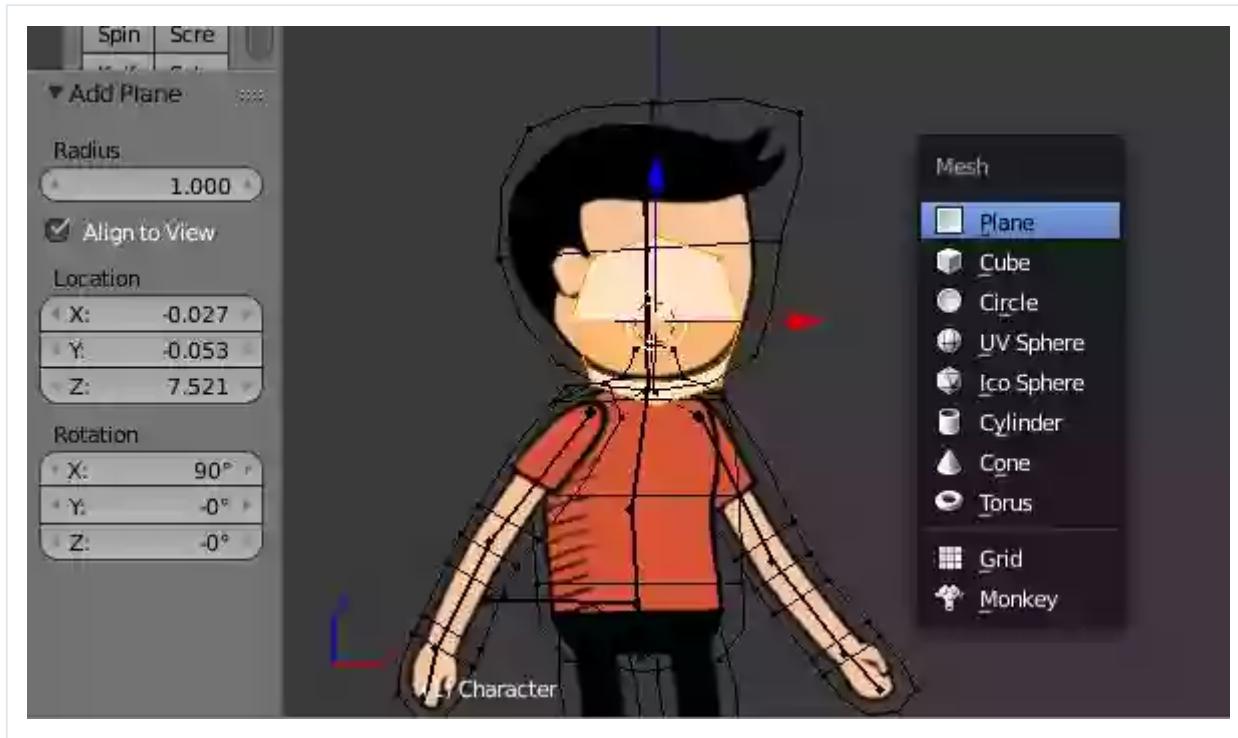


Editing the mesh

Advertisement

## Step 2

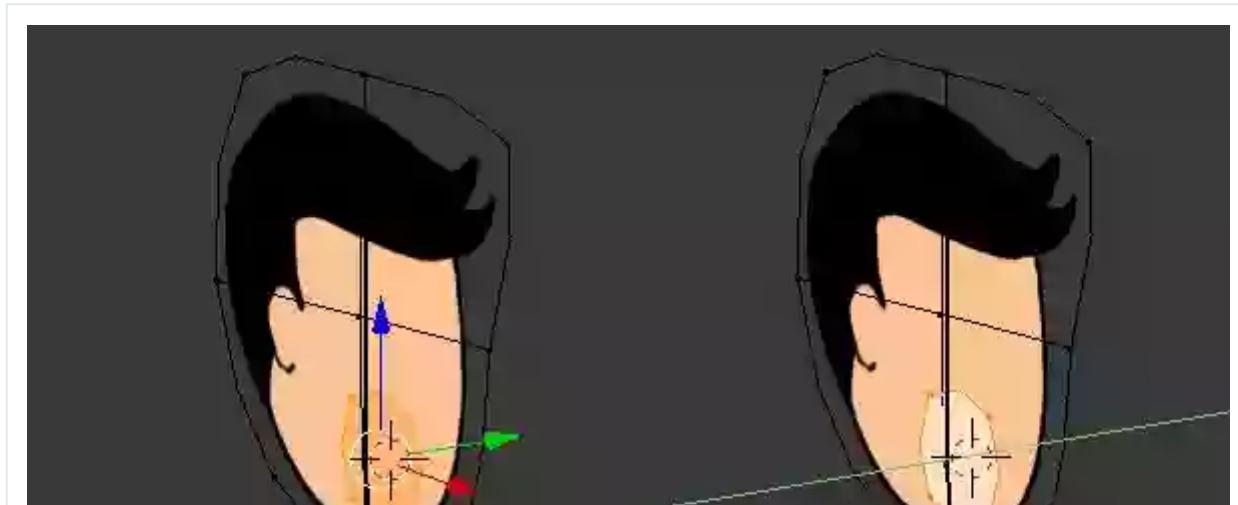
Press **Shift-A** and add a plane. In the bottom part of the toolshelf, tick the **Align to View** checkbox so that it face the viewer.

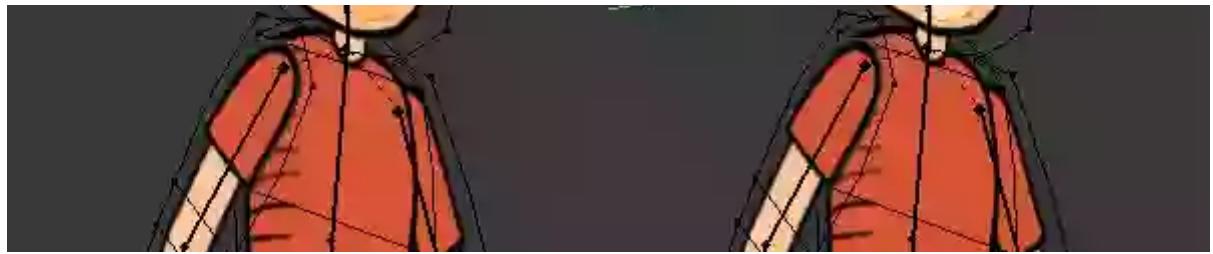


Adding a new plane

## Step 3

Move the new plane forward to bring it in front of the face.





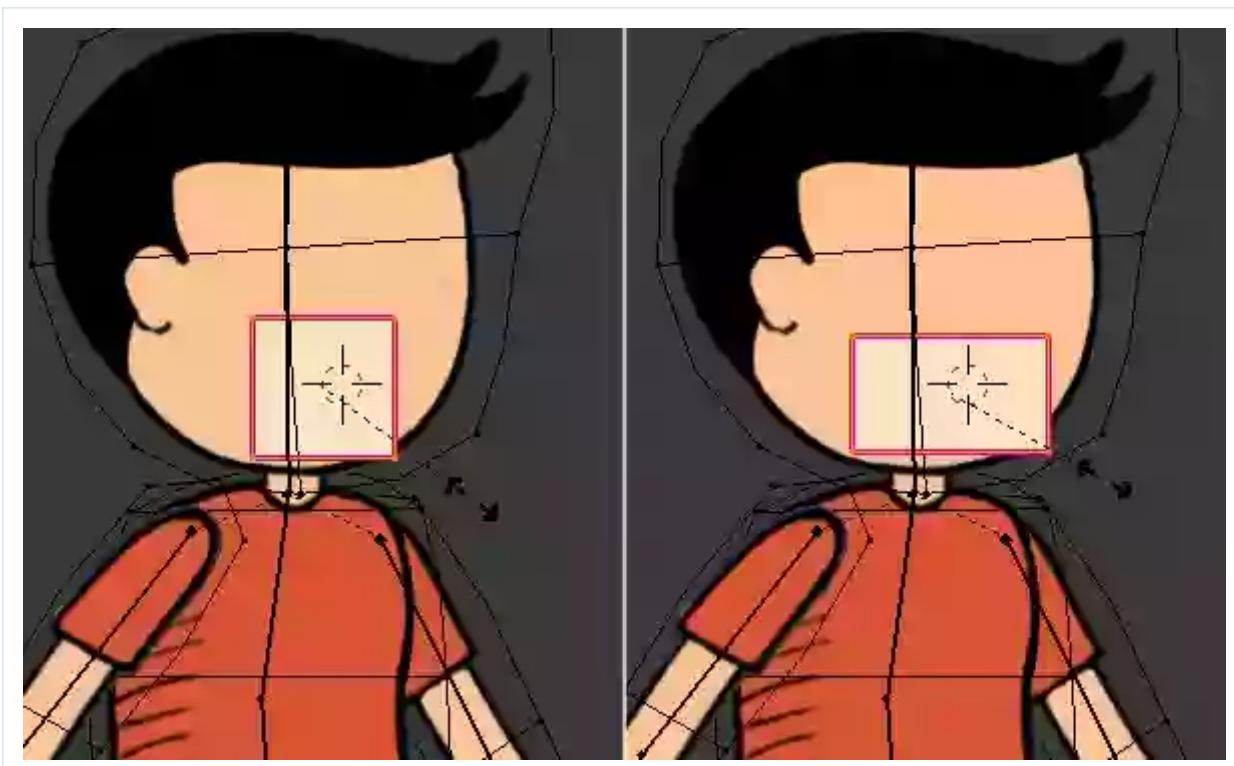
Placing the plane in front

## Step 4

You'll notice that the plane appears to be circular. This is because the subsurf modifier was already applied to the character.

Hold **Shift** and secondary-click on all vertices of the plane. Press **Shift-E** and type **1**. The edges of the plane will become sharp and will be marked in purple.

With the plane selected, press **S** on the keyboard to scale the plane according to the size and shape of the mouth.

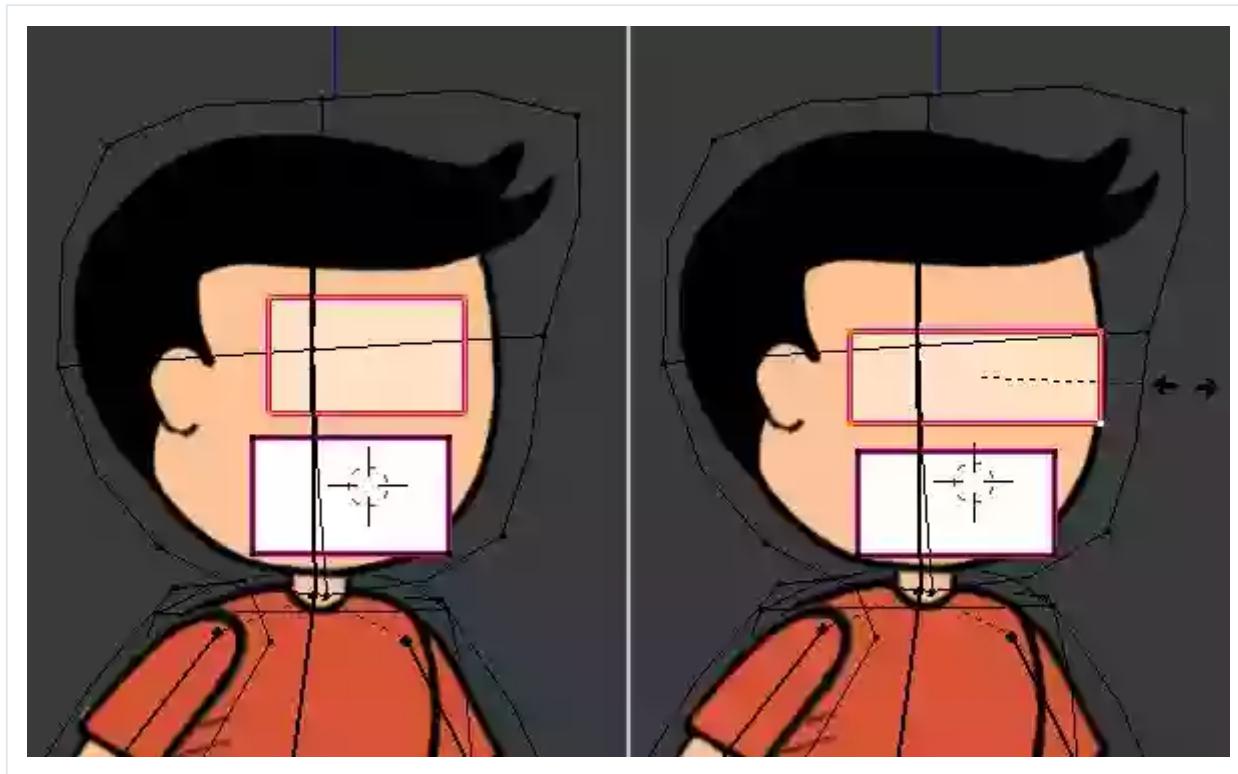


Reshaping the plane

## Step 5

With the mouth plane selected, press **Shift-D** to make a duplicate.

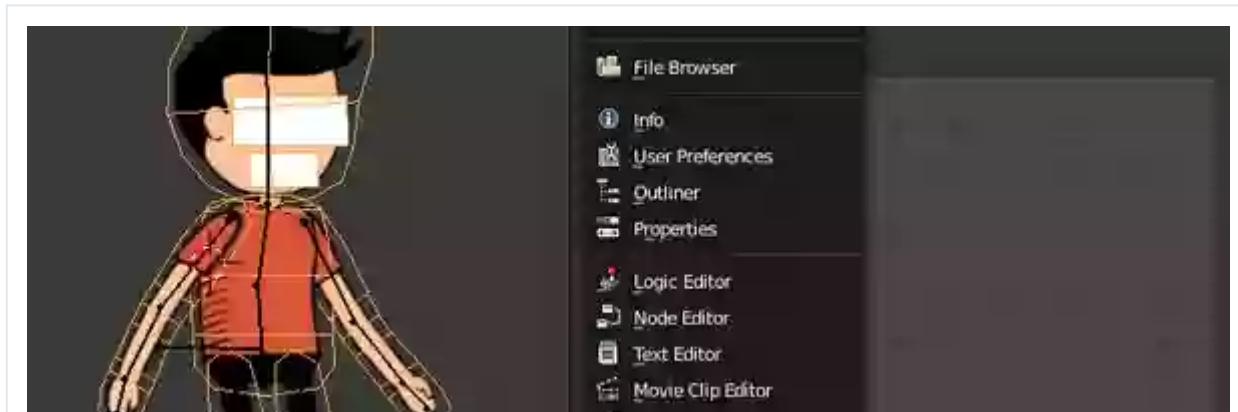
With the mouth plane selected, press **Shift** to make a duplicate for the eyes. Move and place it appropriately. Use **G** key to move. Press **S** and then **X** key to scale along the X-axis.

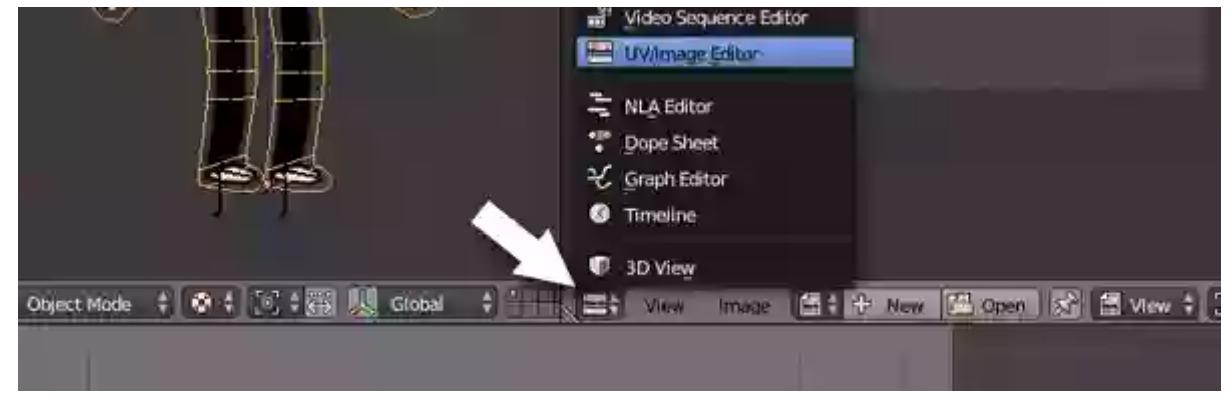


Duplicating the plane for eyes

## Step 6

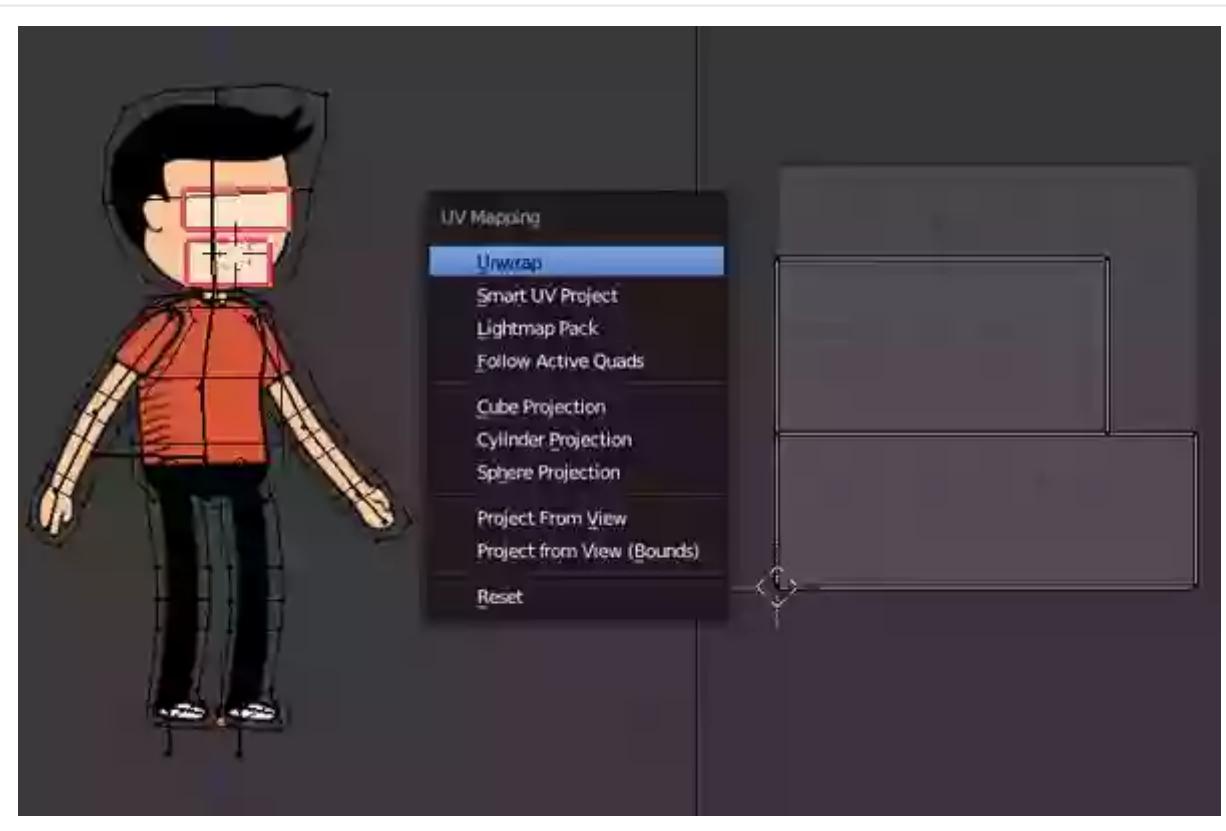
Split the 3D view into two. Click on the window type button and select **UV/Image Editor**.





Open UV Editor

In the 3D view port, select both planes you just created for eyes and mouth. Hold **Shift** and then right click on the vertex to multiple select. Make sure no other vertex is selected. Press **U** key to bring the **UV Mapping** menu. Select **Unwrap**.

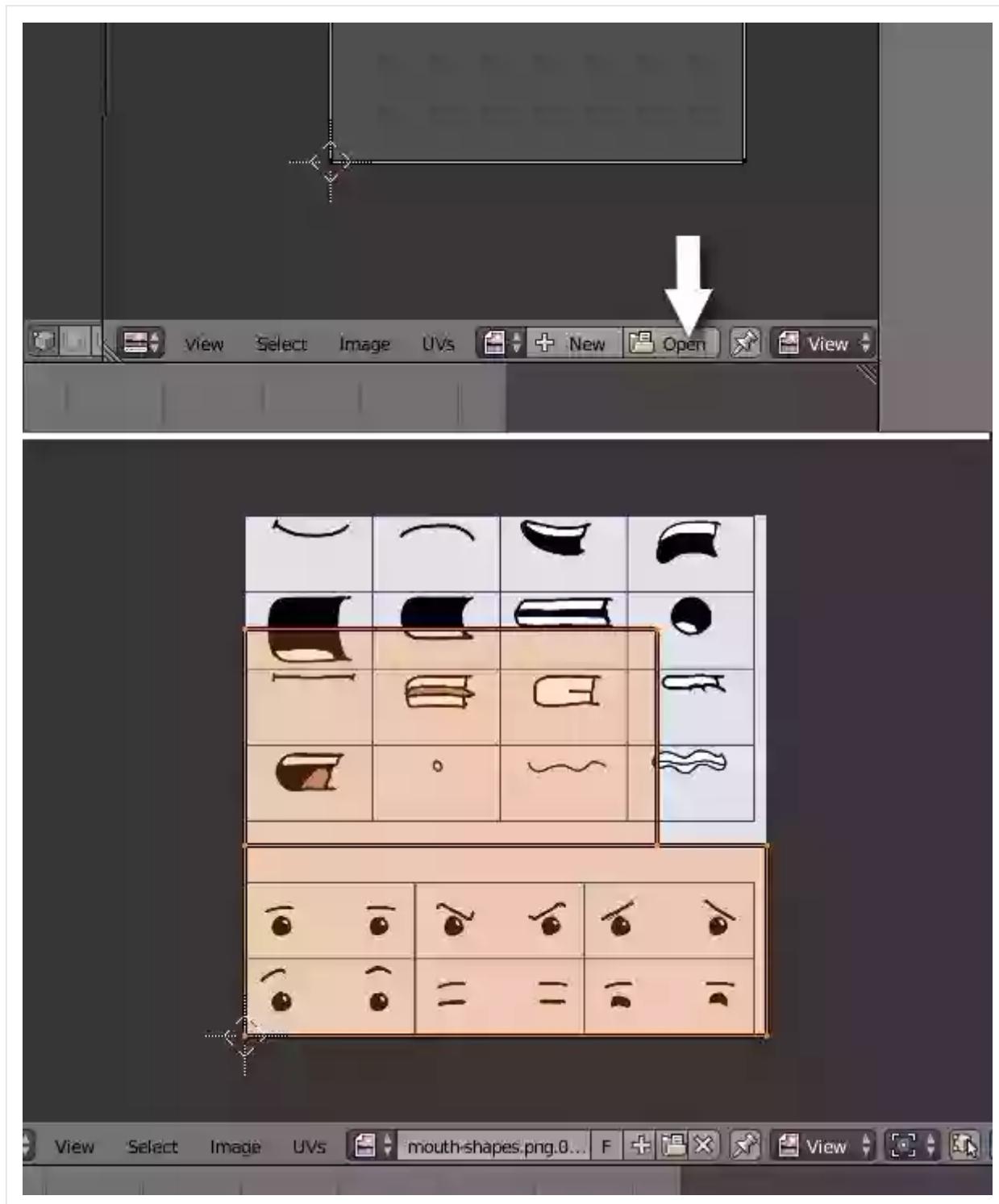


Unwrapping the new planes

## Step 7

In the **UV Editor**, click on the **Open** button and browse for the mouth/eye shape image.

