SMITHMICRO
SOFTWARE

TUTORIAL MANUAL

ANIME STUDIO® DEBUT | 10

Create Your Own Cartoons and Animations

REV February 8, 2014

Contents

Anime Studio Tutorials

In this manual, we will walk you through various aspects of using Anime Studio. This is the perfect place to start if you've never used Anime Studio before. Even if you're an experienced Anime Studio user, this version of Anime Studio has some big changes, so we recommend reading through the tutorials again.

The best way to get started is to read all the tutorials in the Basics section in order. Each of these tutorials builds on skills learned in the earlier ones, and one-by-one will get you up to speed with Anime Studio's basic drawing and animation techniques. Once you're comfortable working in Anime Studio, then you can move on to the other tutorial sections. You don't have to read them all (although that probably wouldn't hurt), but choose the ones that address the specific techniques you want to learn about.

When you first start Anime Studio, you will be prompted to create a Custom Content folder in a location that you specify. The tutorial files that are used in this tutorial manual will get installed in that Custom Content folder. You can find them by going to your Content folder, and looking for the Tutorials sub-folder. If you're having trouble with a tutorial, try opening the corresponding Anime Studio file to see what it should look like.

If you did not create a custom content folder at startup, you can create one any time by choosing **Help > Set Custom Content Folder**.

Once you've finished the tutorials, you should be comfortable enough to continue on your own. However, the tutorials won't teach you how to use every feature of Anime Studio - the rest of this manual is a reference that covers Anime Studio's features in detail, and is recommended reading to be able to use the full power of Anime Studio.

Using the Embedded Media Files

This manual features some embedded media files to help you learn concepts that are more easily explained in video

format. To play the media files, click on the placeholder image. The videos will play in a separate window. You can close the window at any time by clicking the small X in the upper-right corner of the video window.

Please note that recent updates to Adobe Flash may, in some cases, display a notification that Acrobat cannot connect to the flashserver when you attempt to play the media. You can ignore the warning and click OK to display the video without issue.

However, if you want to prevent the message from occurring each time you play one of the embedded media files you can reset your Acrobat preferences as follows:

1. Open Acrobat, and choose **Edit > Preferences**.
2. Select **Trust Manager** from the left hand pane.
3. Click the **Change Settings** button under the **Internet Access from PDF Files Outside the Web Browser** section.
4. In the Web sites list, select **adobe.com** and click Delete.
5. To re-allow adobe.com, go to the top section of the Trust Manager, and choose the **Custom Setting** option. Enter www.adobe.com in the **Specify Web Sites to Allow or Block** field, and then click **Allow**. The Adobe web site will then appear in the trusted sites list, marked **Always Allow**.
6. Click **OK** to set the Preferences, and click **OK** again to exit the Preferences dialog.

Quick Start

Tutorial 1.1: A Quick Run-through

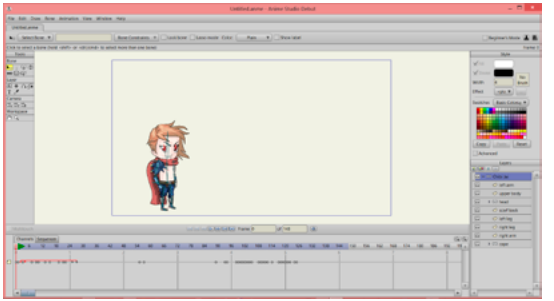
This tutorial quickly runs through the major features of Anime Studio, without going into too much detail. The purpose here is more to give an overview of how Anime Studio works, rather than to teach you how to use any specific features. In this tutorial, we will draw and animate a very simple object.

Anime Studio has several groups of tools, used for different types of tasks. Some of these tools are used to create new objects, and others are used to modify and animate existing objects. The basic Anime Studio tool groups are: Draw, Fill, Bone, Layer, Camera, and Workspace.

This tutorial introduces a few of the Draw, Fill, and Layer tools, while the following tutorials focus specifically on each of the tool groups.

