

## **Blender 3.0 Rigging, Texturing and Animation**

### **Preparatory work**

If we have joint the head and the body, it is difficult to select the faces for the head. It is better to give the whole head and the hair a material now.

In the properties panel we go of the little sphere-icon, the material-penal. There we create a new material, because the sphere have no one until now in 3.0. In the panel of this new material, we open the colour picker, change to RGB and give the material a colour. We choose a soft orange as colour for the head. And we can give the material an name in the Outliner.

Then we activate all the faces from the hair. This is not really simple. A mix between box- and circle select can get good efforts. With Plus we made a new material and give them a colour. And then Assign the material to the selection of the hair. Give them also a name.

By head and hair, we go down by Specular and up of the Roughness.

If we want to give the hair a texture, we should do it now. In this case we must cut of the geometry of the hair. Also this is not simple and it is subject in the chapter of the texturing.

We look for our head in the properties-panel for dimension and we see, the head is really to big. Our character is now a giant, if we create the world in the really size, the character fit not in the world. We must scale him down, the head should be 0,27 meter toll and the body 1,4 meter toll. The value you must scale down get yo, if divide 0,27 to the actually value of the head.

When this work is done, we join head (first) and the body (second) together with Ctrl and J.

### **Rigging**

To animate our character later we need bones to move the polygon of the body. In object mode we Add a Armature. A single bone is now there where the 3d cursor is. Our first bone, the coccyx bone, is the parent of all the other bones they come. He is in the middle of the legs in the x- and in the y-axis of the beginning of the trunk. We need four bones until the neck. Scale the coccyx to a passable size.

To get more then this single bone we change to edit mode, there we extrude (E) bones from the head of old bone. Whit Z the bone extrude exactly in the z-axis. Until to the neck we need 3 more bones, vertebra 1 – 3, then the neck get his bone, and the head get a bone. The bone of the head get later really important. In the side view we pull the bones on the top a little back in the middle of the head.

In the properties of the bone, object data properties (green men) we activate - in front. Now we can see the bones also in the solid view.

There are six bones now, we must give them a name in the Outliner, you also see there the relationship between this bones, there are children and there are parents.

The bones in the middle are finished. The arm need also bones. Took the 3d cursor to a position in middle of y-axis of the left shoulder. Add a single bone in edit mode. There are only one thing to add in edit mode. You get a really big bone. Maybe it is necessary to change the Pivot Point to 3d Cursor to resize this bone. The Pivot Point is the point blender work around. And this point should be have ordinary the value of Individual Origin or Media Point. Look where the 3d coordinate -symbol are and you know what Blender will do. But in this case we must scale the collarbone around the 3d cursor. Rotate them also in y-axis. Now we go back by the Pivot Point to Individual Origin and we extrude the next bone, the shoulder. And the next bones the upper arm, elbow 1 and elbow 2, ulna, hand joint, hand and maybe dumb.

This bones need also names. And we want create the bones of the right side by Blender, so we add each name of a bone .L .

Now we set the cursor for the leg-bones in the x-axis with a little offset to the coccyx, add a single bone, pelvis 1, and extrude the pelvis 2 bone. The tail of the pelvis 2 bone must lie in middle of the leg in x- and y-axis. Then we extrude the next bones with Z, because we want move this bones together. So we extrude thigh, knee 1 and 2 and the calf.

We want move this 4 bones with 1 bone, this is called Inverse Kinematic. We extrude from the head from knee 2 a bone with y forward and from the tail of the calf a single bone backward. In the properties-panel, bone properties (green man), Relations, we deleted the parent-children-relation and also deselected Deform for both bones. We change for a moment to another bone and then we move the bone they come from knee 2 a little forward outside the leg and also the head of knee 2 a little bit. This bone called leg target, the other from the tail of the calf called leg IK. Do not forget .L.

We change to Pose Mode and select the calf. In the properties-panel, object constraints properties (blue bone symbol) we add Bone Constraints Objects, inverse Kinematic.

We fill in the boxes.

Target: Armature

Bone: Leg IK.L

Pole Target: Armature

Bone: Leg Target.L

Chain Length: 4 (we want move thigh, knee1, knee 2 and the calf together)

With the leg IK.L-bone we can test if we can move the bones together. Maybe they move in the wrong direction, change the Pole Angle in one of the 90 degree position. Try first 90 degree.

From the tail of the calf bone we can extrude the food-bone, food.L . You can also extrude two bones from the calf bone and delete the upper bone.

Several bones must be joined. The Collarbone (child) with Vertebra 3 (Parent), the Pelvis 1 (child) with the Coccyx (parent). First select the child and then the parent and the Ctrl and P, keep offset.

We select all the bones from the arm and the leg of the left side. With Armature (Viewport up left), Symmetrize we mirror all the bones to the right side.