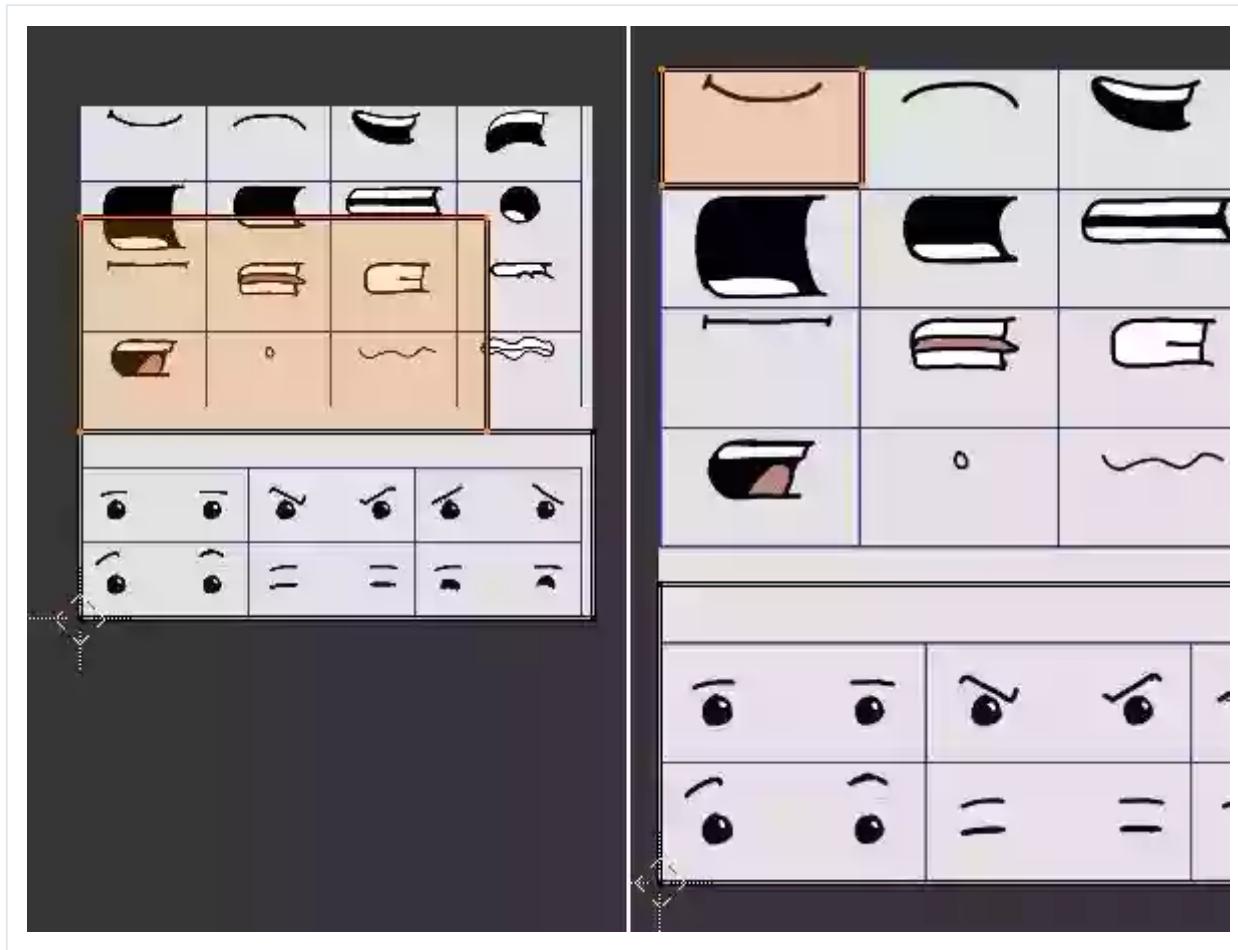
I've turned on the grid and background layer in the 2D program while exporting as I need the grid as reference to align the UVs of the planes.



Open the expression sheet as texture

## Step 8

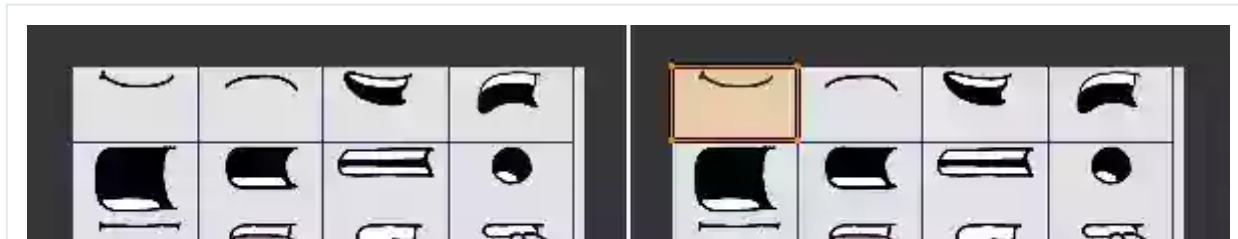
In the **UV Editor**, select the unwrapped vertices of the mouth plane. Scale it down and place it on the first box. This will be the default expression.

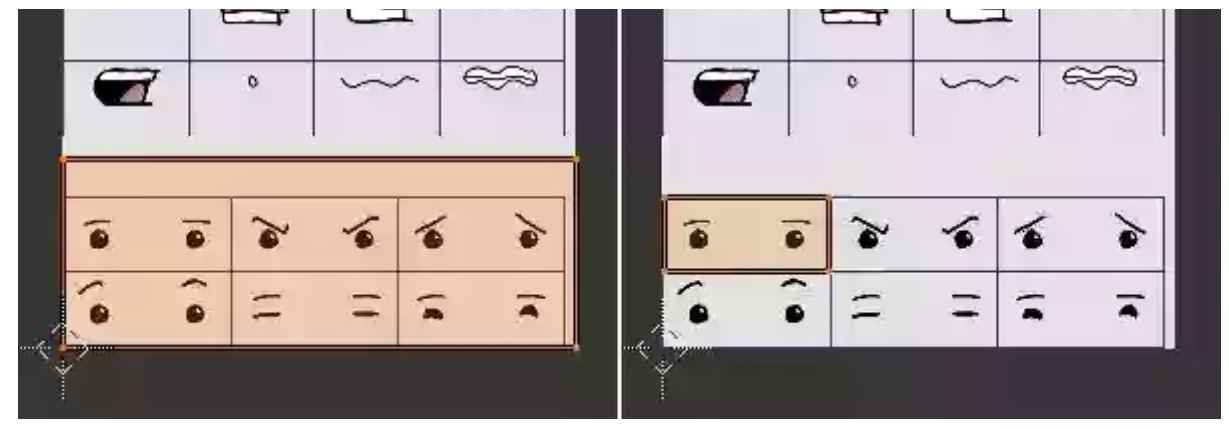


Rearranging the UVs

## Step 9

Similarly do the same for the eyes. Select the vertices and scale it down and place it over the first grid.



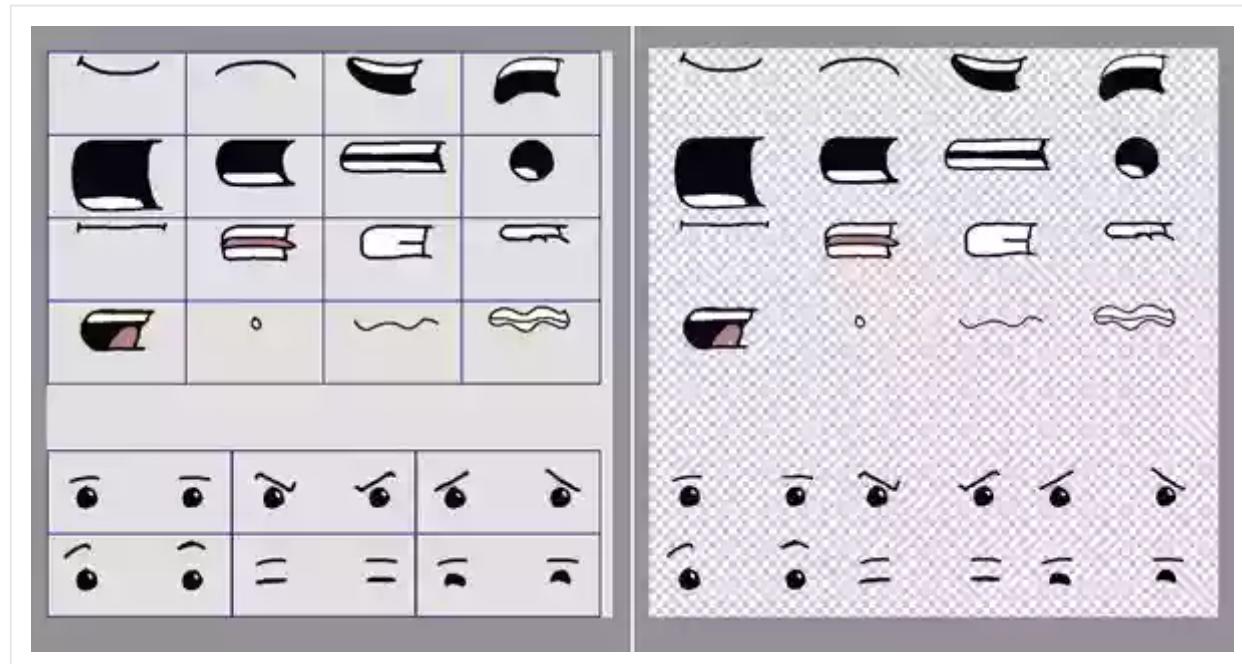


Rearranging the UVs

## Step 10

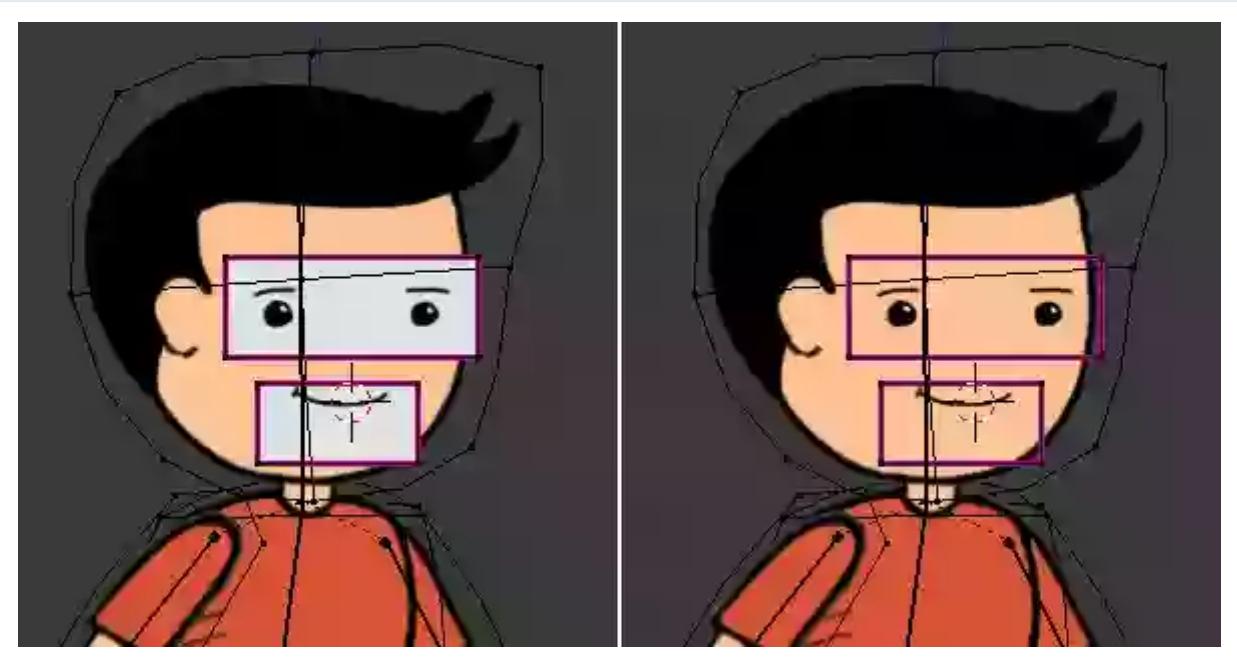
Now in a 2D program, turn off the background and grid layer.

Export it on overwrite the png file. In the **UV Editor** press **Alt-R** to refresh the image or you can re-open the image.



Exporting library as transparent png image

The texture now has transparent background and it blends seamlessly with the character.

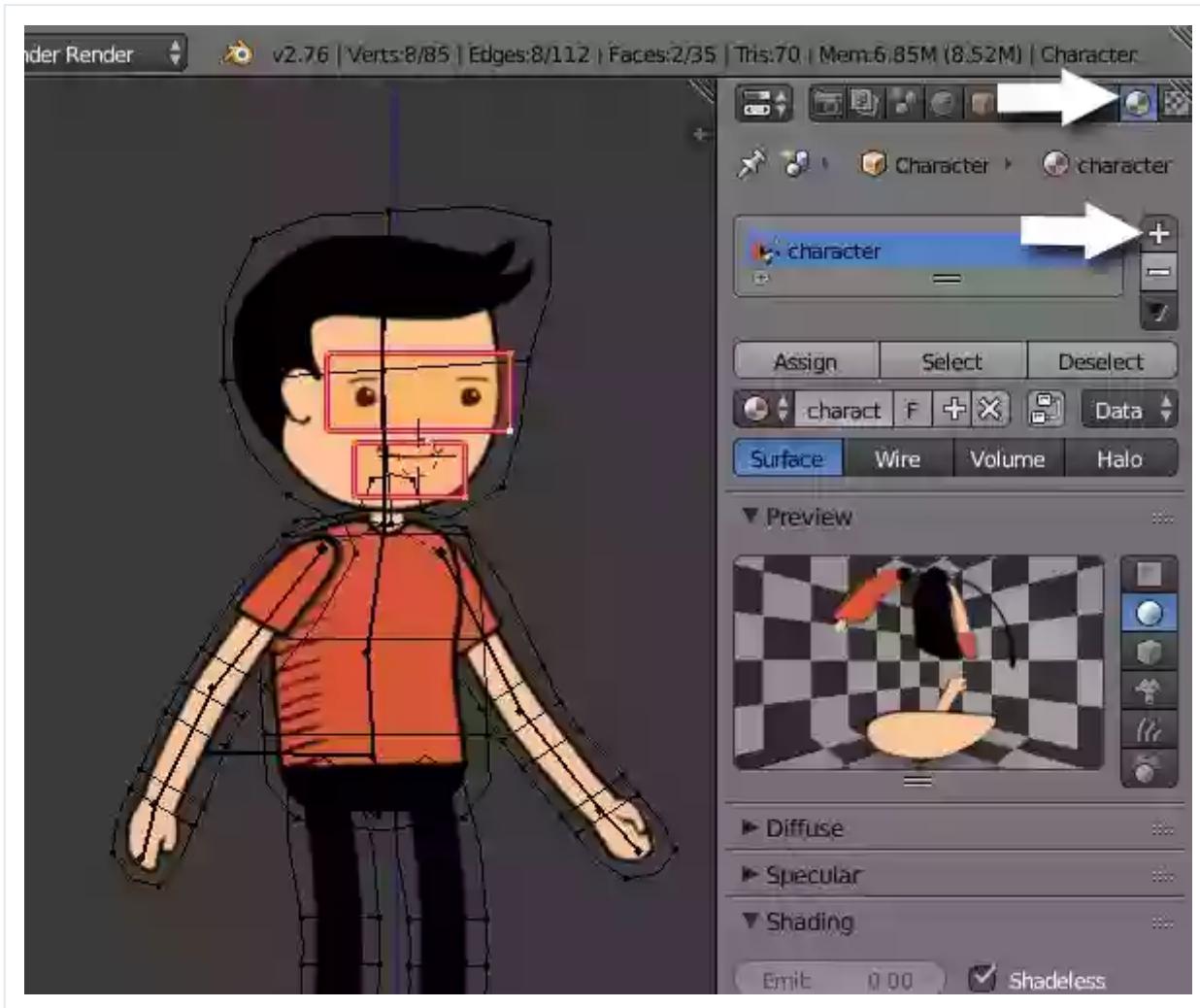


Preview the expression in 3D view

## Setting Up the Material

### Step 1

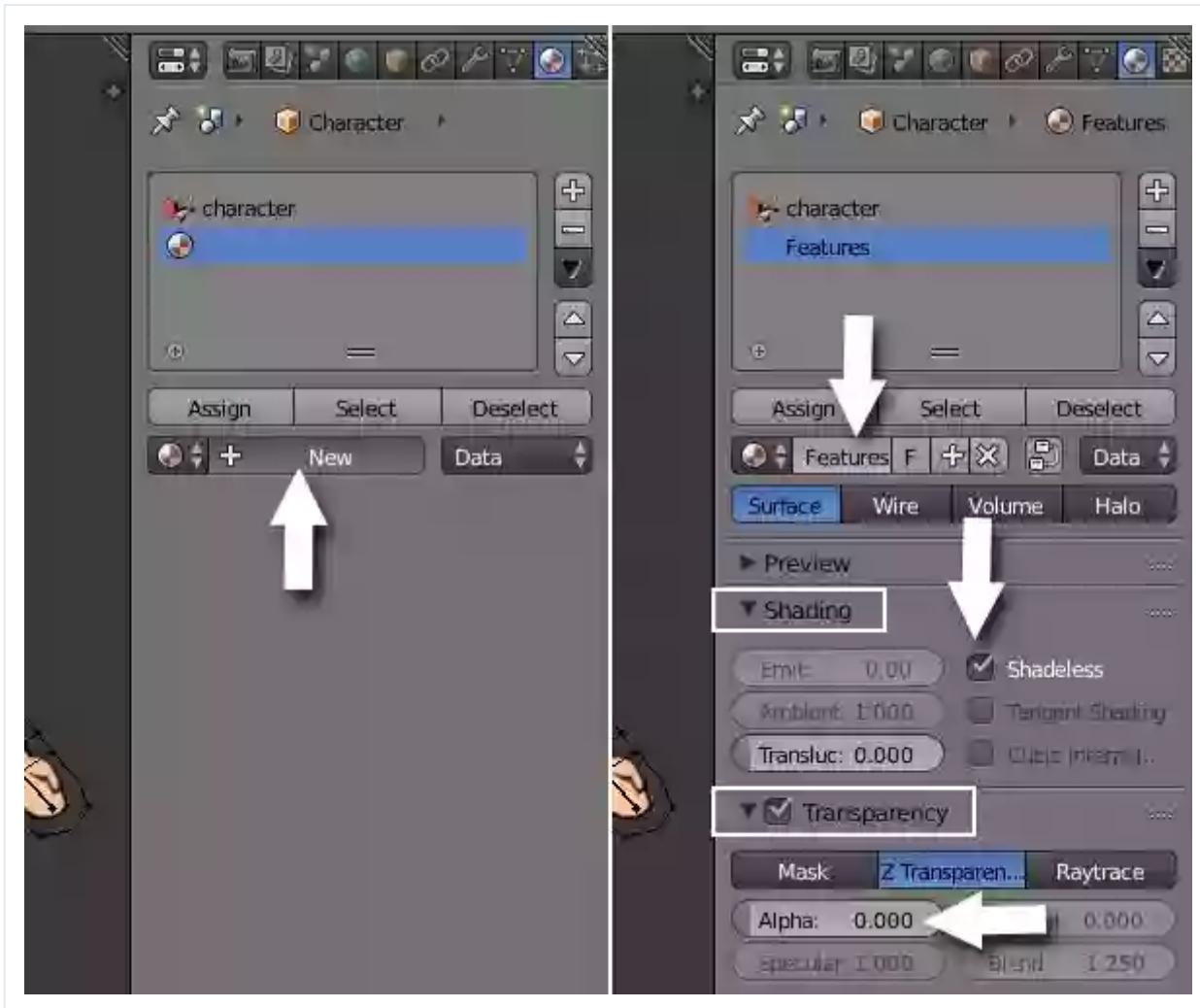
With the two planes selected, click on the materials button in the properties window. Press the + button to add another material slot.



Adding new material

Click on the **New** button to add another material. Rename the material **face** or feature or anything else you want.

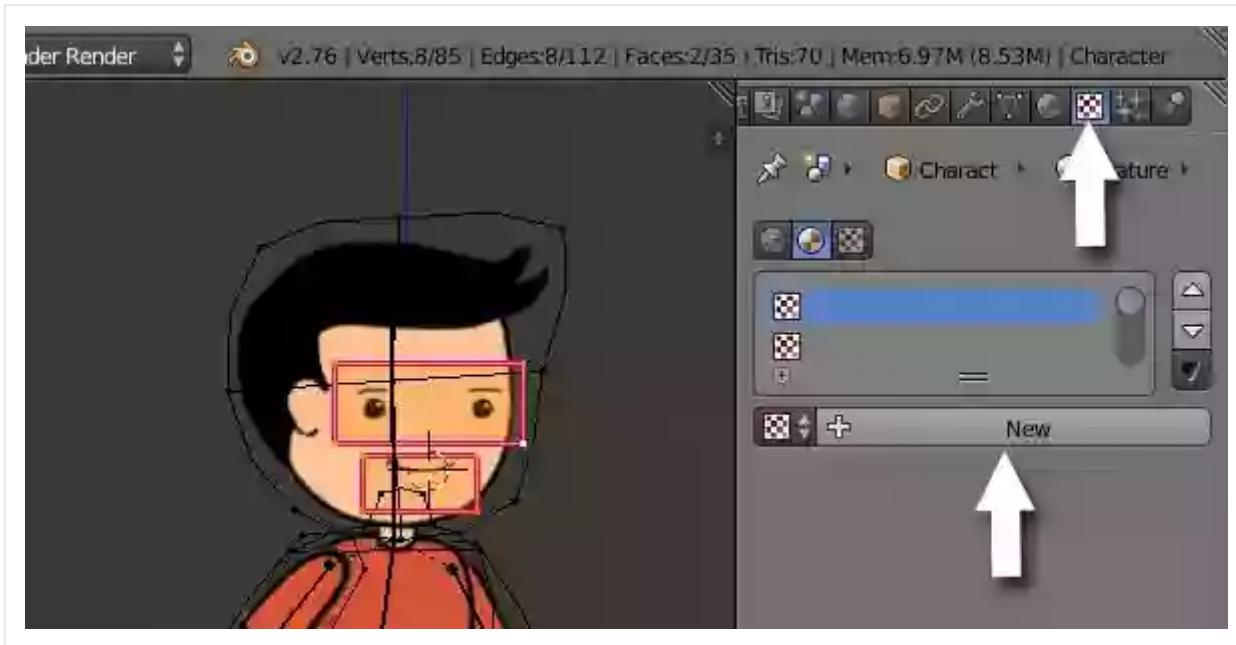
In the **Shading** panel, tick the **Shadeless** checkbox. Turn on the **Transparency** and reduce the **Alpha** to **0.0**.