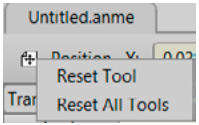
Drawing a Simple Shape

Launch Anime Studio by double-clicking the Anime Studio icon, or selecting the Anime Studio shortcut in the Start menu (Windows). When you create a new Anime Studio project, the application starts off looking something like this:



The Anime Studio Interface

Choose **File > New** to create a new project, and then click the current tool icon (just beneath the File menu), to select **Reset All Tools**. This puts all tools at their default settings so that you can follow along with this tutorial.



Reset all tools.

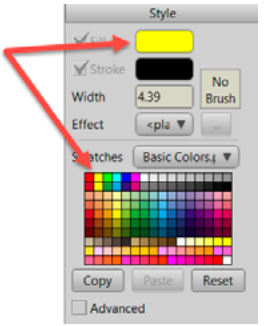
Select the **Draw Shape** tool by clicking on it in the toolbar.

Draw Shape

Select the Oval shape from the Draw Shape tool options.

Oval

The Style panel on the right side of the Anime Studio interface allows you to select fill and stroke colors for the shapes you draw. To select a fill color, click the Fill color square to open a color palette, or click one of the color squares in the Swatches palette. Select the fill color you want to use, and click OK.

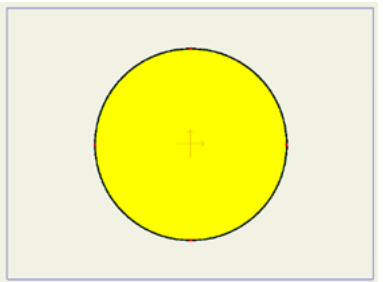


Changing the fill color

Press the **Shift** and **Alt** keys while you drag from the center of the workspace to create a circle shape. The **Shift** key forces the shape to be a circle, rather than an oval; and the **Alt** key centers the circle around the point that you first clicked. Try to keep the circle within the blue rectangle (this rectangle represents the visible area of your project). Note

that the circle will automatically fill with color when the **Auto Fill** option is checked as shown in the previous figure.

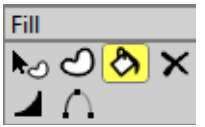
If you're not happy with your circle, just select the **Edit > Undo** command from the menu bar. Your circle should look something like this:



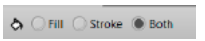
Your first Anime Studio drawing

Changing the Color of Your Shape

If you want to change the fill color, choose the **Paint Bucket** tool from the Fill toolbar. The **Fill** option changes only the Fill color; the **Stroke** option changes only the Stroke color; and the **Both** option changes both the Fill and the Stroke color to those that you have selected in the Style window.



Paint Bucket Tool



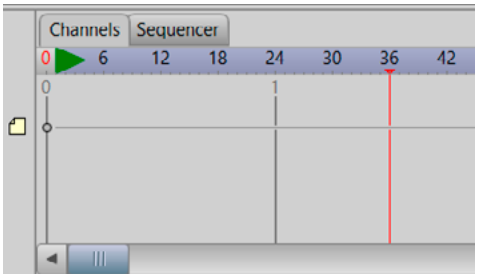
Paint Bucket options

Select a new color from the Style panel, similar to the way that you selected the color in the previous steps. Then click inside the shape to change the color(s).

Simple Animation

When you animate in Anime Studio, you move objects around and set up keyframes - points in time at which an object has a certain position. At points in time between keyframes, Anime Studio automatically computes the position of all objects.

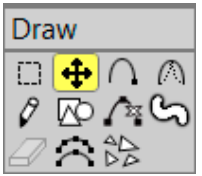
Near the top of the Timeline window is a ruler that displays frame numbers in the animation. Click the number 36 to set the current time to frame 36.