After them we change to object mode, we select first the body then the armature and command Ctrl P, here we need with Automatic Weight. Blender himself joint the geometry to the different bones. Our character is in T-position, this is the reason why.

This is the moment to change to Pose Mode with our Armature. Look to the Outliner, the body of the character is the child of the Armature. Test the bones with the support of the Move- and Rotation-tools in the Toolbar (T). Also the leg IK.L and .R-bones. Perfect, or!?

Something left. The jaws and the eyes must move with the head.

The left eye is still there. With Shift and d we have a new eye. There we change the +/- from position in X and the rotation in Z. Now the new eye is the right eye. The jaw are two cylinder, scaled down an put behind the lips.

The two jaw and the two eyes will be selected, at least we selected also the Armature, then we change to Pose Mode, there we select the head-bone. Ctrl and P, there we choose Bone Relative. Test it in Pose Mode.

The Rig is ready now.

A little colour for our character is not so bad.

## **Texturing**

Mercedes shirt should get a Texture. The nice hearts from our video.

First the shirt must get a material. In this moment we have two material, one of the whole face and one of the hair. But the body is maybe grey. This is material of the cube. We can give him the same colour as the face.

Next we choose the faces for the shirt, with plus in the material-penal, then New and Assing the shirt get a material.

Now we change the Work-Surface to UV-Editing. On the left side Blender try to unwrap the shirt. But he unwrap only a part of the original cube. We will see if Blender made it better by himself. We push U and Smart UV Project. The result is even better. But still not good enough. We must to many guess.

There are only one way left. We must cut of the shirt. We change the Work-Surface to Layout. Push Select in the material-penal. The shirt is chosen now. We can see where we must cut of the geometry of the shirt. This is not simple. We need Symmetrize in the UV Layout. We must see the structure of the shirt, so we need any cuts. We cut of on the side, so the arms hide something.

The Edge we want cut of are selected, Ctrl and E, there we choose Mark Seam. The Edges will get red. To Unwrap the shirt the Work-Surface of UV Editing is a good Choice.

In the material-penal we select the shirt again and go to UV Editing. We push U and choose this time Unwrap. We can see now if we made good cuts. And I know we have good cuts.

In the UV Editing on the top, UV, then Export UV Layout. We can export here the Layout on the Computer.

So we can work with this Layout in Photoshop or GIMP. We create our texture by our self. The first layer is the UV Layout. The second layer is a Photoshop own Cloth-Texture, we delete the colour, so he is grey. The next layer is simply white. We change to Copy together or Soft Light. The next layer is a copy of our UV Layout. The next is still empty. Here we put the hearts on the UV Layout. If all the hearts are on the right spot, the UV-Layout-Layer on the top, will get invisible. He was only the support to do the hearts on the right places.

Certainly the UV-Layout-Picture was a PNG. So our new UV-Layout-Picture is also a PNG.

It would be nice some parts of the shirt, like the hearts or the seams get a bump. So we need a second picture for this bump. The background is black and the hearts and seams white or grey.

Back in Blender we import the picture with Open in the UV Editing on the top. Blender use still the material the shirt get from us. In Base Colour we say Blender he should use a Image - Textur, in the Drop-down-menu down we add our new picture. Now we should see the hearts of our shirt.

For the bump map we change the Work-Surface again to the Shading. There we see the same like in the material-panel, there are a Basisshader and a Outputshader. And in the Basisshader is a Image-Textur-Shader and there we have our Image.

With Add, Texture we add a new Image-Textur-Shader. In the Slot of this Shader we import our Image for the bump map. But we can not join our new Image-Textur-Shader in the Basisshader. For this we need a Vector, a Bump Shader.

We connect Colour in the Image-Textur-Shader with the High of the Bump Shader and the Normals to the Normals of the Basisshader. You will see the Effect in Material Preview (Z) in the Viewport Shading. Maybe the Effect is to strong, you can size it in the Bump Map Shader.

The shirt is ready.

Mercedes has the whole time a red head in edit mode. This is because we cut of the hair in the bone tutorial. This is the same work like the cut of of the shirt.

The other material are simply material we can create in the Basisshader of material-panel. The skin should be less Specular and more Roughness. My earrings has much Metallic.

The floor and the background are simple planes, where I import a image texture or I create a texture in Blender him self.

There are four lights in the scene. Three of them are Points. The main light come from in front, left a little up. This light is really strong. We can change the strength, the type of the light and the colour of the lamb in the properties-panel in Object Data (green light bulb). The second from in front right a little down. The third from a little back and from the top. The second and third are really weaker. But there are Points if you want the light shine over the whole scene so the light must put away from the scene. But then the light get quick weaker and you have a dark scene. It is not easy to keep distance and strength.

But the background id still dark. There I have a area light.

## Animation

A Go-Animation is a good option to show how we done a Animation. First we hide all the other elements in the scene with the eye in the outliner. Then we bring our character in a 90 degree position, 0, 90, ... . So we can you use the rotation tool for the bones very simply.