Material settings

## Step 2

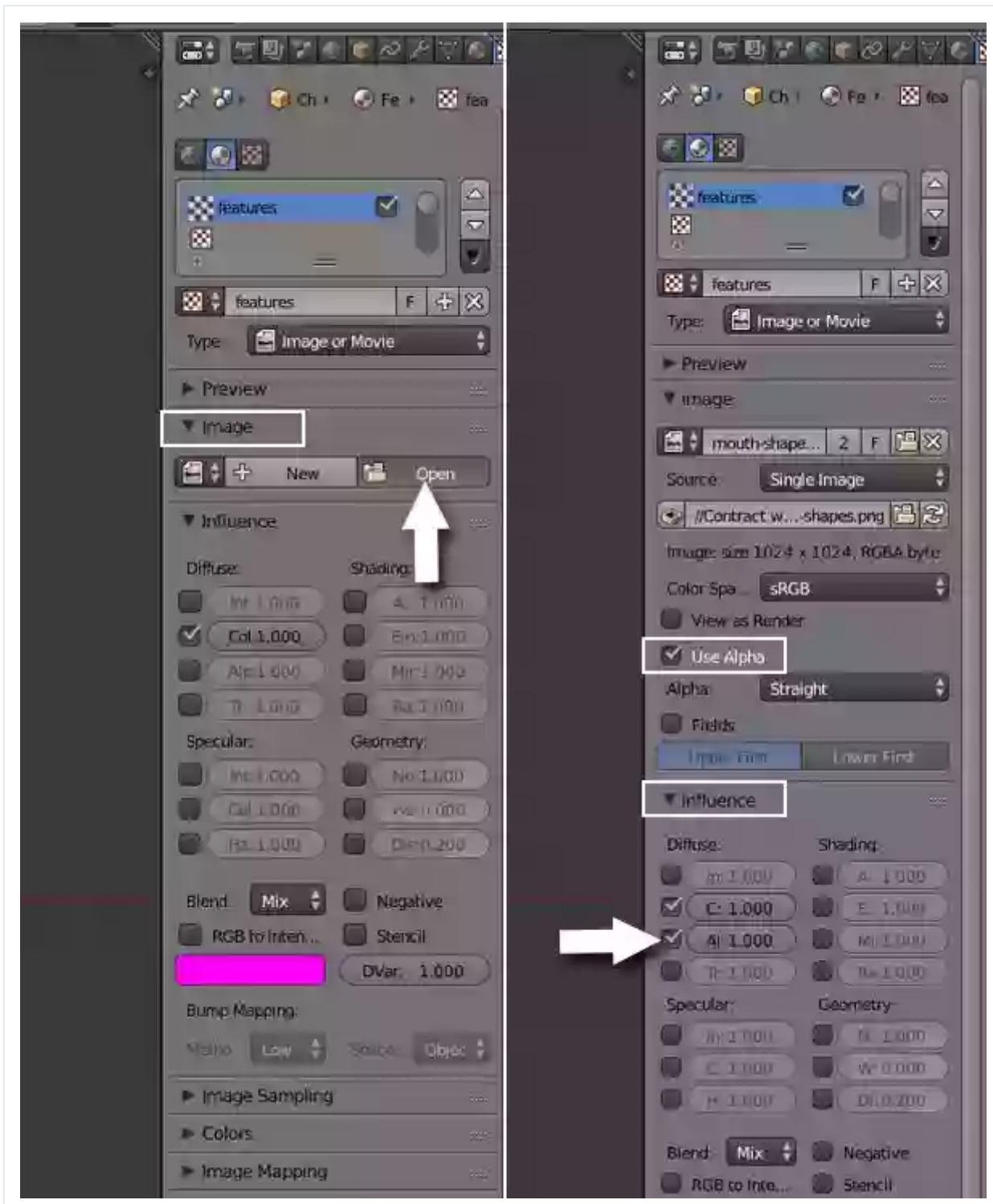
Click on the texture button on the **Properties** window. Click on the **New** button.



Adding new texture

### Step 3

In the **Image** panel, press **Open** button and browse for the transparent mouth texture image. Tick the **Use Alpha** checkbox. In the **Influence** panel, tick **Alpha** checkbox.

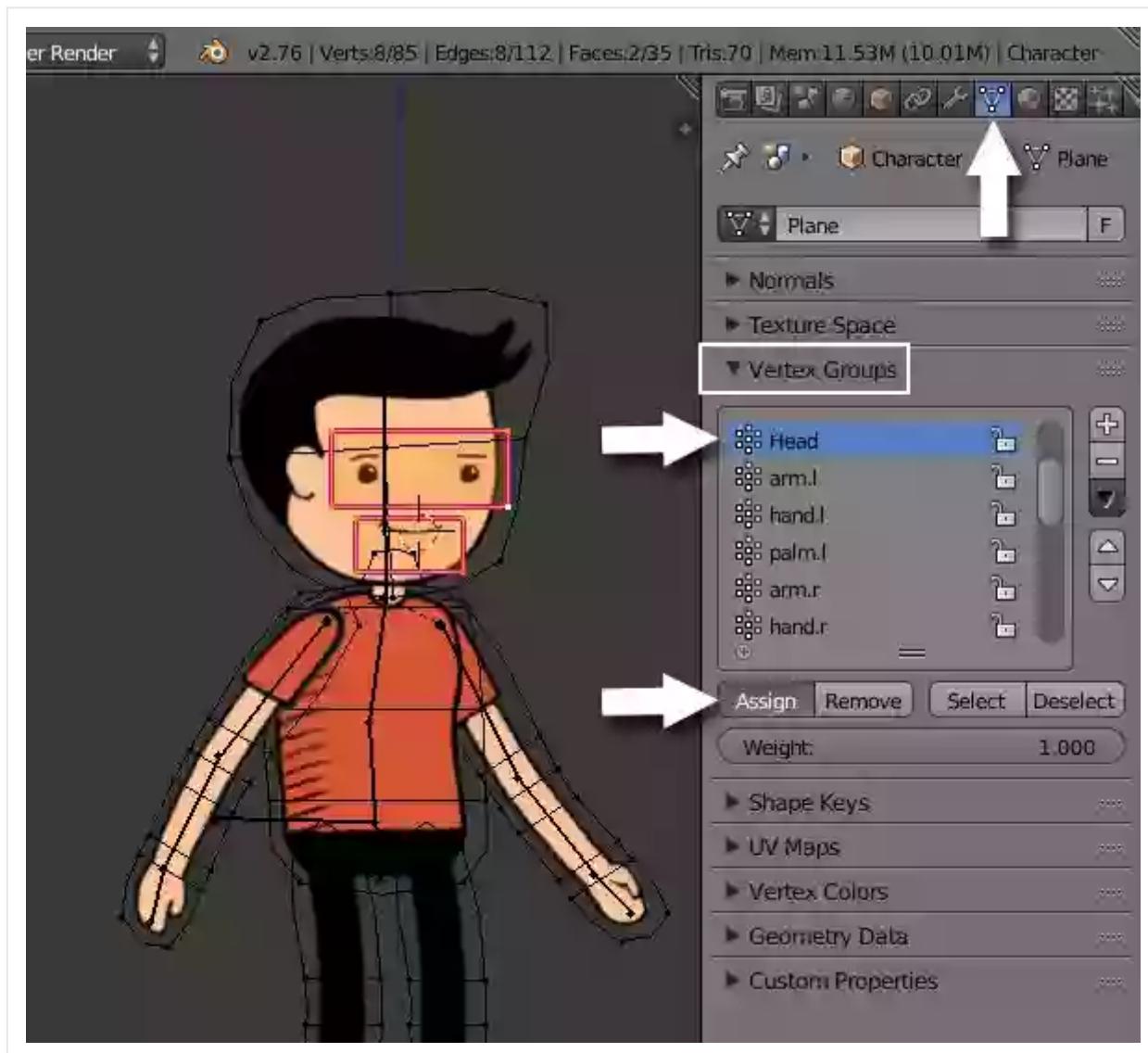


Textures settings

# Parenting to the Bone

## Step 1

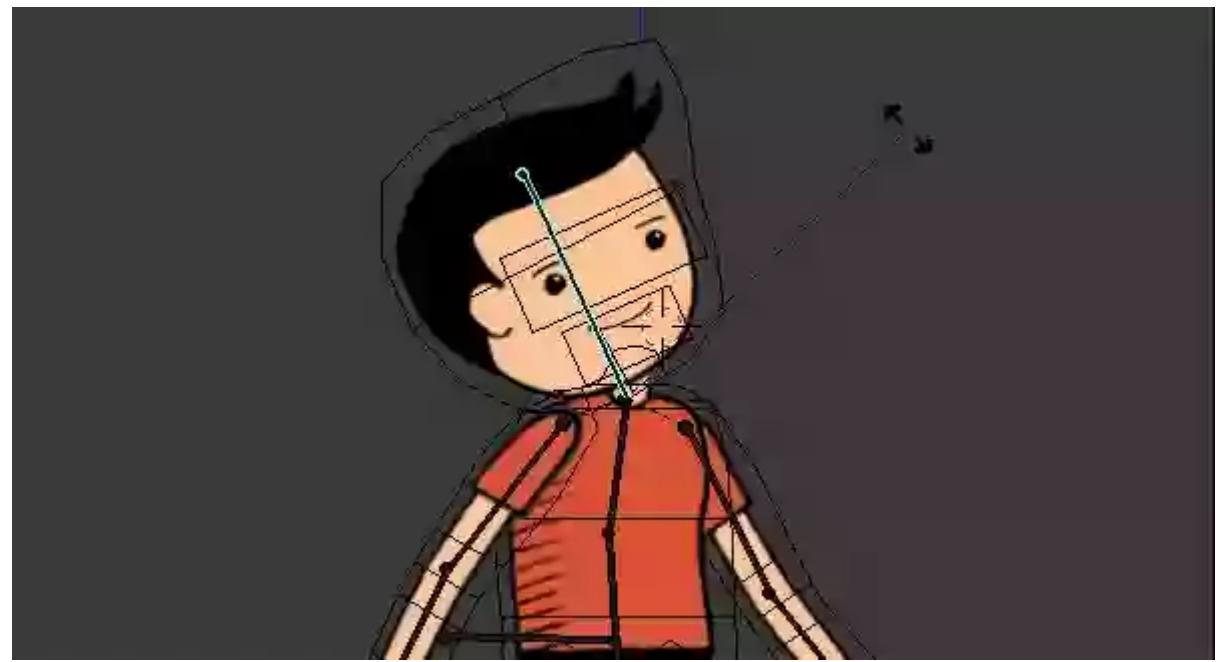
With the planes selected, click on the **Vertex Data** button in the properties window. In the **Vertex Groups** panel, click on **Head** and then click the **Assign** button. The planes will now follow the head bone along with other vertices of the head vertex group.



Assigning vertex groups to facial features

You can test it by right clicking on the armature object. Pres **Ctrl-Tab** to enter pose mode if you are not in pose mode. Right click on

the head bone and press **R** to rotate it. Press **Alt-R** to reset the rotation.

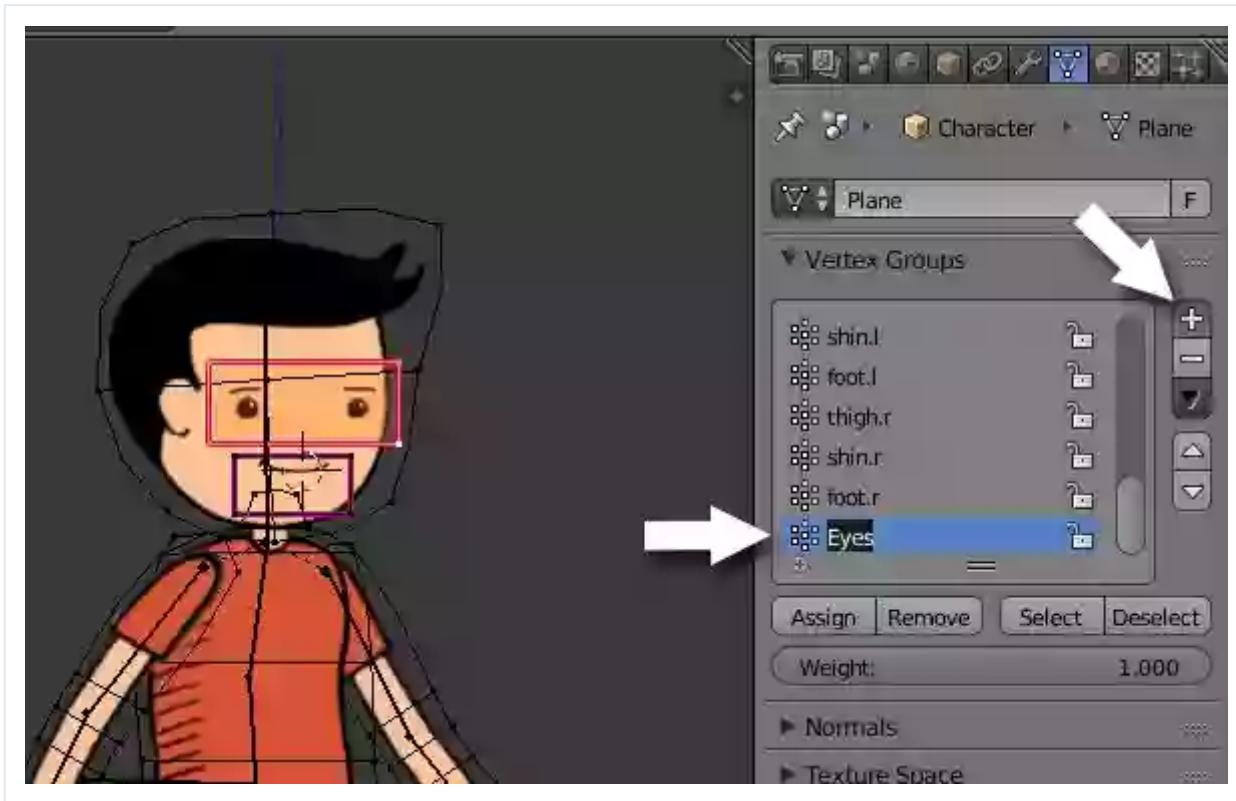


Testing the head bone

## Creating Reference object and Control Bones

### Step 1

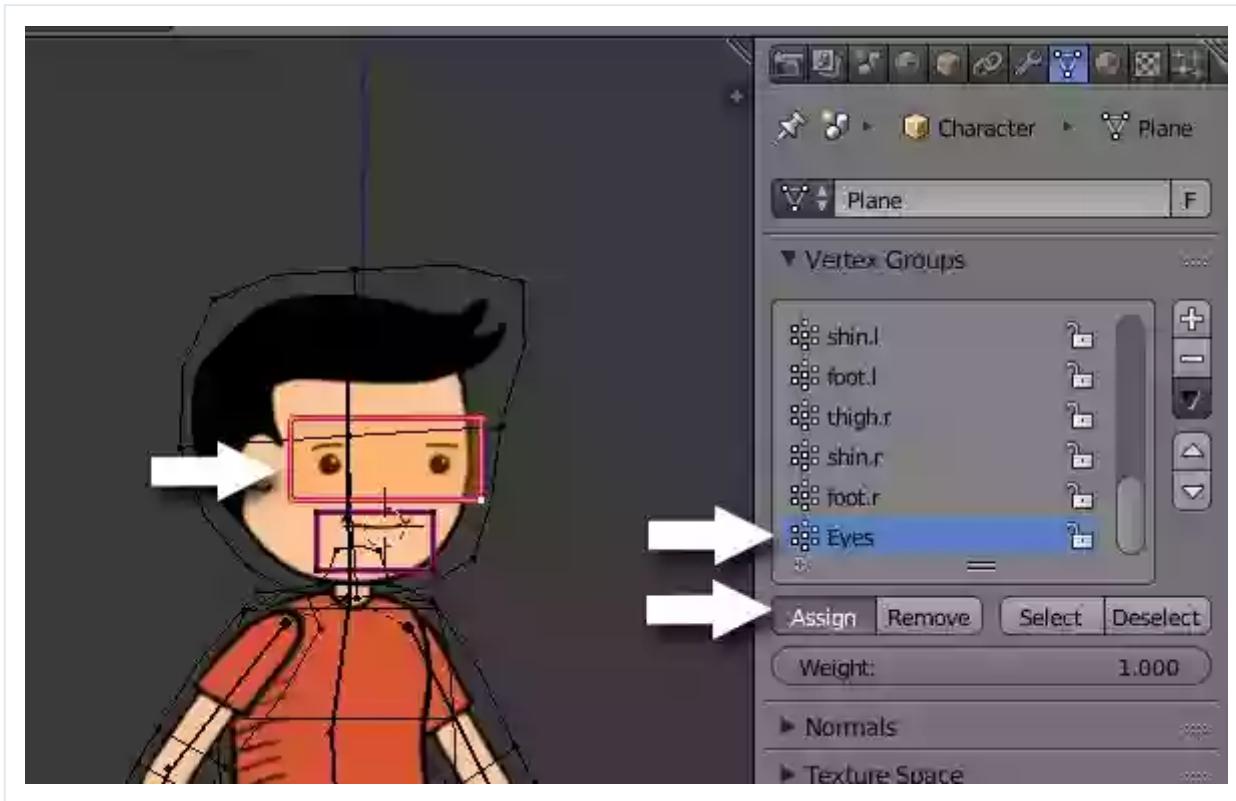
Right click on the character object and press **Tab** to enter edit mode. In the **Vertex Groups** panel, click on the **+** button to add a new group. Rename it **eyes**.



Creating new vertex group for eyes

Press **A** to deselect all vertices. Now select only the vertices of the eye plane.

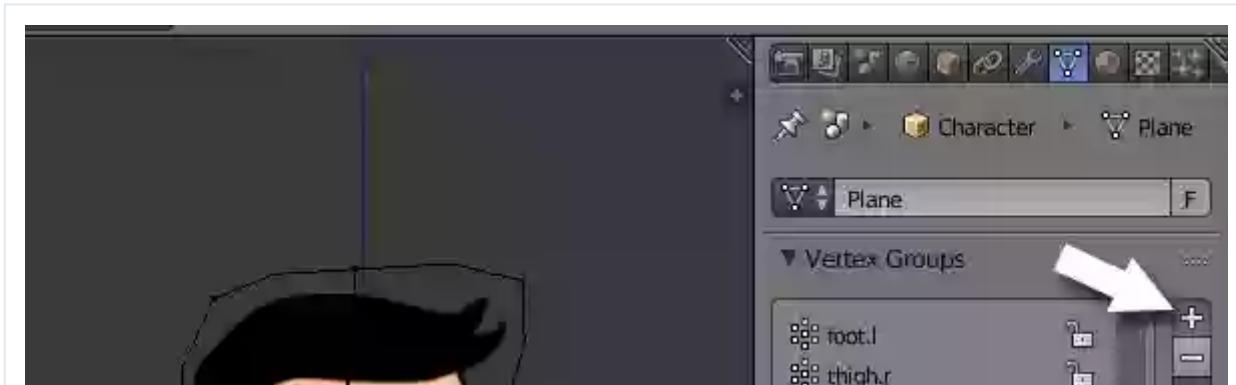
Click on the **Eyes** and click the **Assign** button to assign the selected vertices to the Eyes vertex group.

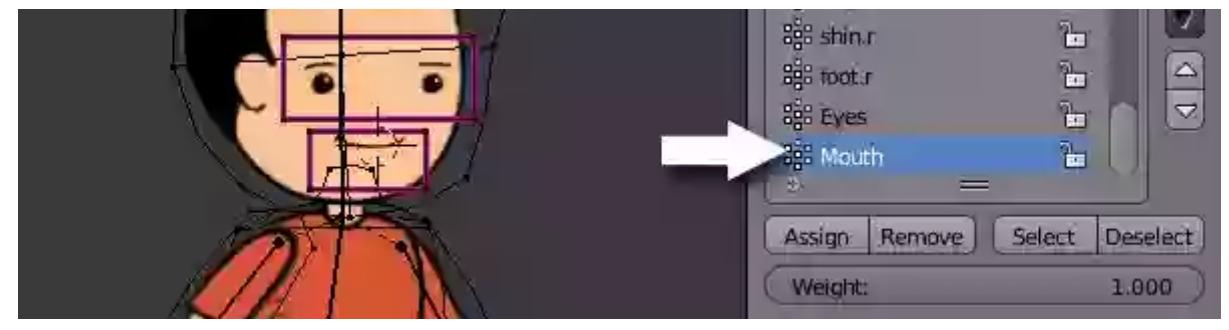


Assigning vertices to vertex group

## Step 2

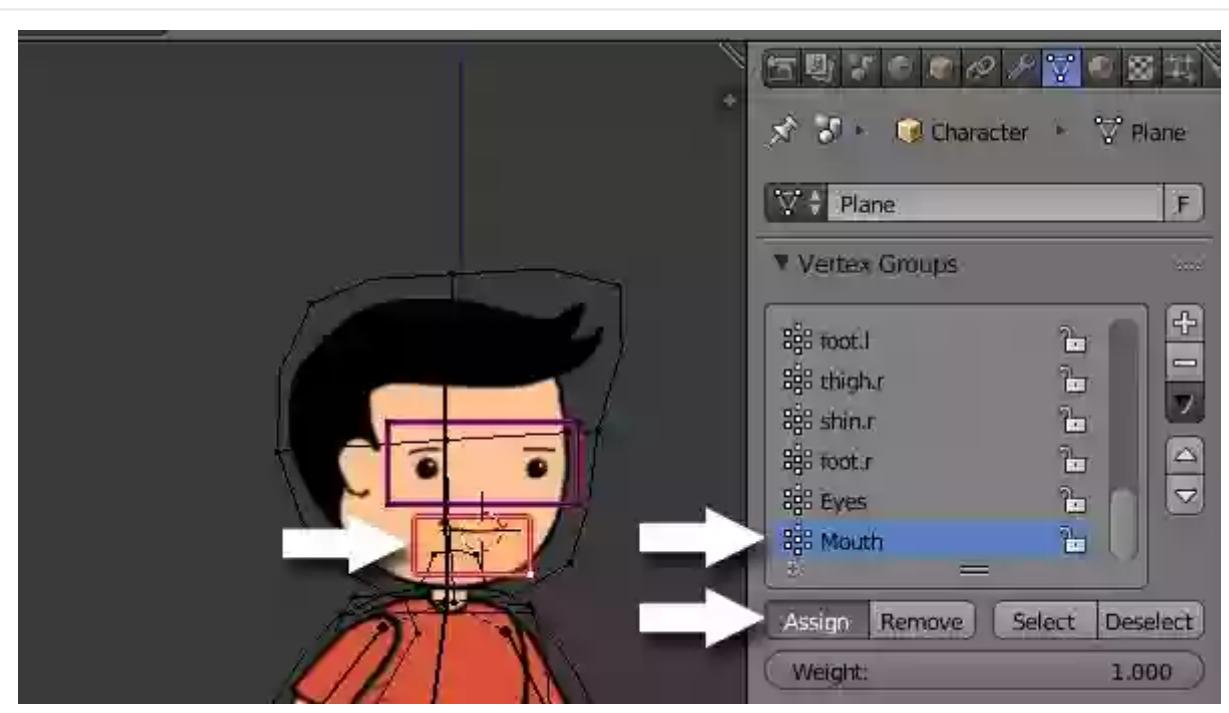
Next, click on the **+** button the in **Vertex Group** panel to add another group. Rename it **Mouth**.





Creating new vertex group for mouth

Select the vertices of the mouth. In the **Vertex Groups** panel, click on the **Mouth** and click on the **Assign** button. This will assign the selected vertices to the Mouth vertex group.