The Timeline

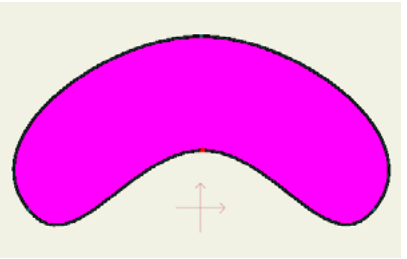
Next, choose **Edit > Select None** from the menu bar.

Pick the **Transform Points** tool from the toolbar.



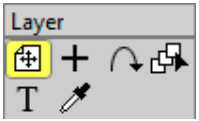
Transform Points

Click and drag the bottom point of the circle upward to distort the circle into a shape that looks like this:



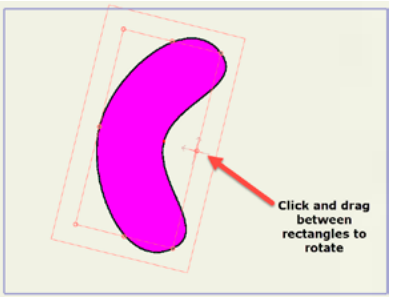
Moving a single point

Now use the **Transform Layer** tool from the Layer section of the Tools panel to rotate the layer.



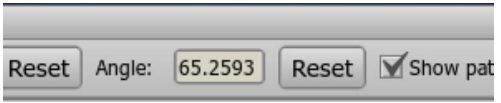
Transform Layer

To rotate the object with the Transform Layer tool, click and drag in the area between the two bounding boxes that surround your object. Rotate the object into a position similar to the one below:



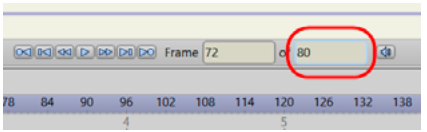
Rotating an entire layer

Back in the timeline, click frame number 72 in the ruler to change the current time. Next, select **Draw > Reset All Points** from the menu bar to move all points back to their original positions. In the tool options area at the top of the main window, press the **Reset** button to reset the rotation of the entire layer.



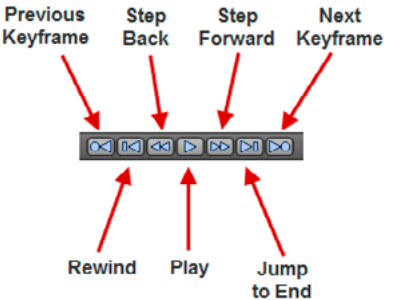
Click the Reset button to reset the rotation of the layer.

Finally, we'll shorten the length of the animation from its default length of 240 frames. In the Timeline window, enter 80 in the second number field. This will shorten the length of the animation to 80 frames.



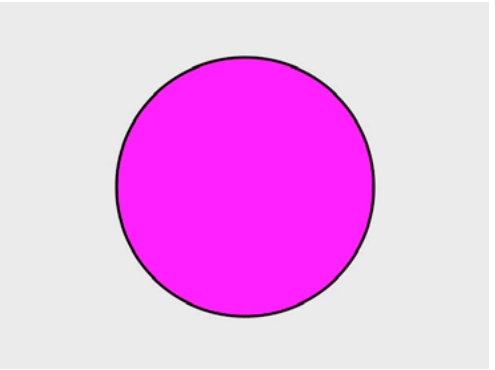
Shorten the animation to 80 frames.

Congratulations, you've made an animation! Press the play button near the bottom of the main window to watch it go. When you're done, press stop. OK, so it probably won't win any film awards, but you're off to a good start learning Anime Studio.



Playback controls.

Here's what your finished animation should look like (approximately). Press the **Play** button below to see the result.



The final result. (MP4 File)

You've learned how Anime Studio has different groups of tools for different operations, and even how to use a few of those tools. You can experiment more on your own, maybe adding more keyframes. When you're ready to learn more, move on to "Tutorial 1.2: Drawing Simple Shapes" on page 9.