The body is part (child) of the armature and so we must move the armature and not the body in Object Mode. In Pose Mode of the Armature we sink with the rotation tool the two upper arms down. Then we raise the two elbow 2 a little up.

In Frame 1 we set key frame in the properties box in the 3d-View-Editor (N), for the two upper arms in the rotation and for the two leg IK bones in the position. We select this four bones together. Then we change the editor in the great window to the Dope-Sheet-Editor. We will find our key frame in frame one, we copy and paste it in frame 20, 40, 60 and 80.

We are back in the great window in the 3d-View-Editor and now in frame 10. We should be in the timeline of the Work-Surface - Layout.

The left leg-IK-Bone would be moved a little up and a little forward. But there are a limit, then the leg switch on the other side. This happens because the skirt will be animated too. This is a compromise, our character is simply to animate but she can never run.

But until -1,25 in the high and to the side should be possible. And so we set key frame for the left leg-IK-bone in frame 10. We change to the rotations tool and rotated the left upper arm backward, the right forward. We set for this bones in frame 10 key frame in the rotation. The right leg-IK-bone we do not move, but we give them also a key frame here in frame 10.

We choose again this four bones together and go again in the Dope Sheet.

There we deactivated all the key frame (Yellow to White). And now we choose all the key frame in frame 10 with box select. We paste the key frame from frame 10 in frame 50. In frame 30 and 70 we paste flipped.

Vertebra 3 will be also animated during the character goes. He get key frame in frame 1 and 80 by the rotation. In frame 10 we rotated him a little forward, set a key frame and for this value also in frame 70.

Now we play our Animation with the buttons in the timeline. We see, she goes, but she do not change her position, This we can change in the Object Mode for the whole Armature. We set key frame in Position and Rotation in the different frames.

Gray boxes are without key frames, in yellow boxes are key frame, in green boxes are key frame but not in the frame we are now.

The character has no bones in his mouth, but she can speak. How can she do this.

This is the secret of the Shape Key.

We will find them in the properties-panels, Object Data Properties (green triangle). In Edit Mode all the Polygons must be there now, if we want, there are there without any animation. Then we create our first Shape Key. Blender called them Basis, and this is really good name for this first Shape Key. But one Shape Key made no sense. We need here in Object Mode another Shape Key (Plus). We name then Mouth Open. In Edit Mode we move now all the Geometry around the mouth to a Mouth Open. If we are ready we change to Object Mode. And we see nothing. There are a box under the Shape Keys, Value. Change here Value to 1 and you see the result. Here you can animated the mouth.

We need another Shape Key to animated the eyes, we called them Blinking. We go around the eyes in Edit Mode and move the geometry around the eyes. Test the result in Object Mode.

We are ready for the animation. In Mouth Open in frame 1, 20, 40 and 60 we set key frame for Value 0, in frame 10, 30 and 50 for the Value 1. We change to Blinking, in frame 30 he get the Value 1, in frame 20 and 40 the Value 0. Give them key frame in this frame.

This is a very short animation. The effect you will see first if you repeated the scene a few times. You can do this in Video-Editing in Blender – later.

Now we are ready for the Output, the Rendering. Rendering is hart work to do for our Computer and so we go to frame in the middle from our scene, enter F 12 and look the result of this frame. Are really all the things so, we want the are so. We can stop the Rendering later, but it is really better to look good here in your scene.

## **Output**

In the properties-panel, the Output Properties (Printer-Icon) we fixed the data of our output. If you are in Europa 25 Picture in the second are not a bad choice. Also a Avi Jpeg. Better then 250 single picture we must join later in a video-cut-program.

The Value of Resolution can be reduce to 50 %. Rendering is really a hard work for the computer. With 50 % your Resolution is still high and and the computer can still breath.

Very Important. We rendering in Eevee. Not in Cycles!!! We need 25 pictures in the second. Do your computer a favour. No Cycles!!! Go in the Render-Properties (Camera-Icon), there you find the Renderer, Eevee.

In the Output-Properties is a box Output, there you find tmp. This is the spot where Blender would save the scene. You can use it or not. Give the scene a name you can also find them in six month.

At least we have a lot of single scenes. To join them to our cartoon, we use the Work-Surface of the Video Editing. Behind all the other Editors, behind Scripting, in the header you will find a Plus and there hides the Video Editor. Since 2.8 the Video Editor get normal, like many other video-cut-programs. But there are still any strange function. There are a lot a function you know from the 3d-View-Editor you can use here. In the window left up we can open out file and pull the single strip (video, audio, picture ...) in Sequencer. We can add a lot of effect strips. At least we save the whole cartoon also with the Output-Properties.

The Cartoon is ready. The first time it is really a lot of work, try and error. But then, at least...  
Congratulation. Have Fun Cerise