Assigning mouth plane to mouth vertex group

### Step 3

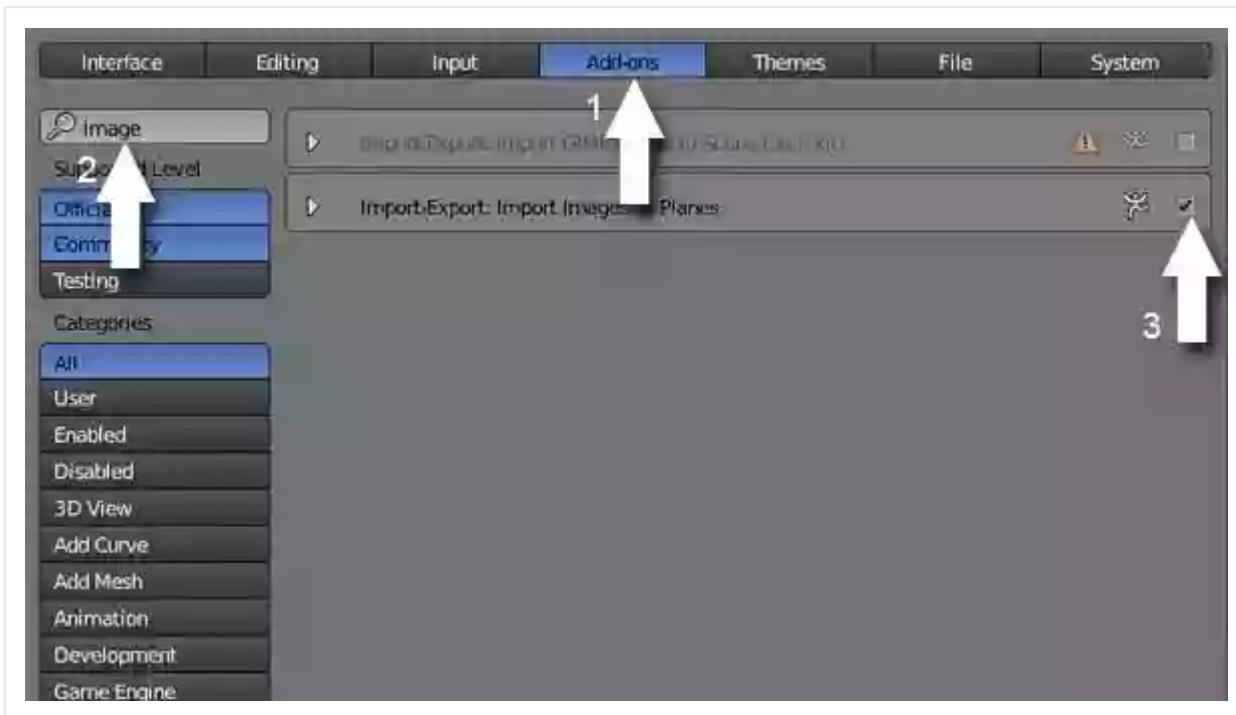
Press **Tab** to exit edit mode. You need to have a reference image and bones setup to control facial animation. First click on the **File** menu and select **User Preferences**.



Open User preferences

Click on **Add-ons** tab. Type **image** in the search box and tick the **Import as Planes** checkbox to enable the add on.

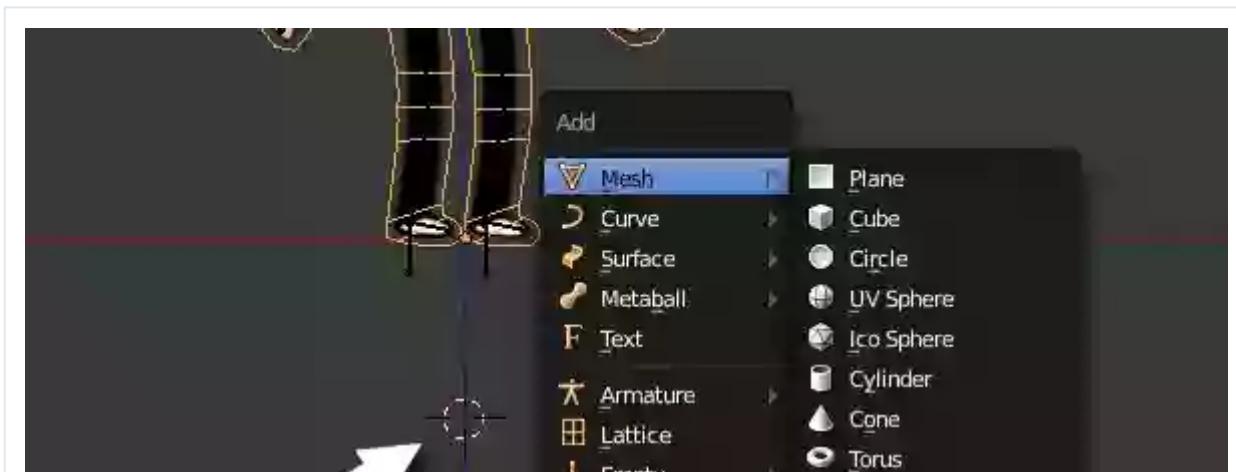
Close the **User Preference** window.



Addon settings

## Step 4

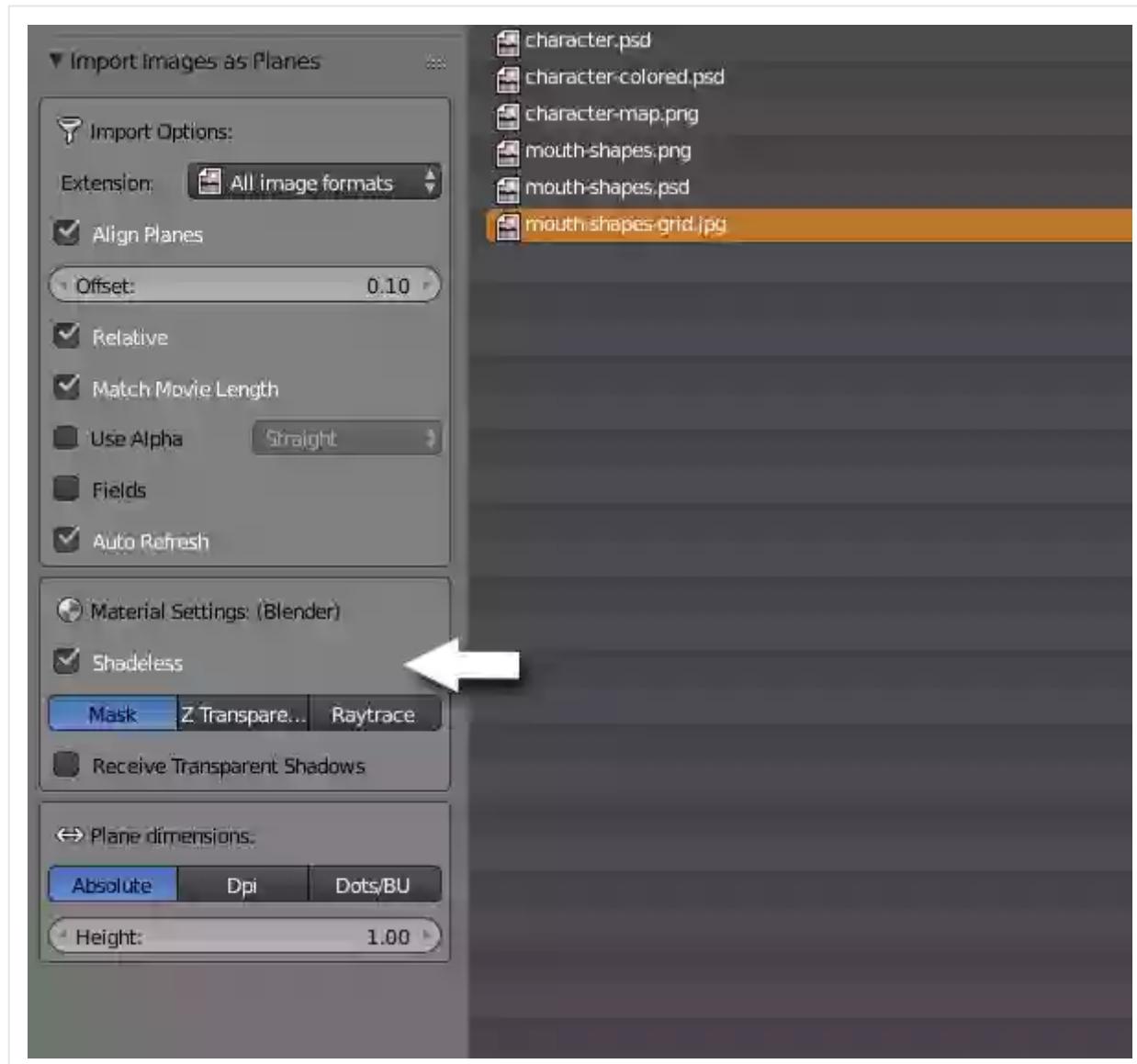
In the 3D view, press **Shift-A** to bring out the Add menu. Click on **Mesh > Images as Planes**.





Importing image as planes

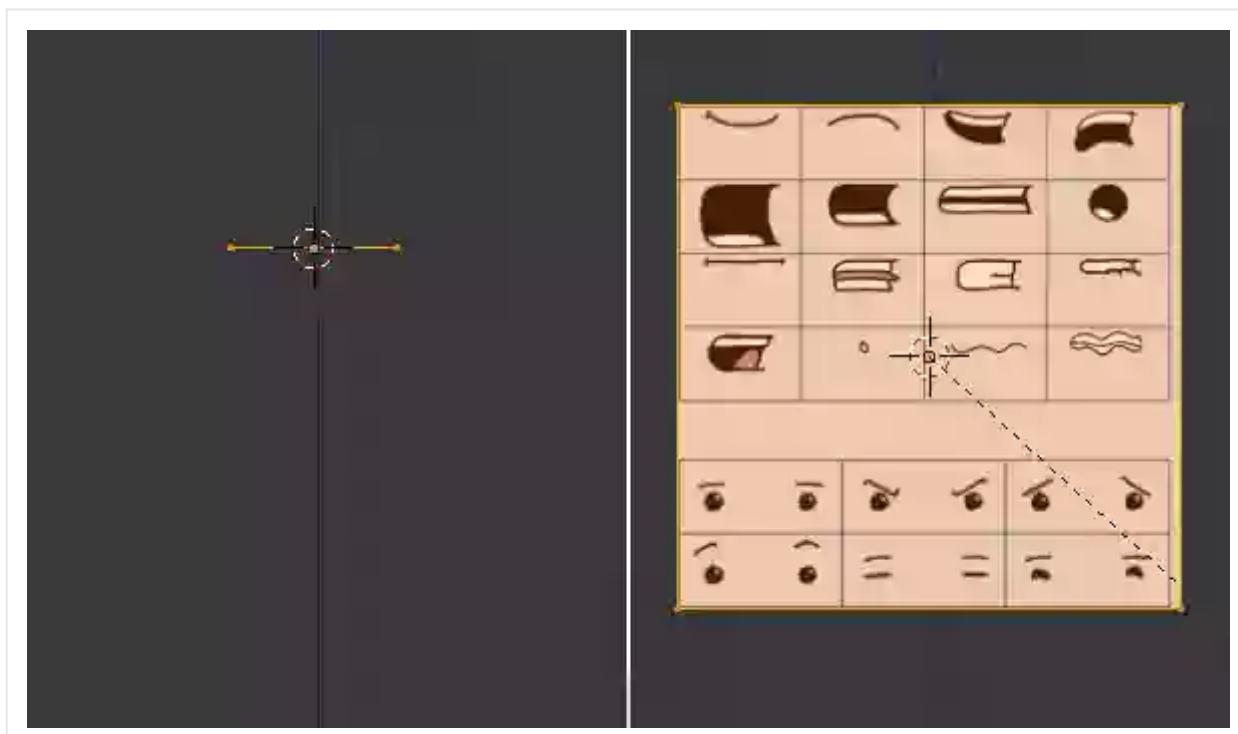
Browse for the image you exported with grid and background layer turned on. While importing, in the **Material Settings** panel.  
Tick the **Shadeless** checkbox.



## Step 5

Secondary-click to select the plane and press **Tab** to enter edit mode. Ensure you're in front view; press **1** on numpad to get into front view.

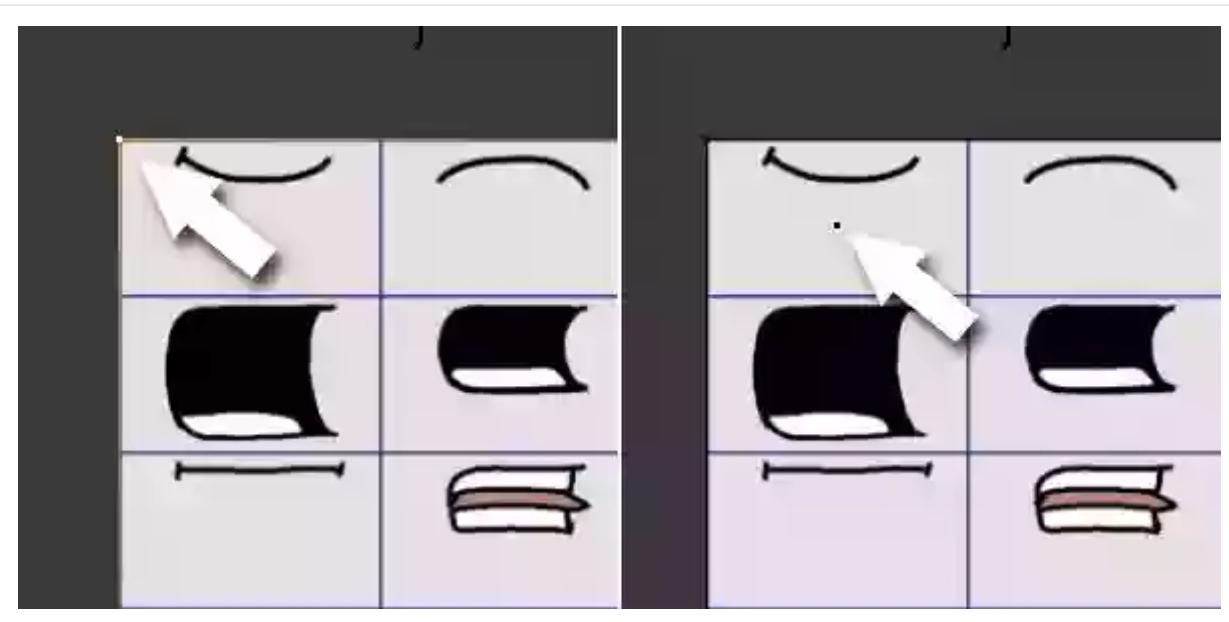
Select all vertices by pressing **A** key. Press **R** and then **X** and then type **90** to rotate the plane 90 degrees on the X axis so that it faces the viewer. Press **Enter**. Don't resize the plane.



Editing the geometry

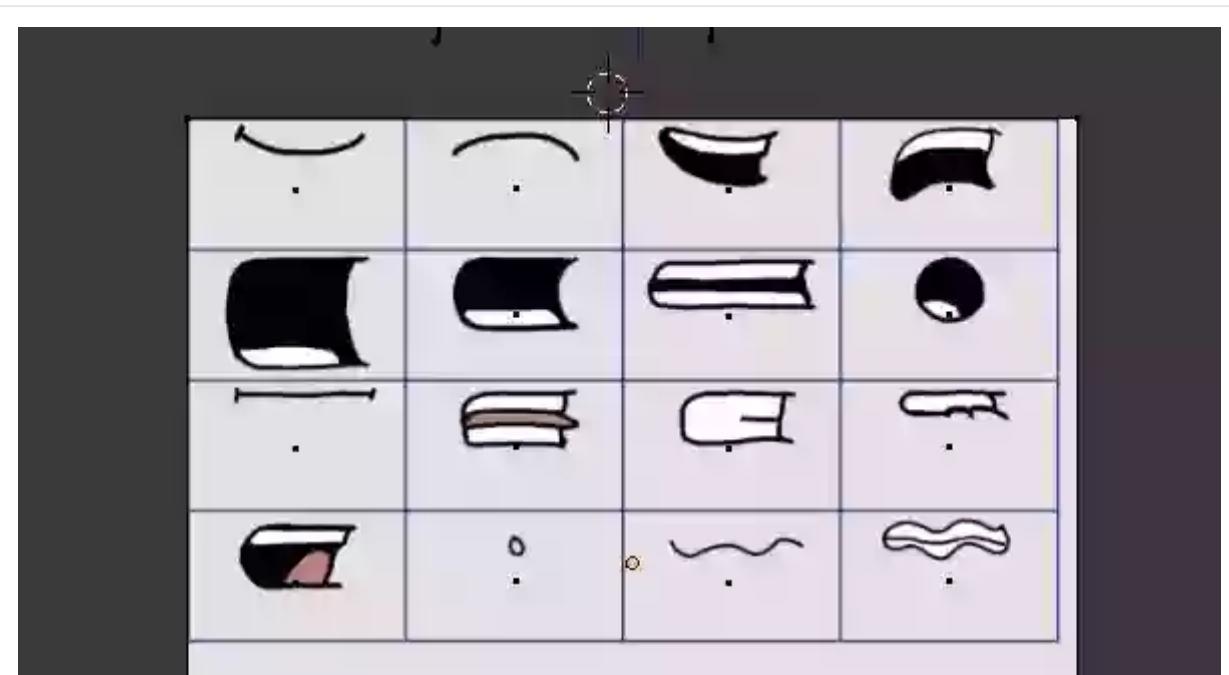
## Step 6

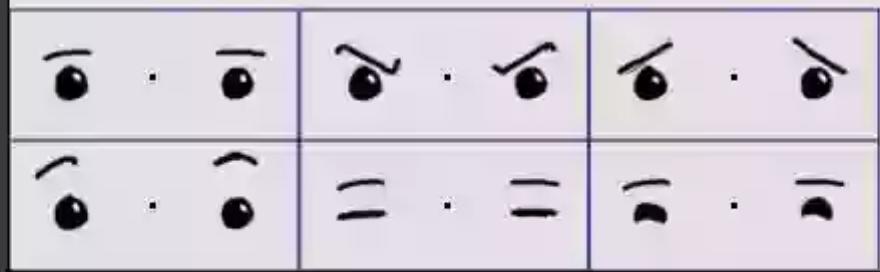
Press **A** to deselect all vertices. Secondary-click on the corner point to select it. Press **Shift-D** to make a copy. Move the mouse and place the point in the middle of the first grid. Click to confirm. This will be helpful while snapping the bone to the centre of the grid.



Adding new vertex

Duplicate and place more vertices on the center of each grid.

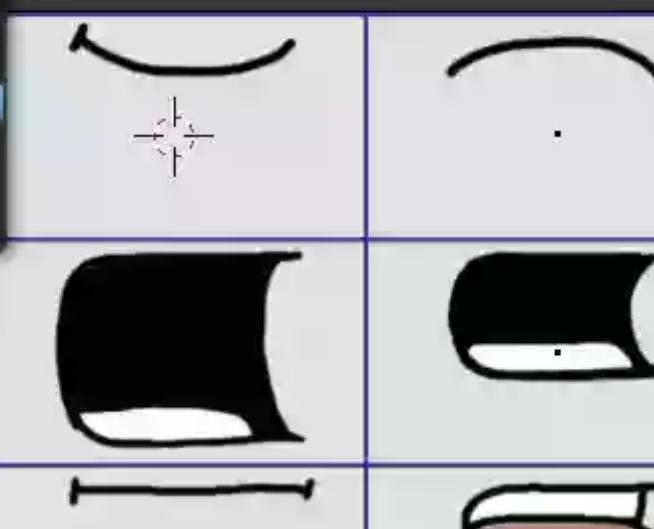
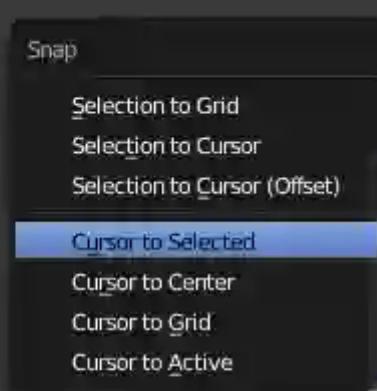




Editing the geometry

## Step 7

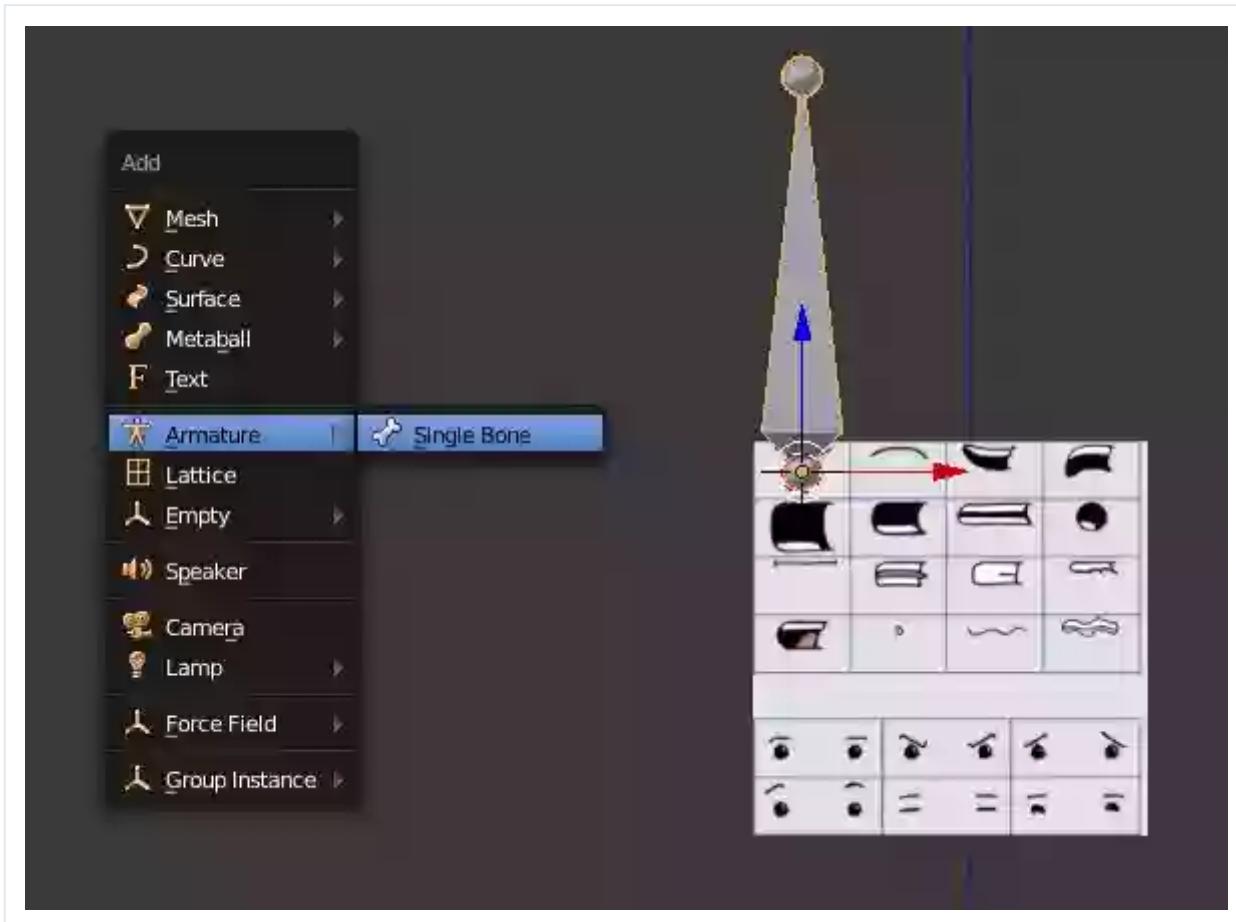
Secondary-click on the first vertex which is at the centre of the first grid. Press **Shift-S** to bring out the snap menu and select **Cursor to Selected**. This will bring the 3D cursor to the selected vertex.



Placing the cursor

## Step 8

Press **Tab** on the keyboard to exit edit mode. Press **Shift-A** and add an **Armature**.