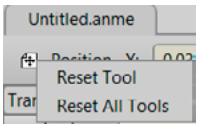
Tutorial 1.2: Drawing Simple Shapes

In this tutorial you will learn how to draw simple shapes in Anime Studio. The following tutorials will build on what you start drawing in this tutorial.

Creating a Background

Launch Anime Studio by double-clicking its icon. Or, if Anime Studio is already running, choose **File > New** to create a new project, which opens in a new document tab.

Click the current tool icon (just beneath the File menu), to select **Reset All Tools**. This puts all tools at their default settings.



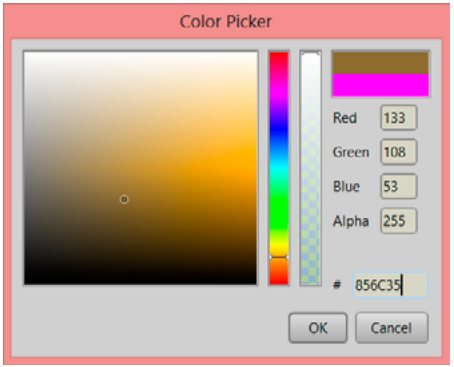
Reset all tools.

In the Tools window, click the **Draw Shape** tool to activate it. Then select the Rectangle option.

Draw Shape

Rectangle

From the Style window, select a brown color for the Fill color as shown below.

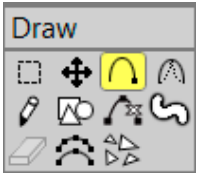


Select a brown fill color.

Click and drag in the working area to create the rectangle shown below:

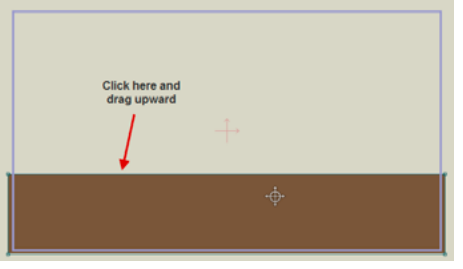
Draw a simple rectangle.

This shape is going to be the start of some rolling hills. So far, these hills look kind of flat, so let's fix that. Pick the **Add Point** tool from the toolbar.



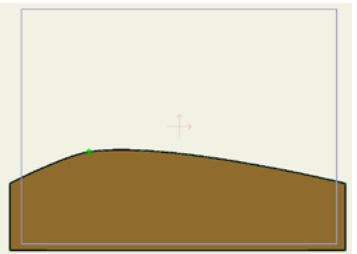
Add Point

Click on the top edge of the rectangle and drag the mouse upwards:



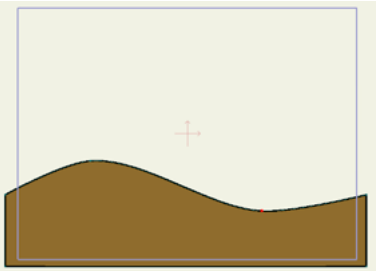
How to add a point to an existing shape.

You should have something now that looks like the picture below. If this isn't what you got, select the **Edit > Undo** menu item and try again. Be sure to click on the line that forms the top of the rectangle and drag upwards from there.



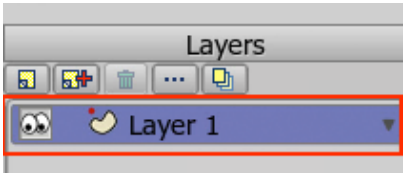
Drag the new point upward.

Let's add another curve to the hills by clicking a little more to the right and dragging downwards:



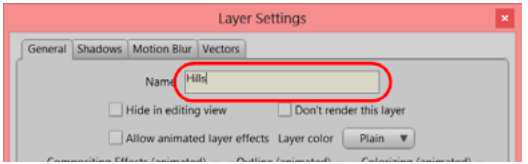
Add a second point and drag it downward.

To keep things organized, it's a good idea to name the layers in an Anime Studio project. Double-click this layer (the only one so far) in the Layers window.



Accessing a layer's properties.