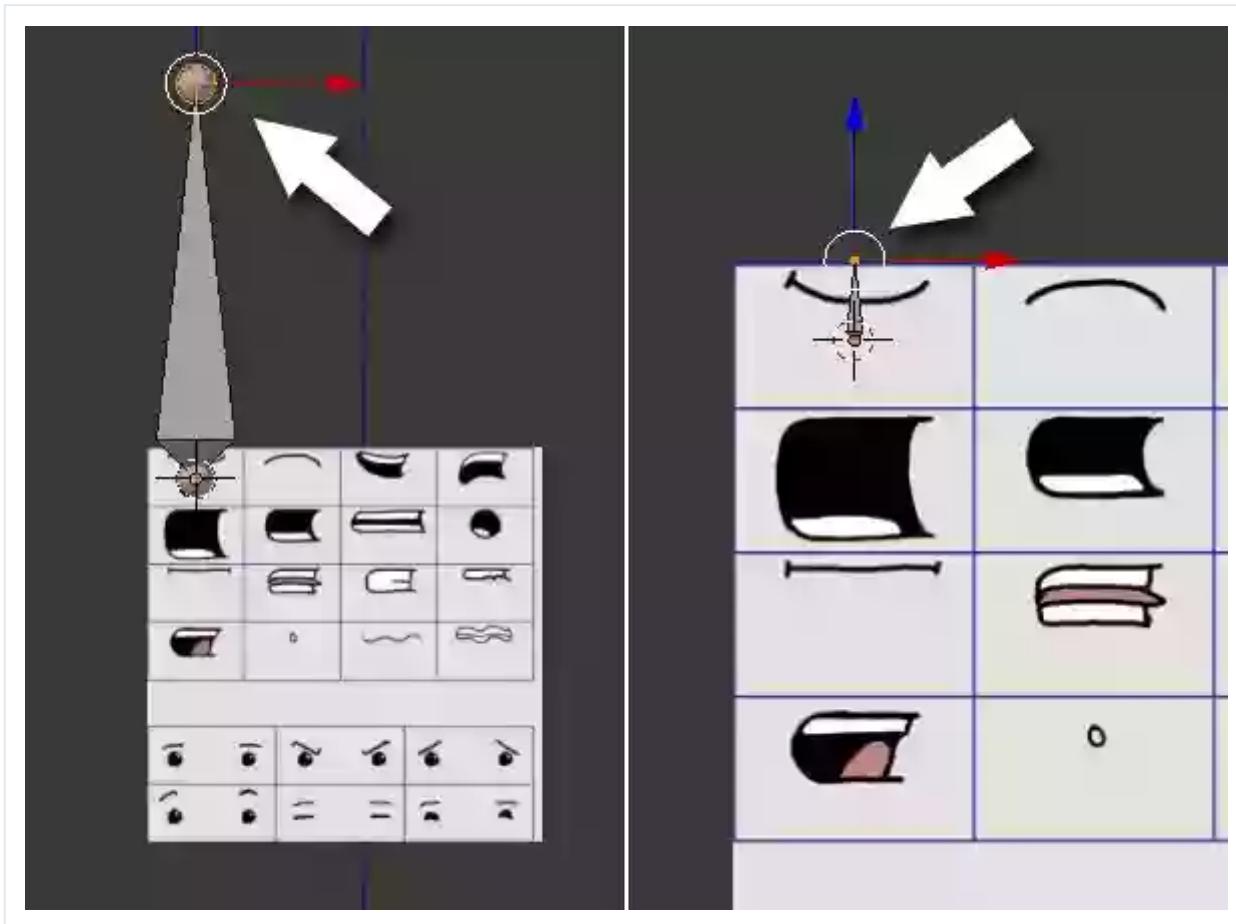


Adding new armature object

## Step 9

Secondary-click to select the bone and then press **Tab** to enter edit mode. Select the tip of the bone and move it down.

You can use either **G** key or the arrow manipulators to move the selection.

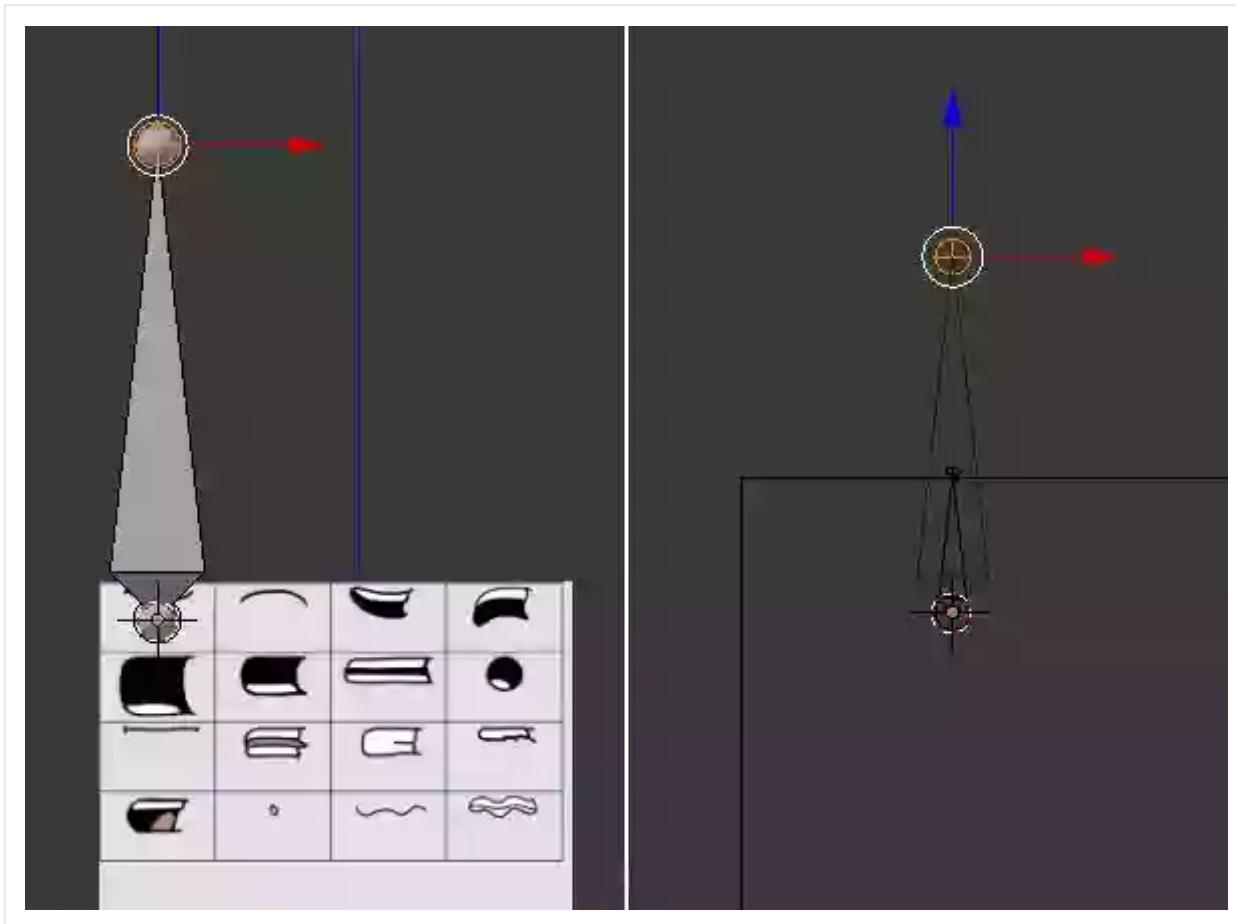


Editing the bone

## Step 10

Press **Shift-A** again to add another bone at the same point. Move the tip down a bit but it should be a bit bigger than the previous bone.

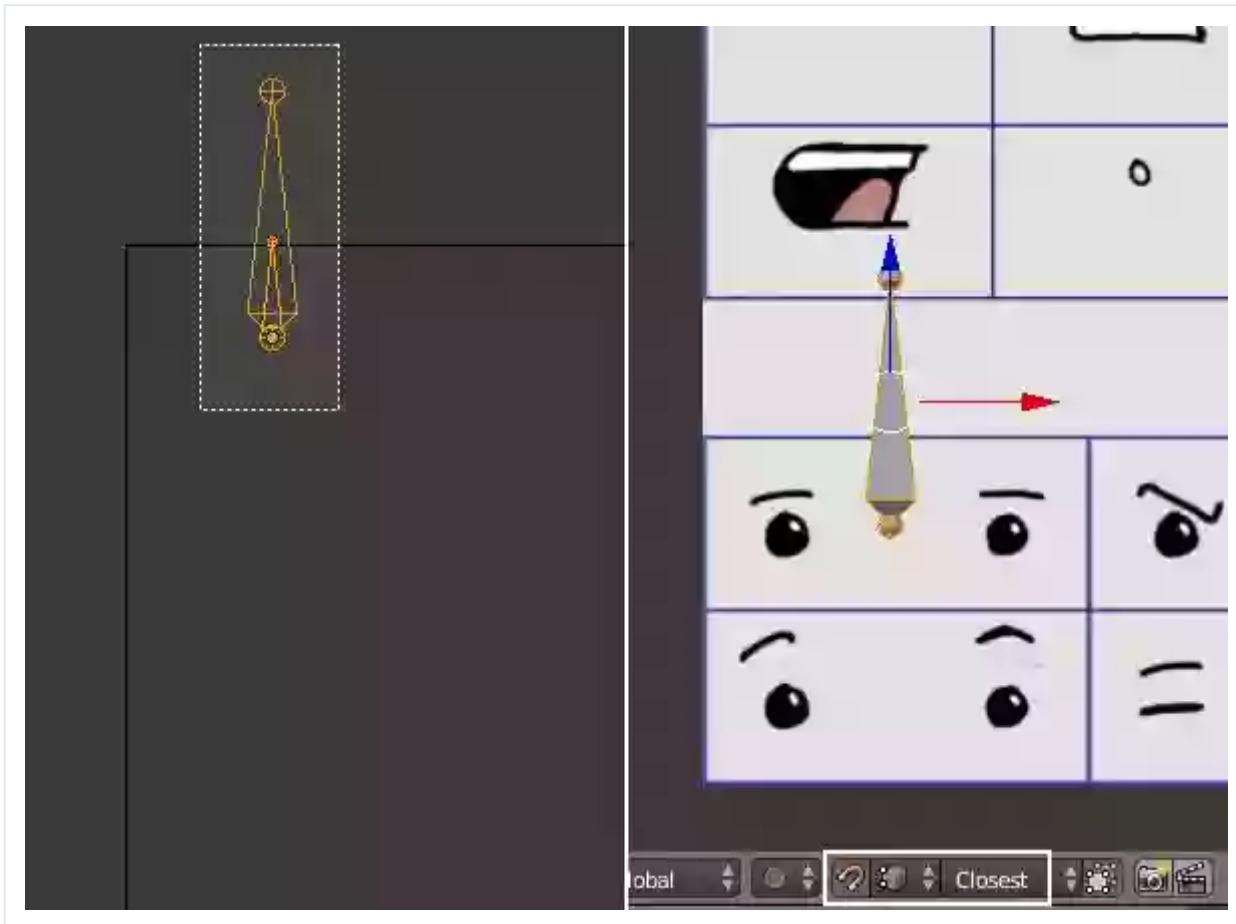
Press **Z** key to toggle on wireframe view.



Adding another bone

## Step 11

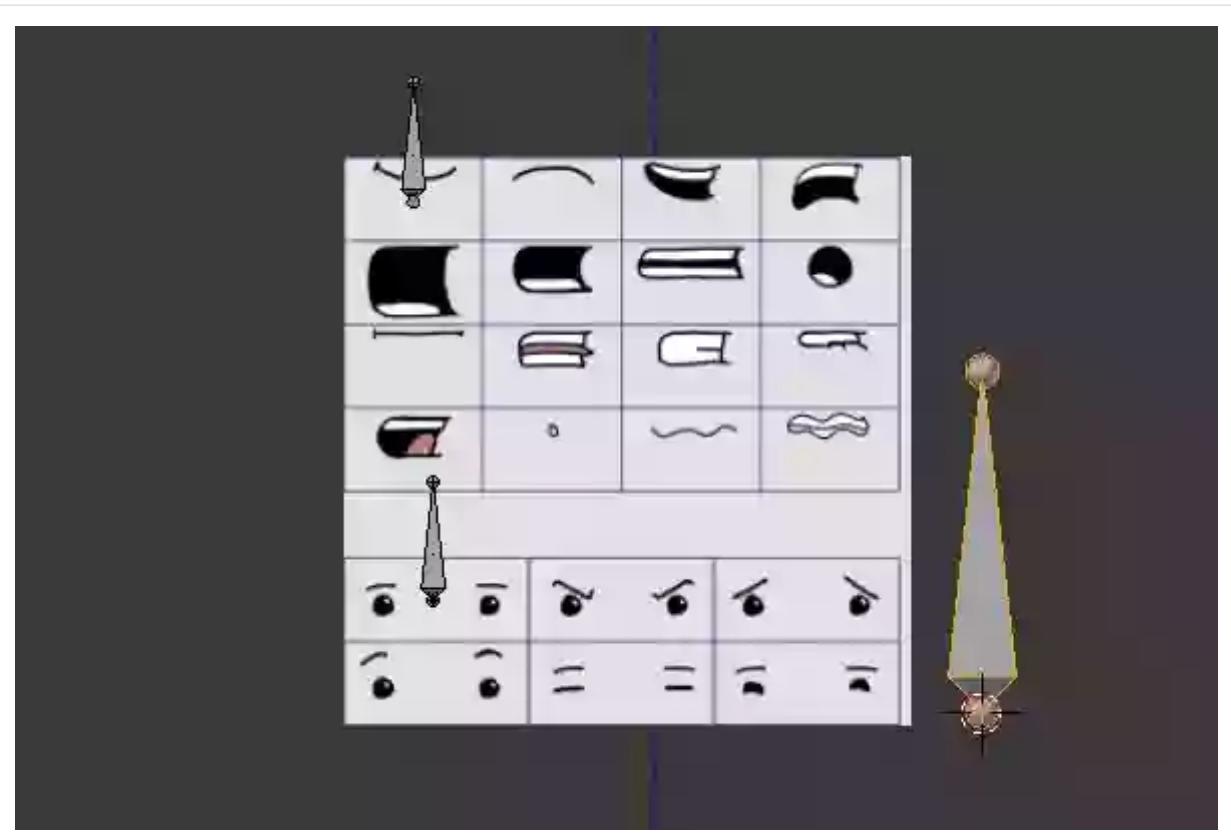
Press **B** and drag select both bones. Press **Shift-D** to make a duplicate set and move them down at the center of eye grid. You may turn on snapping by clicking on the magnet button in the header. select vertex in snapping mode.



Duplicating the bones

## Step 12

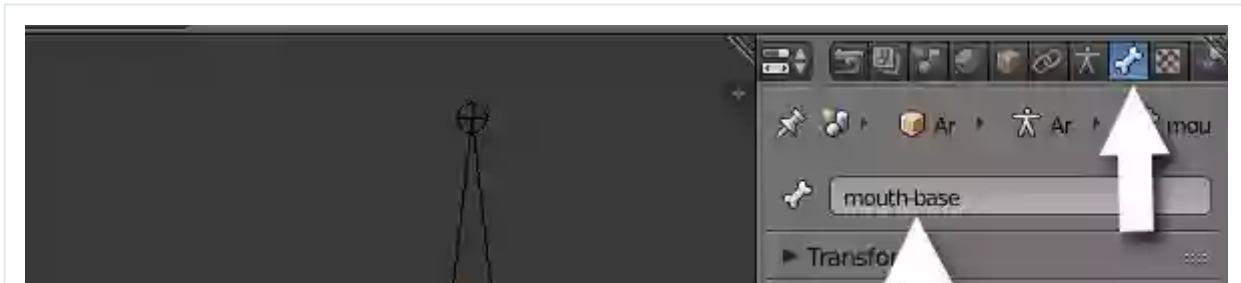
Press **Shift-A** and add another bone. Place it on either side of the image. This will be the parent bone.

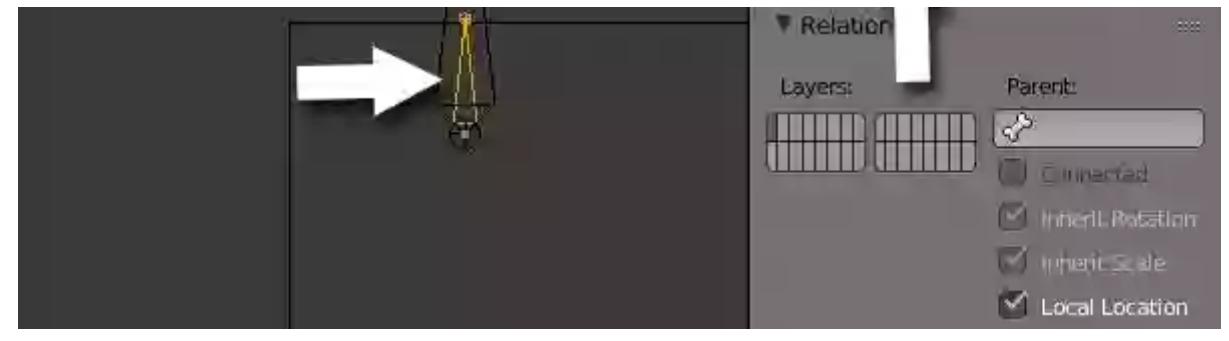


## Adding a new parent bone

## Step 13

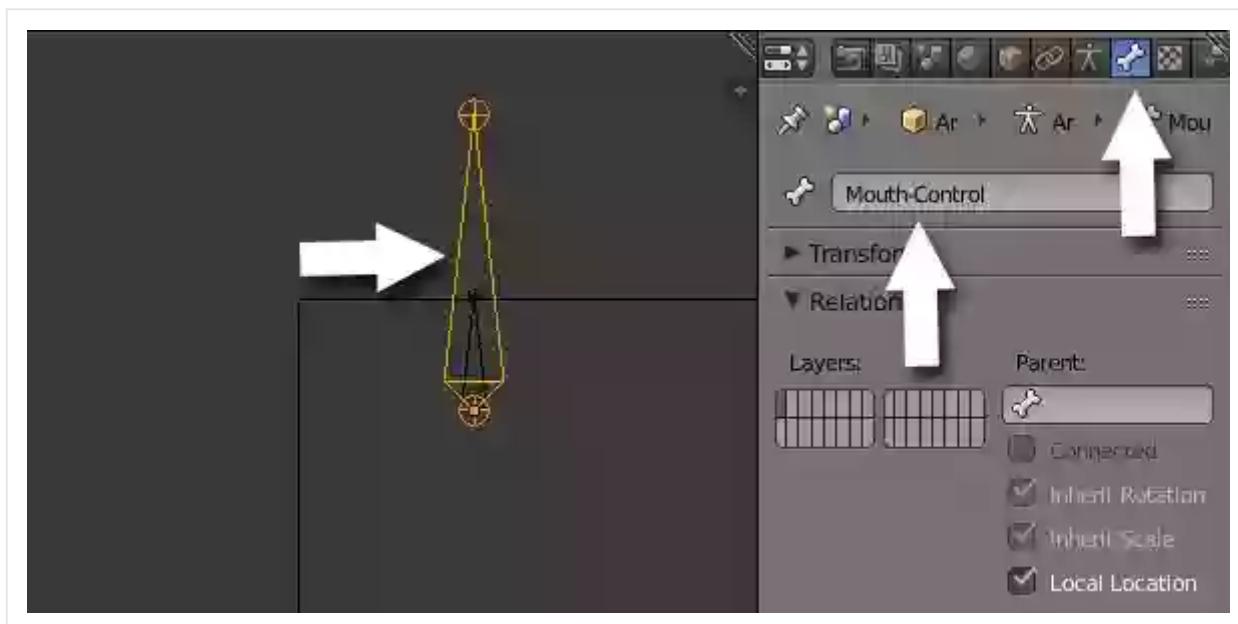
Press **A** to deselect any selected bone. Right click on the first bone to select it. Click on the Bone button in the **Properties** window and rename it **mouth-base**.





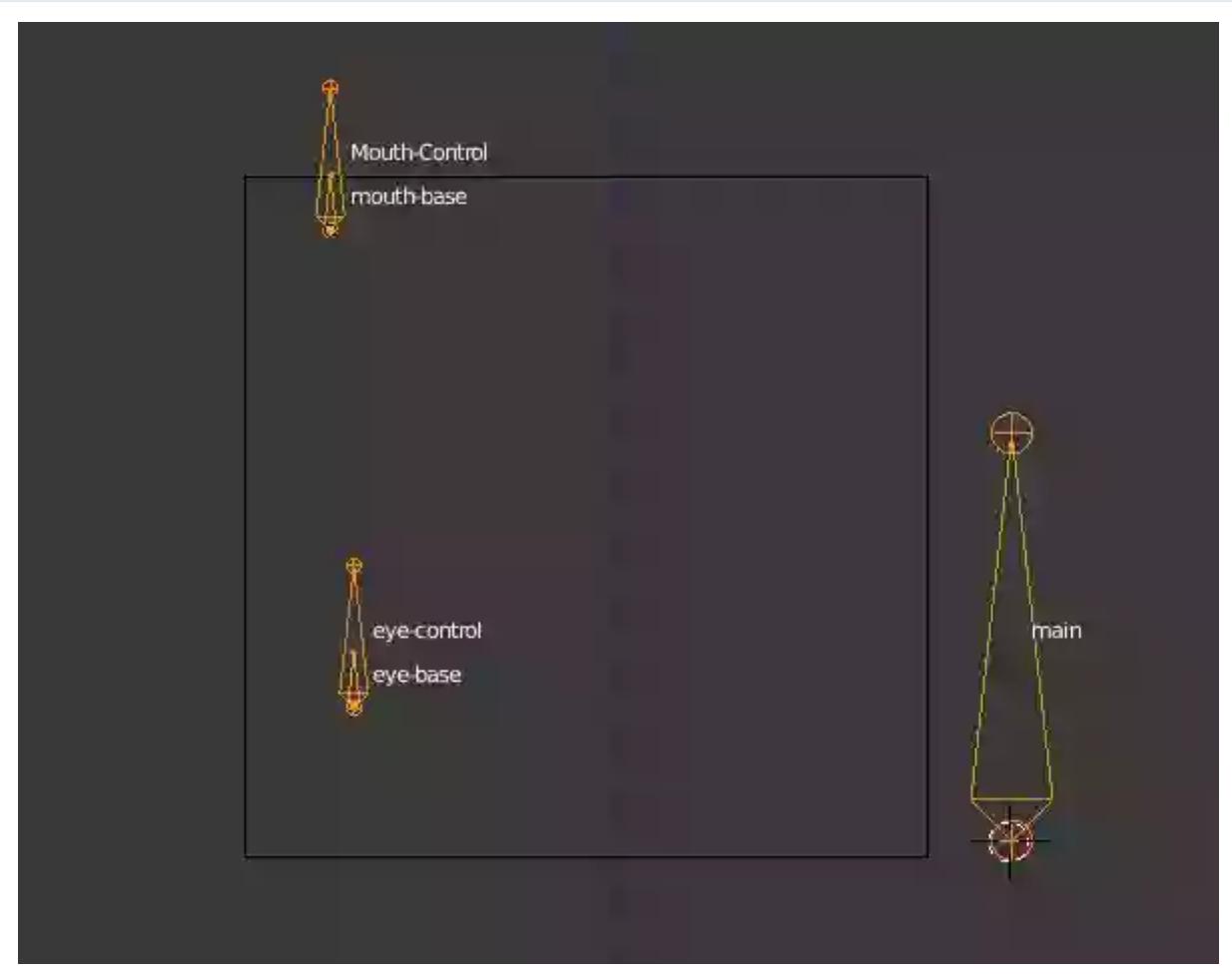
Renaming the bones

Secondary-click on the second bone and rename it **Mouth-Control**



Renaming the bones

Similarly rename the other two bones as **eye-base** and bigger one as **eye-control**. Rename the last bone as **main** or parent.

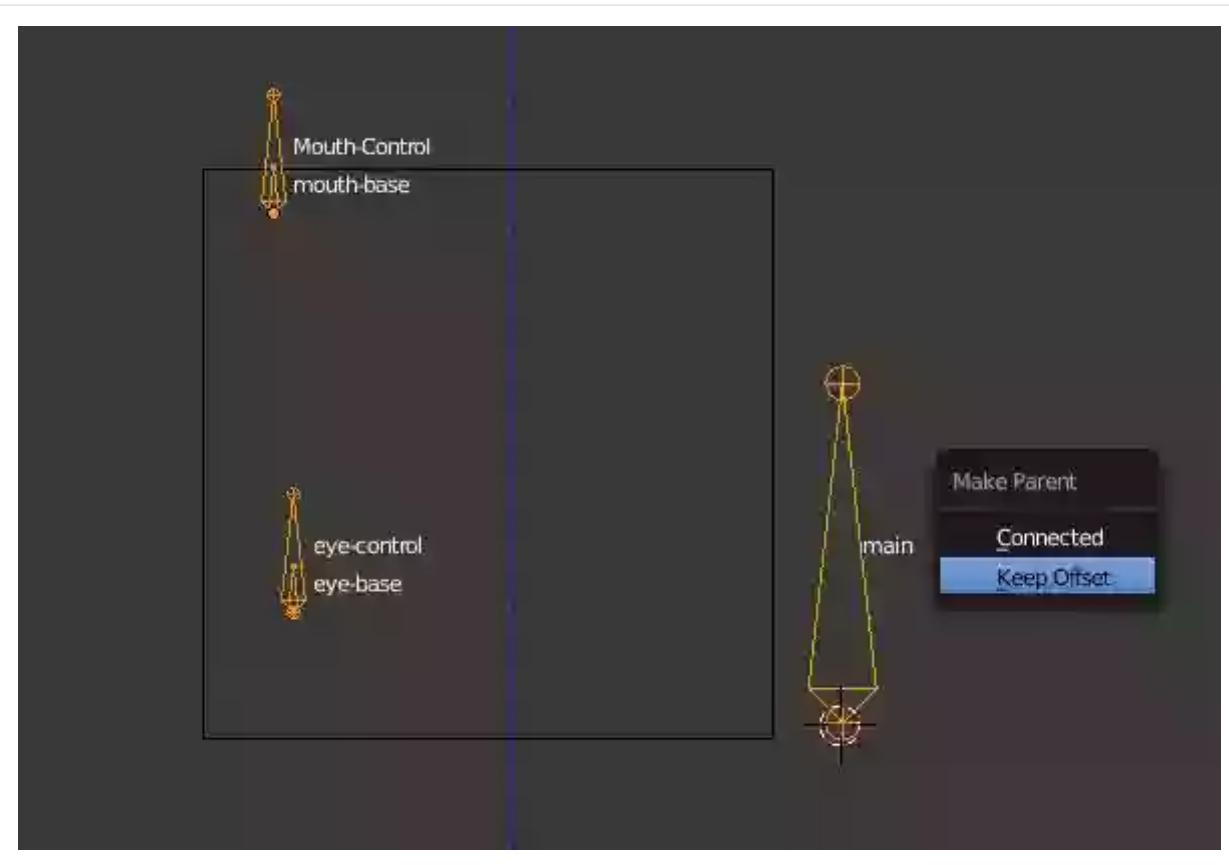


Renaming all bones

## Step 14

Press **A** to deselect any selected bone. Hold **Shift** and then right click on the mouth and eye bones and then the main bone at last.

Press **Ctrl-P** to make it parent bone. In the menu select **Keep Offset**.

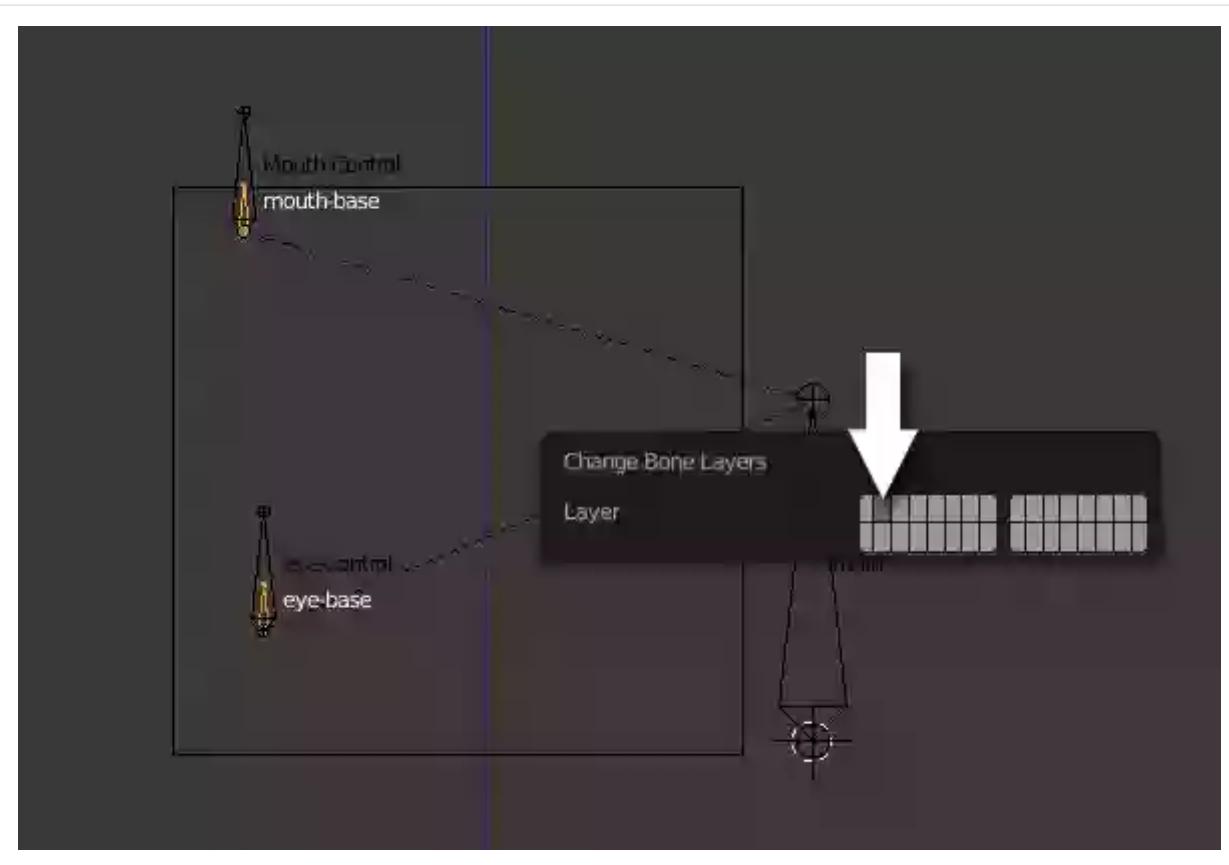


Making the main bone parent

## Step 15

Press **A** to deselect the bones. Select only the smaller bones, i.e. **mouth-base** and **eye-base** bones. Press **M** to move them to another layer.

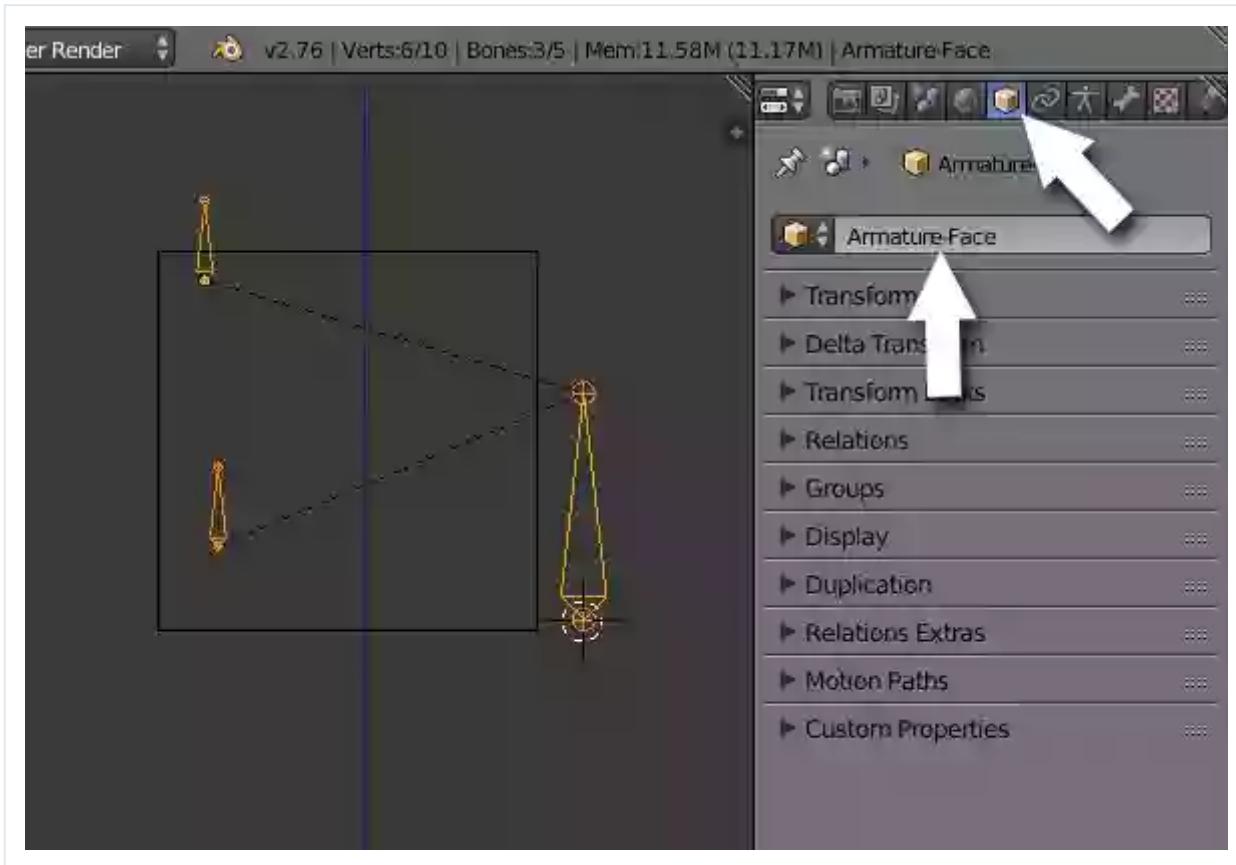
Click on the second layer in the **Change Bone layer** popup. I'm moving them away as they are not supposed to be moved or touched.



Moving base bones to another layer

## Step 16

With the object selected, click on the **Object** button in the **Properties** window and rename it to **Armature-Face**.

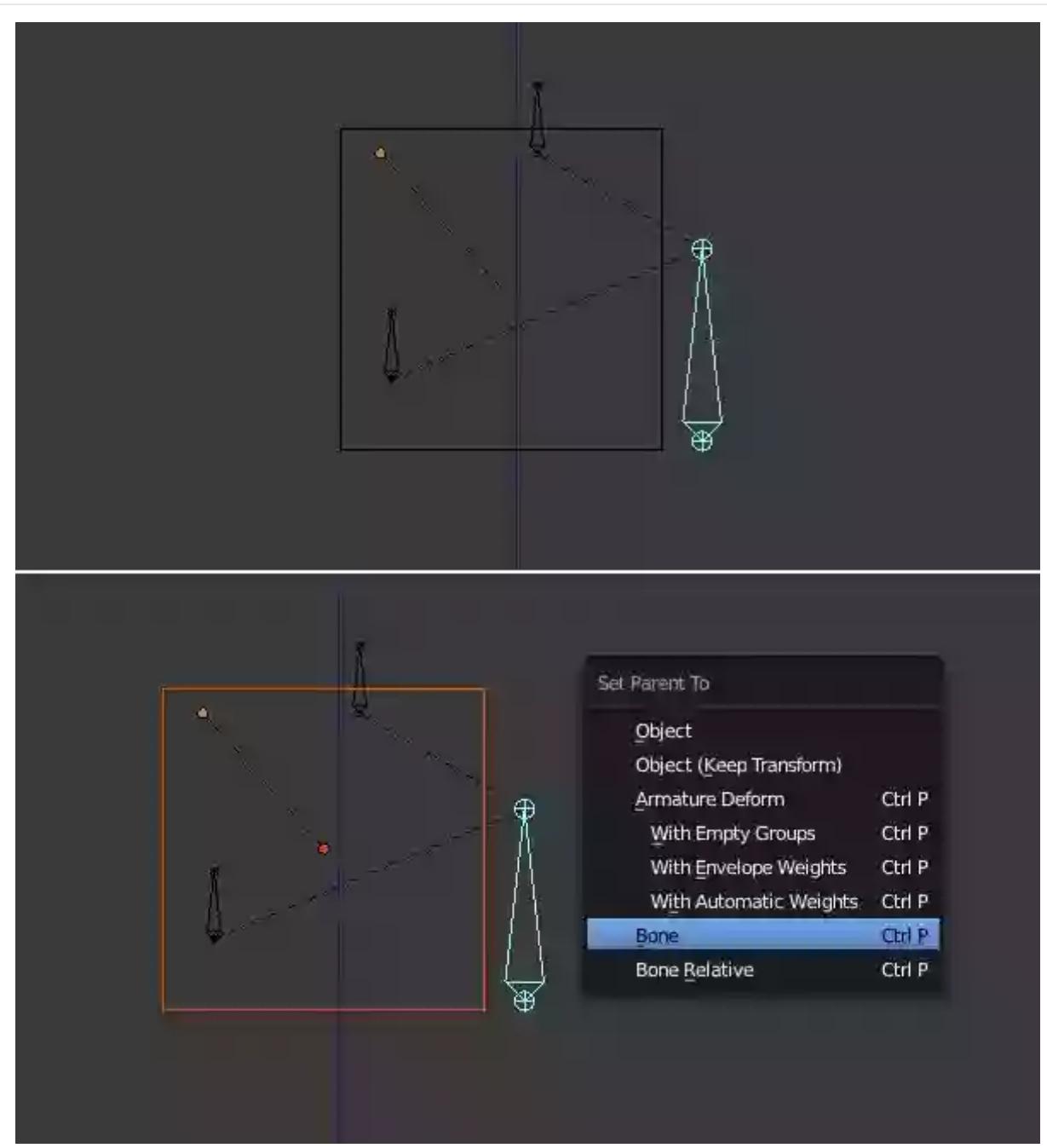


Renaming the object

## Step 17

Press **Ctrl-Tab** to enter pose mode. Secondary-click on the main bone to select it.

Secondary-click on the reference plane. Hold **Shift** and right click on the main bone to select it. Press **Ctrl-P** and in the **Set Parent To** popup, select **Bone**. The reference plane is now rigged to the main bone.



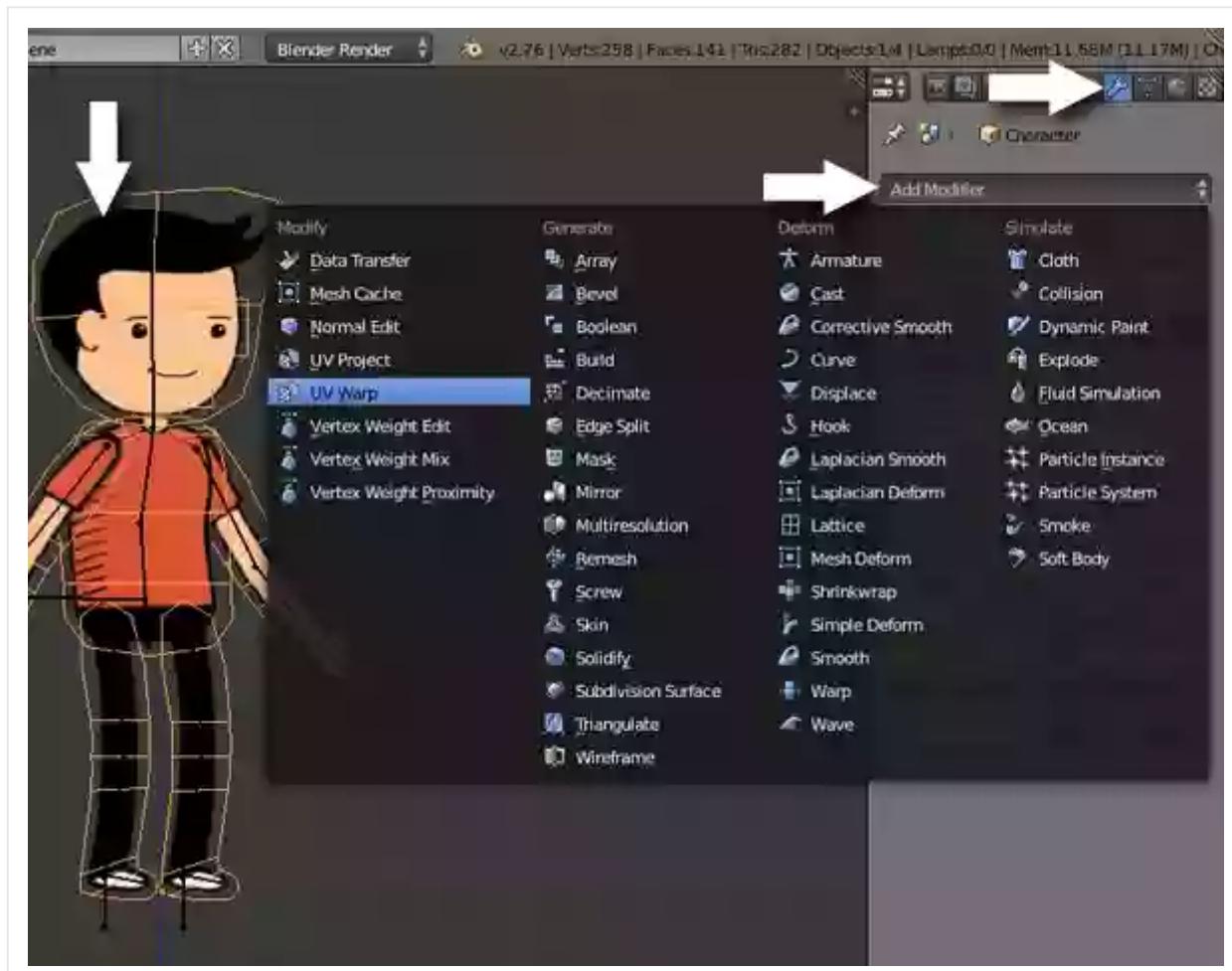
Linking the plane to the bone

# Setting up Bone Controls with UV Warp Modifier

## Step 1

Secondary-click on the Character object to select it. Click on the modifiers button in the properties window.

Click **Add Modifier** button and select **UV Warp**.



Adding UV Warp modifier to character object

## Step 2

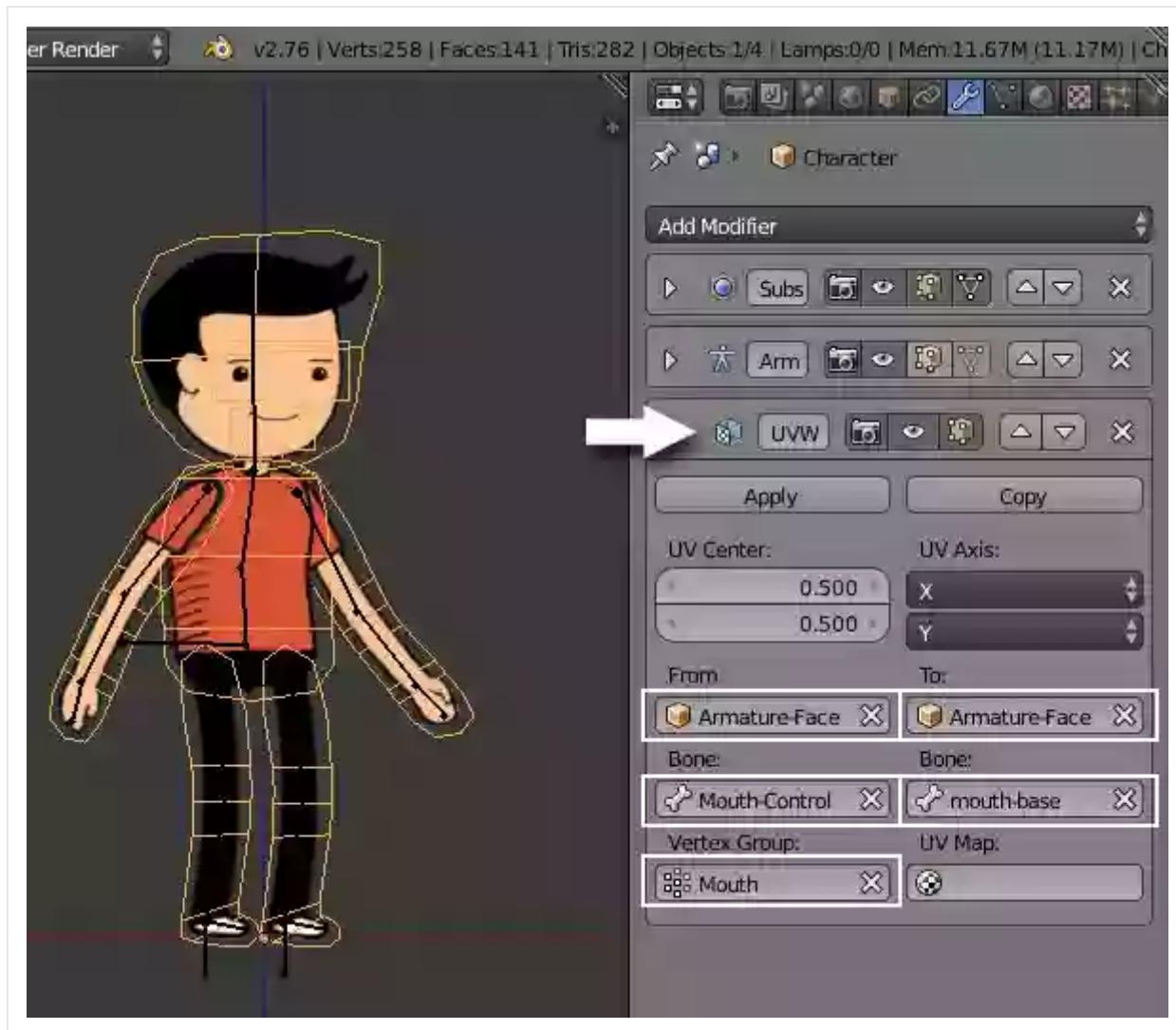
In the **UVWarp** modifier panel,

- set the **From** object to **Armature-Face** and From **Bone** to **Mouth-Control**
- Set **To** object to **Armature-Face** and **Bone** to **mouth-base**

- Set the object to **Armature** mode and bone to **Mouth-base**

- In the **Vertex Group** select **Mouth**

This means that when the Mouth Control bone is moved in relation with the mouth-base bone, the texture map will also move and warp, and it will affect only the vertices assigned to **Mouth** vertex group that is the mouth plane.