In the dialog that appears, type in "Hills" for the layer name and click the OK button.

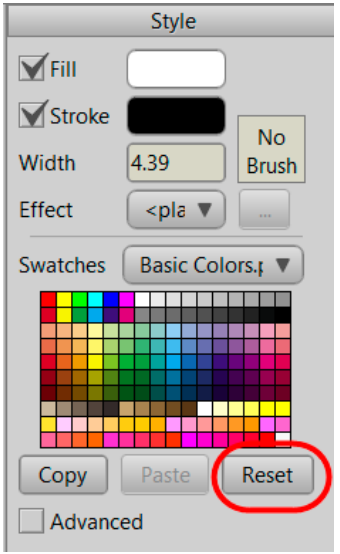


Rename the layer.

After creating the hills, choose **Edit > Select None** to deselect any selected points. Then click the Select Shape tool in the Fill section of the Tools panel, and click the fill on your hills.

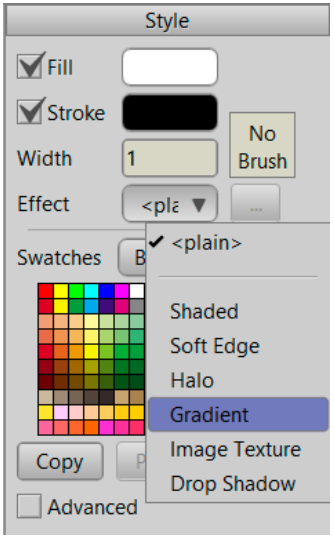
Select Shape Tool

The Style window will display the settings for the fill: its color, its line width and color, and the styles used to display it. To remove settings that you have used in previous projects, click the **Reset** button to reset the fill colors to their default settings.



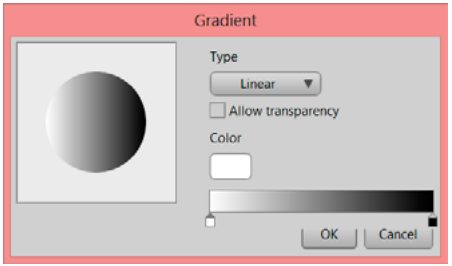
Click the Reset button.

Set the line width to 1. Then choose Gradient from the Effect menu to open the Gradient dialog.



The Style Window

When you select the Gradient fill style, Anime Studio automatically opens up the gradient settings dialog. The Linear gradient type is automatically selected for you.



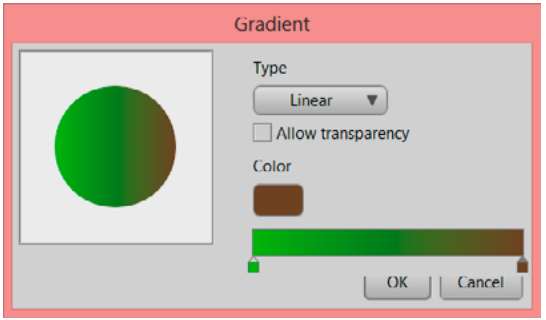
Linear gradient.

If you want to change the gradient settings later, click the details button to the right of the pop-up menu.

To set the left gradient color, double-click the left square at the bottom of the gradient bar to open the Color Picker. Select a green color and click OK to return to the Gradient dialog.

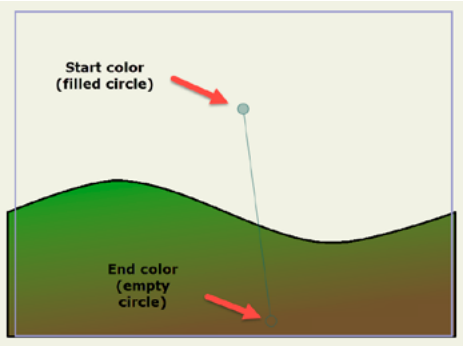
To set the right gradient color, double-click the right square at the bottom of the gradient bar to open the Color Picker. Select a brown color and click OK to return to the Gradient dialog.