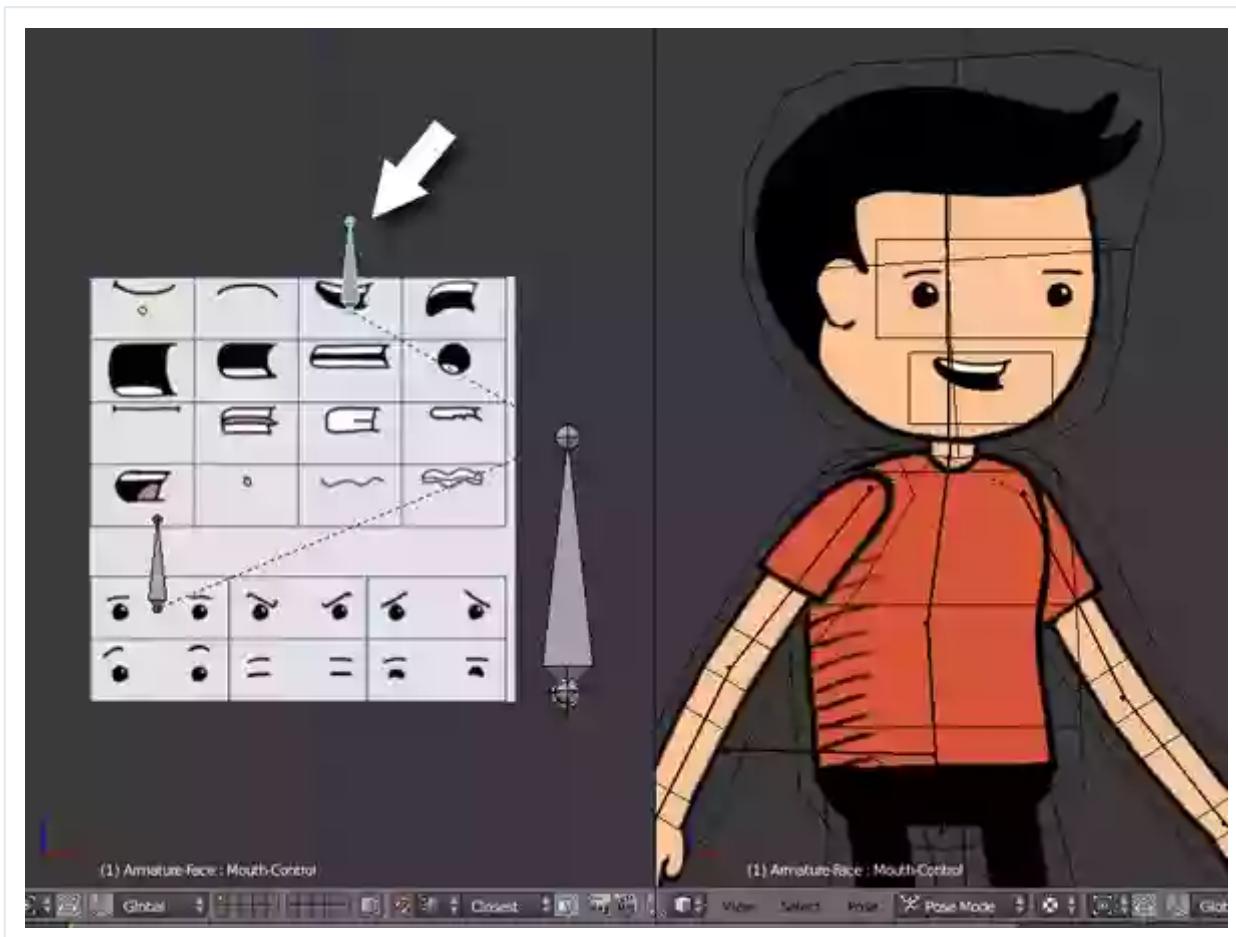
Modifier settings

### Step 3

When you will move the mouth-control bone in pose mode, you will see that the texture map is also warping but only in the mouth plane.

Split the 3D view into two. Zoom in to the reference object in one

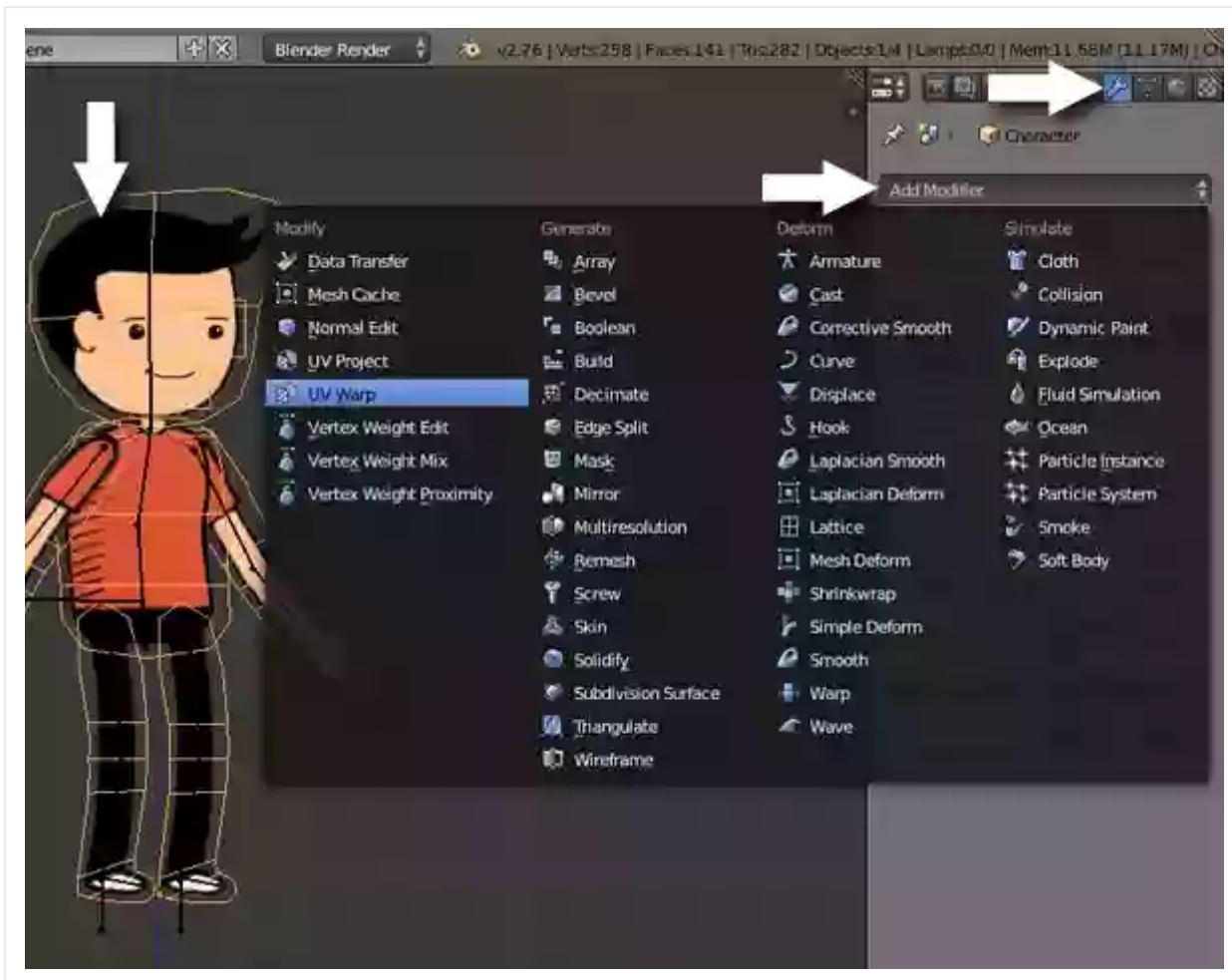
view.



Testing the modifier by moving the bone

## Step 4

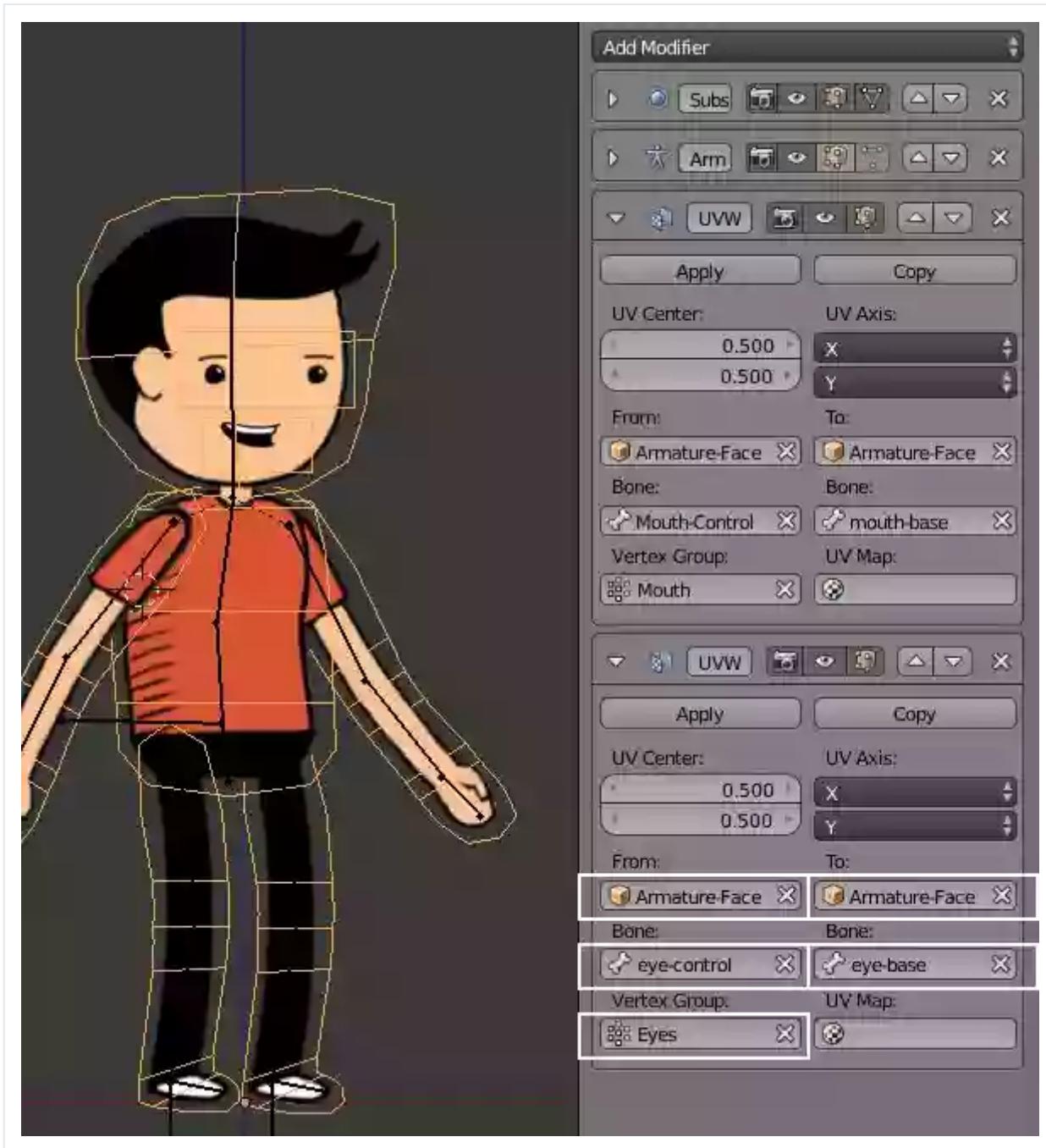
Select the character object. In the modifiers panel, add another **UV Warp** modifier. This will be for the eyes.



Adding another UV Warp modifier

## Step 5

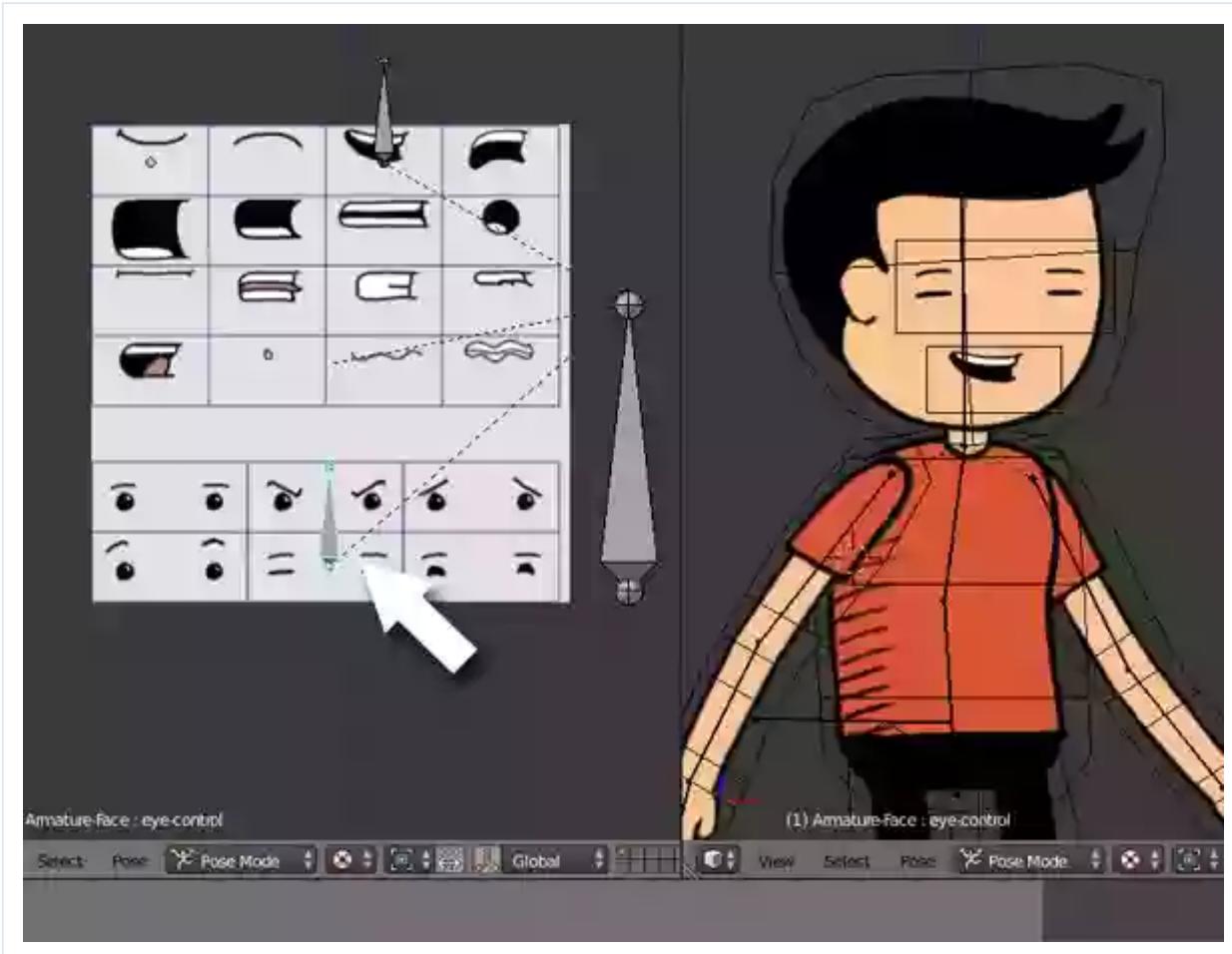
Set **From** object to **Armature-Face** and **Bone** to **eye-control**. Set the **To** object to **Armature-Face** and **Bone** to **eye-base**. In the **Vertex Group** select **eyes**.



UV Warp modifier settings

Move the eye-control bone and see the texture moving and

warping.

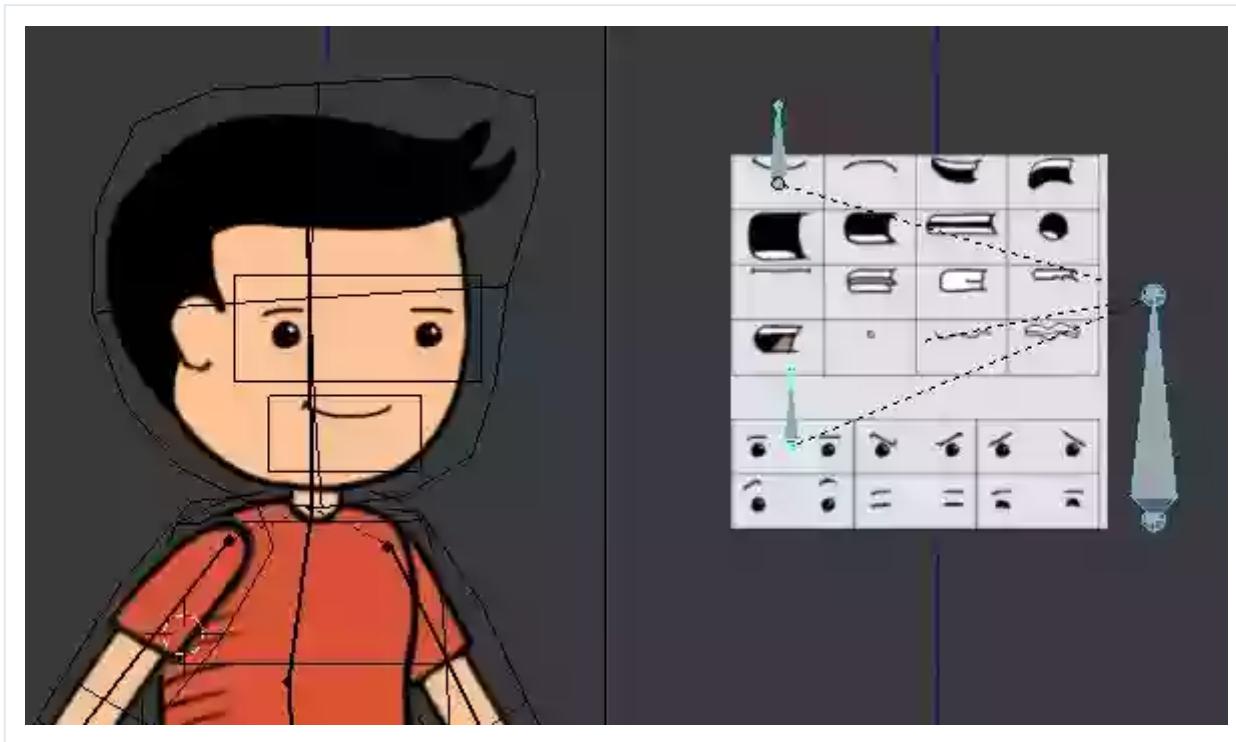


Testing the modifier by moving the bone

## Pose Library

### Step 1

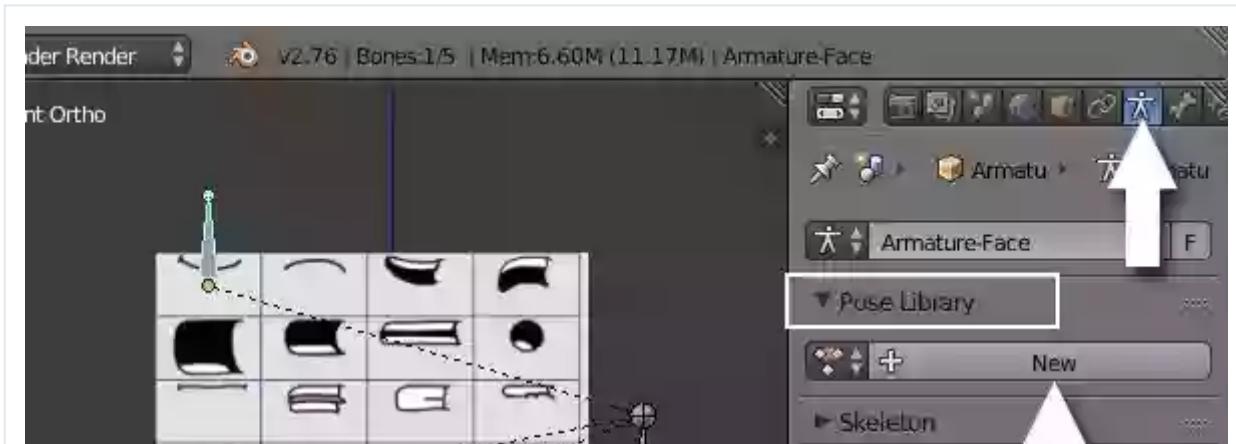
In the pose mode, select all bone with **A** key and press **Alt-R** and then **Alt-G** to reset the location and rotation of the bones.

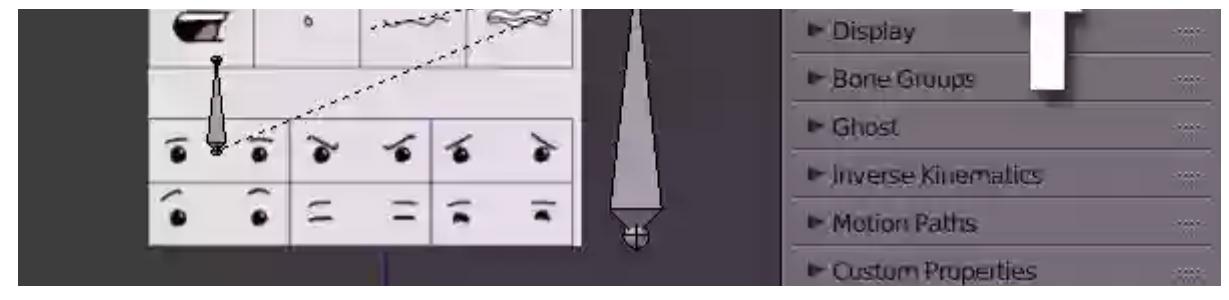


Reset the location and rotation of all bones

## Step 2

Click on the Armature button in the properties window. In the **Pose Library** panel press the **New** button.

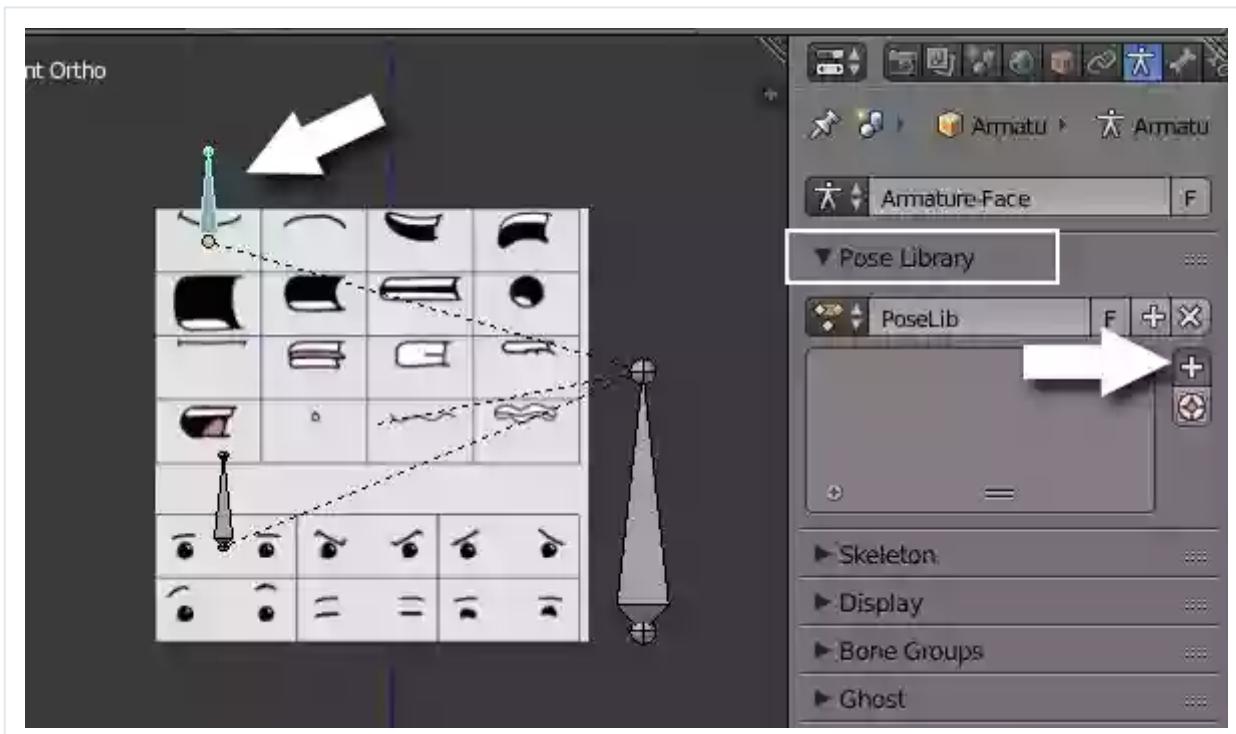




Add new pose library

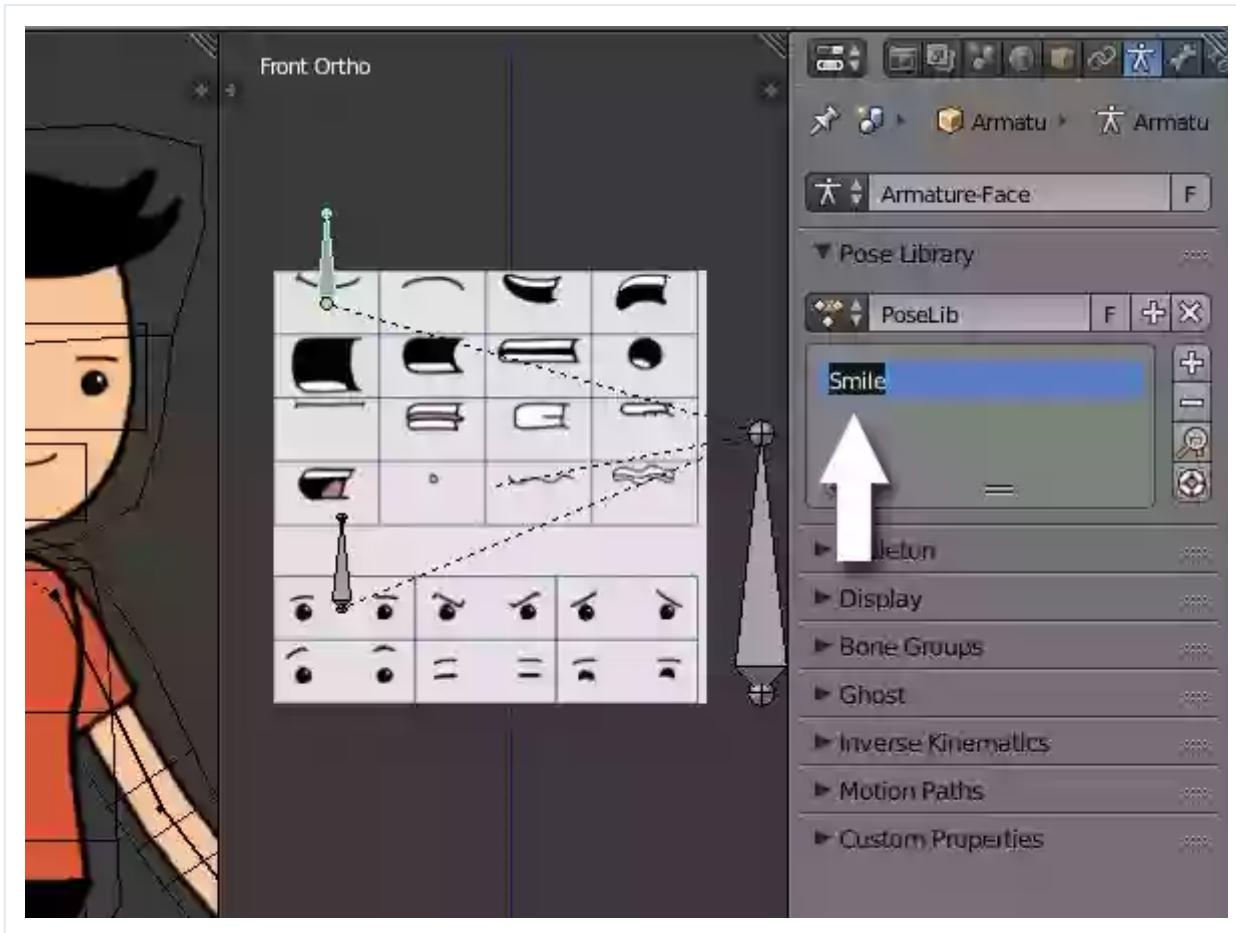
### Step 3

Secondary-click on the **mouth-controller** bone to select it. In the **Pose Library** panel, press the **+** button to add a new pose.



Adding new pose

Rename the pose **Smile**.

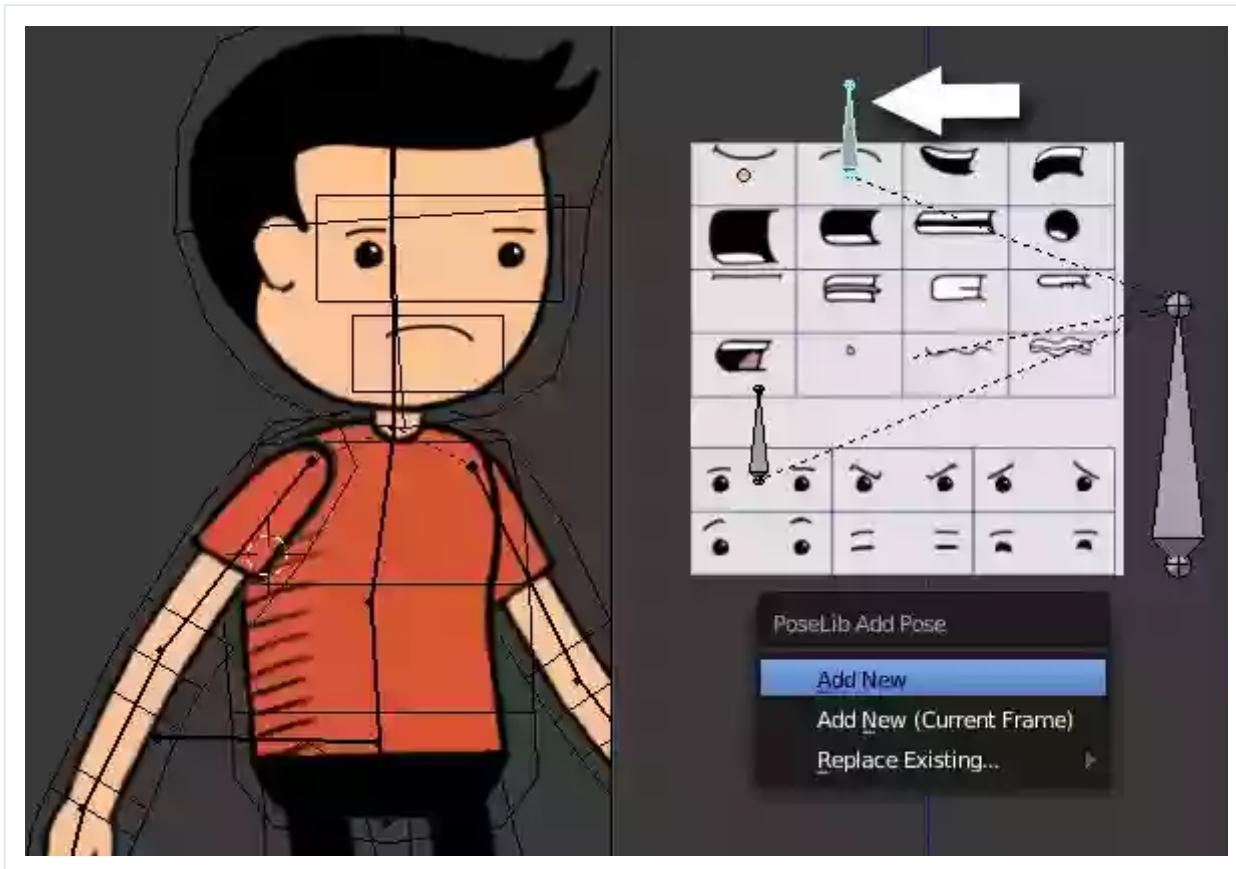


Renaming the pose

## Step 4

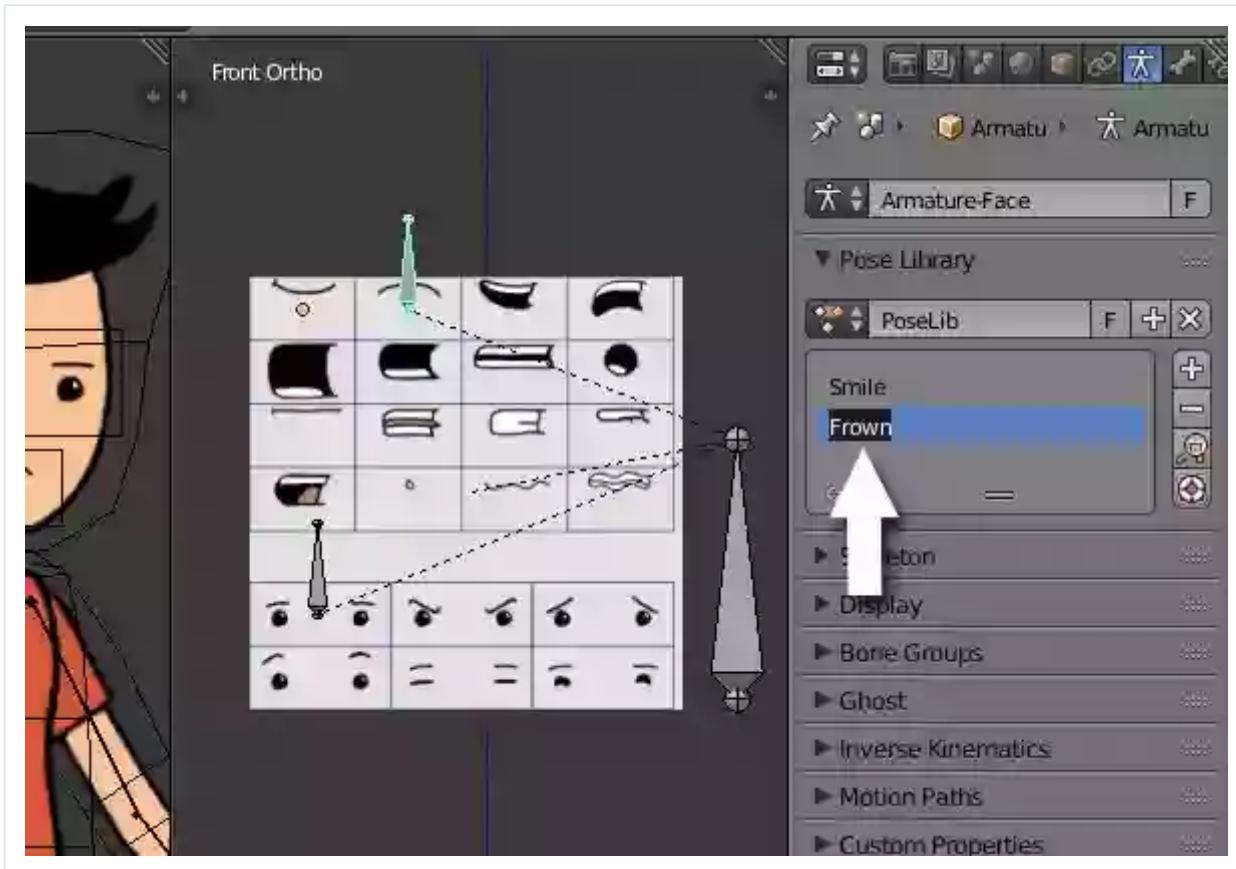
Move the mouth-controller bone to center of the next grid. You can turn on the snapping option so that the bone will snap to the vertex you created in the middle of the grid.

Press **Shift-L** to add a new pose. In the pop up menu click **Add New**.



Adding another pose

In the **Pose Library** panel, rename the new pose **Sad** or frown.



Renaming the pose

## Step 5

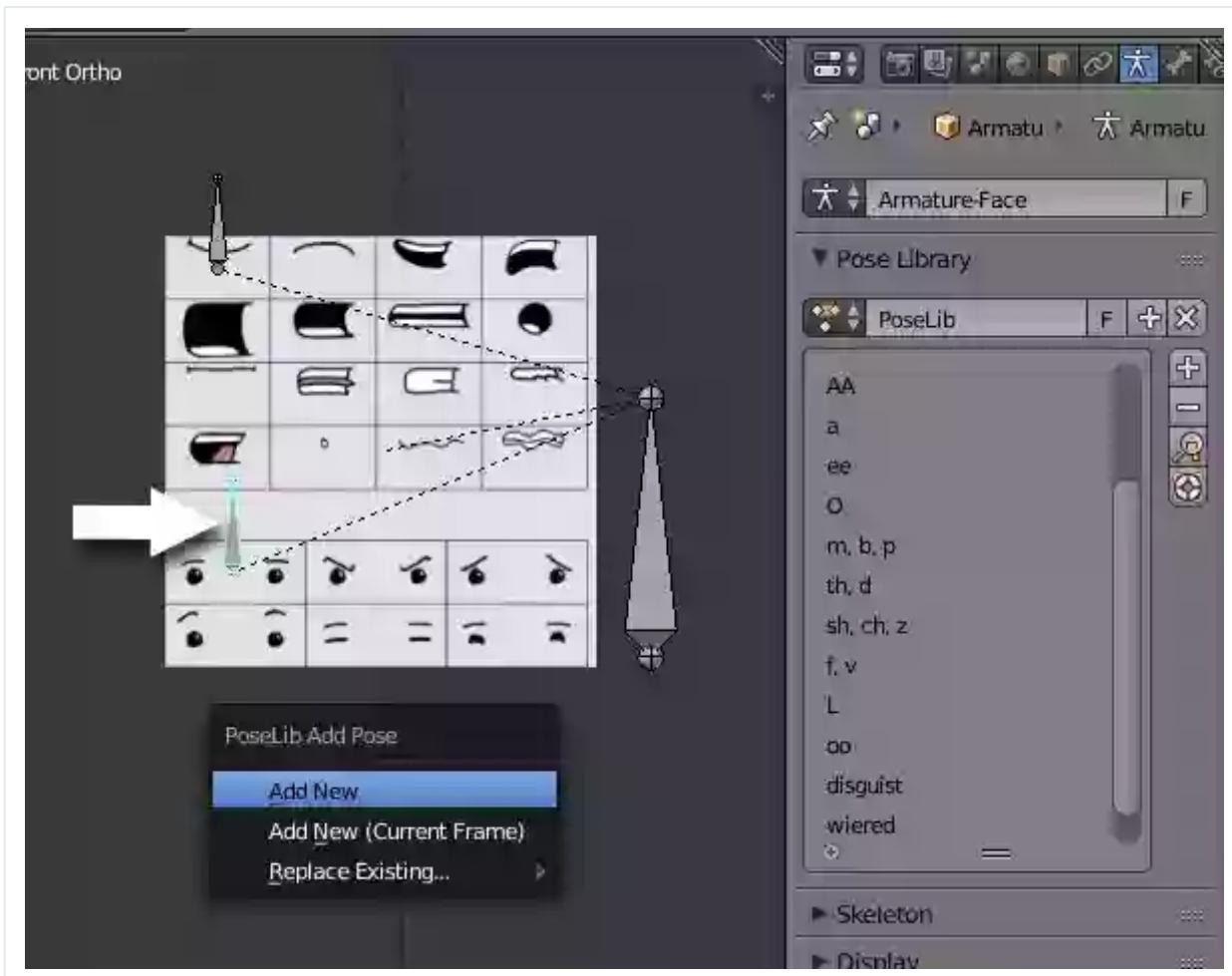
Similarly add all pose and rename according to the image.



Creating pose library for mouth bone

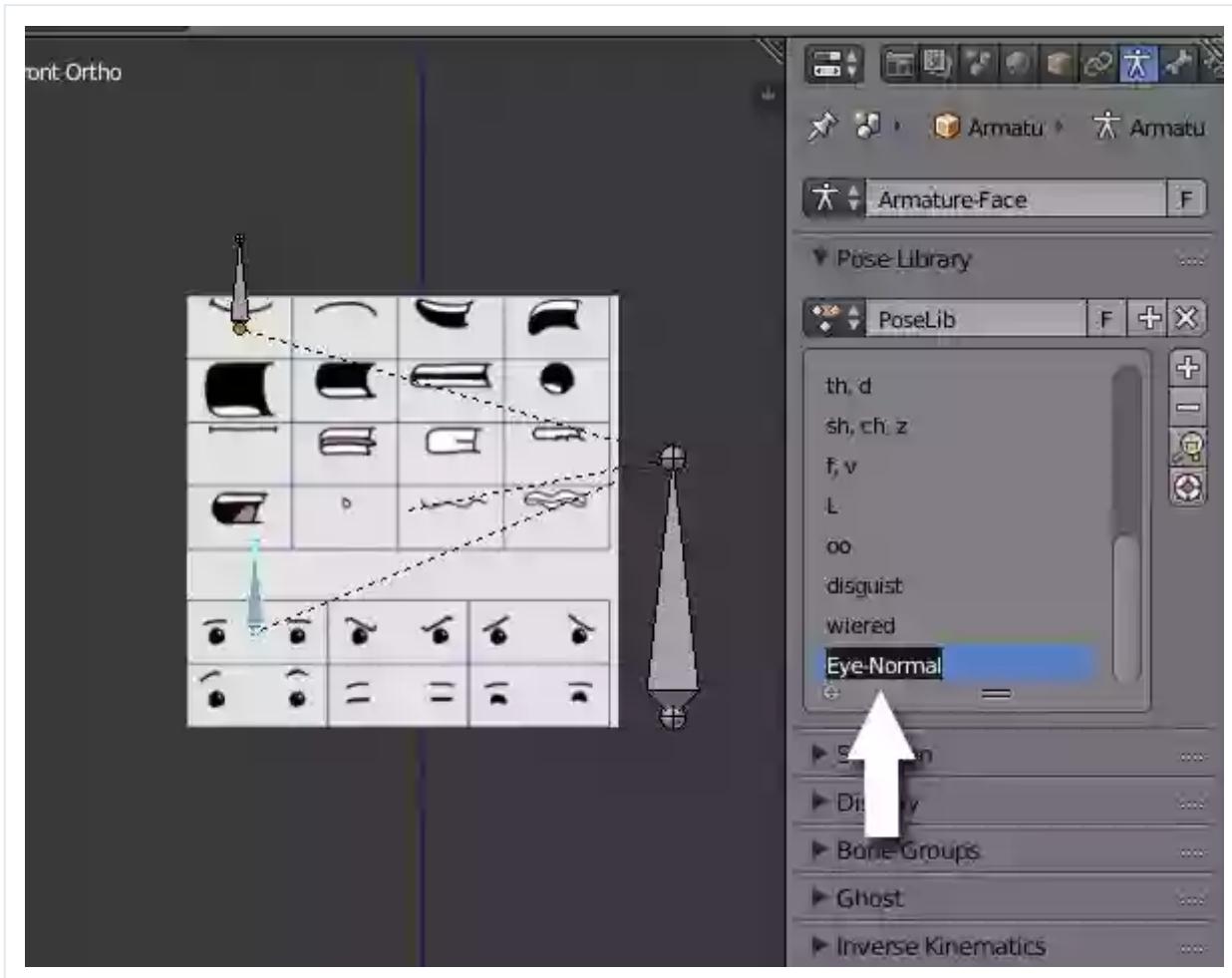
## Step 6

Select the **eye-controller** bone. press **Shift-L** and add a new pose.



Add new pose for eye bone

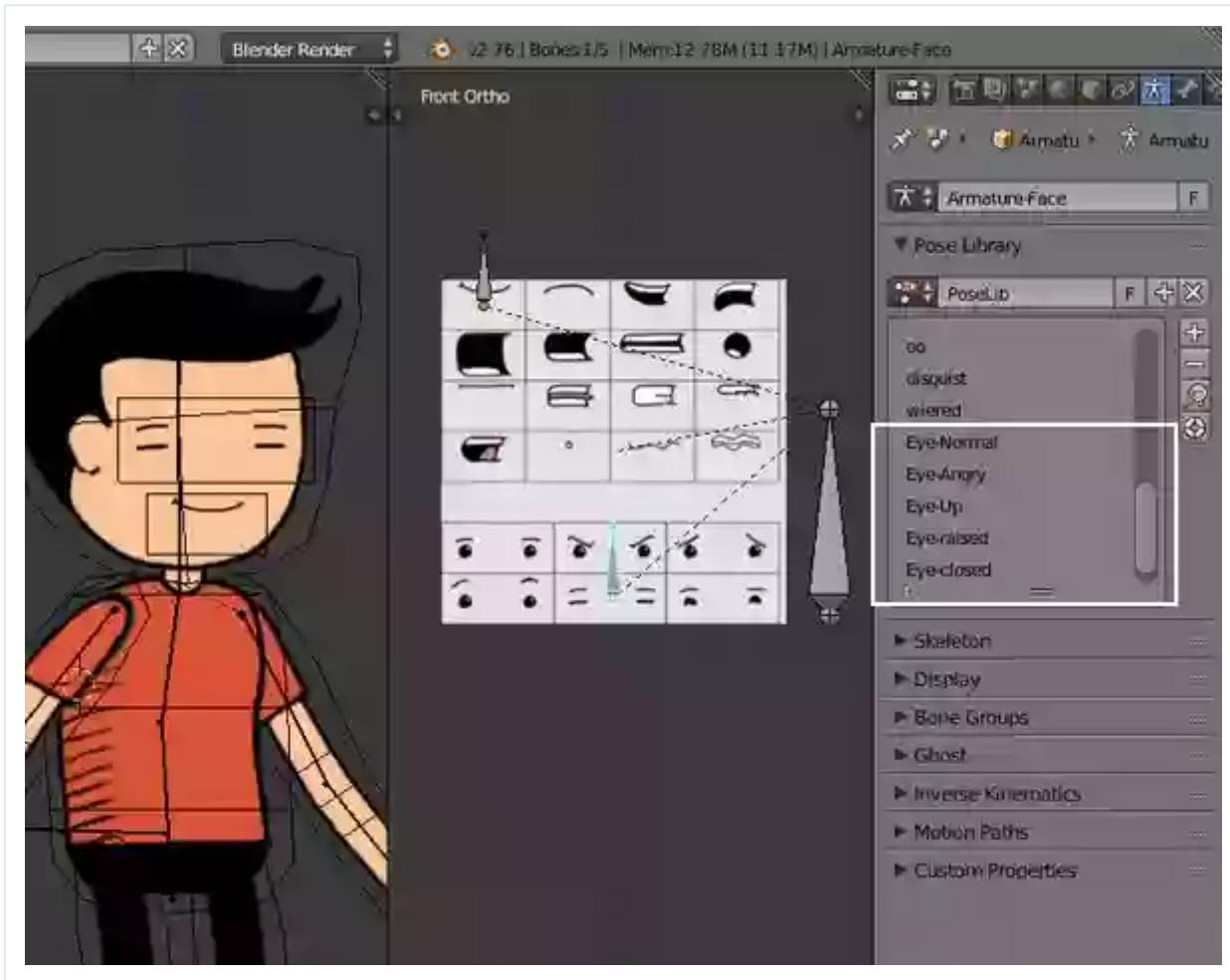
In the **Pose Library**, rename the pose **Eye-Normal**.



Renaming the pose

## Step 7

Just like the mouth, create library of poses for the eyes and rename them according the the expression.



Creating pose library for eye bone

## Step 8

The setup is now ready. Whenever you want to see a pose in action or insert into keyframe, just left click on that pose in the **Pose Library** panel, and click on the button with magnifying glass.

Now you don't need to move the controller bone each time while animatina.



Previewing a pose

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## Karan Shah

Karan Shah is a 3D Artist and Animator from India. He is a BFA Graduate with specialization in sculpture. An inclination towards the digital medium made him a self taught computer artist. He is currently freelancing..

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Name



Ach Hadda

4 years ago

dude this is amazing thank you could you show it in action please :D

2 ^ | ^ 1 Reply



Vincent Doucet

2 years ago edited

Thanks for this tutorial ! Great job.

I have an issue though. I placed a white plane in the backaround ... the transparency (around the body for

instance) is correct when I display in texture mode but when I render (blender render) the transparent areas around the body appear black (not transparent).

Same for mouth and eyes, they appear as black rectangles ... I probably did something wrong ...  
(I'm running blender 2.79)

1 ^ | v Reply

 **Pablo Carlos**  
3 years ago

thank you!!!!!!!!!!!!!!

^ | v Reply

 **log**  
3 years ago

can u upload this character

^ | v Reply

 **Mikhail Suvorov**  
4 years ago

Thank you very mucho for this lesson! And so make for Lego cartoons in Animation faces and emotions?

^ | v Reply

 **Karan** → Mikhail Suvorov  
4 years ago

You can use this technique for animating Lego faces.

1 ^ | v Reply

 **marcus loe**  
2 years ago

How do you render this properly so that it looks like a 2d animation?

^ | v 1 Reply

 **Prasad Sn**  
2 years ago

tHANKS A TONNE, WILL IMPLEMENT SOON...!!

^ | v 1 Reply

 **mehdi14**  
4 years ago

how to export this animation to animation sheet

^ | v 1 Reply

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