When your colors are selected, the Gradient settings should appear as shown below. Click OK to return to the scene.



Gradient settings.

To see the gradient preview more easily, click outside the hill to deselect the fill. You'll notice a line with a filled circle at one end, which represents the start color of the gradient (green in our example). The empty circle at the other end represents the end color of the gradient (brown in our example). You can adjust this indicator to control the blending and direction of the gradient.



Final result.

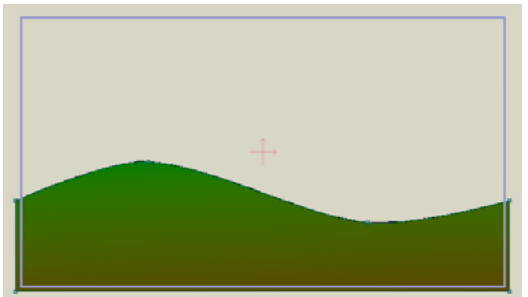
In our example, the gradient starts with brown on the bottom (empty circle) and ends with green on the top of the hill (filled circle). The angle tilts slightly toward the left as shown below.

Choose the **File > Save As...** command from the menu and save the project under the name "Tutorial 1.2".

In "Tutorial 1.3: Drawing Complex Shapes" on page 16 we'll continue working on this scene by adding more complex shapes.

Tutorial 1.3: Drawing Complex Shapes

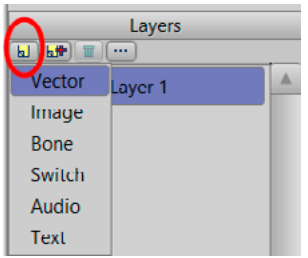
This tutorial follows on the previous one, and teaches you how to draw more complex shapes. You can either continue with the project you created in Tutorial 1.2, or you can open a file provided for you named "Tutorial 1.2". This file can be found in the "Tutorials/1 - Basics" subfolder within your custom content folder. The file you're starting this tutorial with should look something like the following:



Starting point.

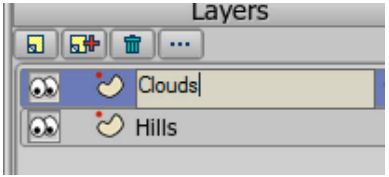
Creating a New Layer

Click the New Layer button in the Layer window to create a new layer. In the popup menu that appears, choose "Vector".



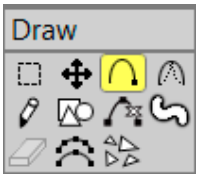
Create a Vector layer.

You can assign the name "Clouds" to the new layer when you create it, or double-click this new layer and rename it "Clouds" in the Layer Settings dialog.



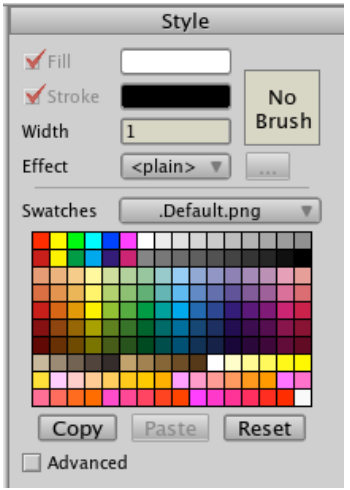
Rename the layer Clouds.

Now select the **Add Point** tool.



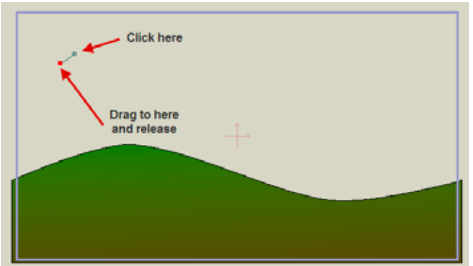
Add Point

Click the **Reset** button in the Style panel to reset the colors to their default. Set the line width to 1.

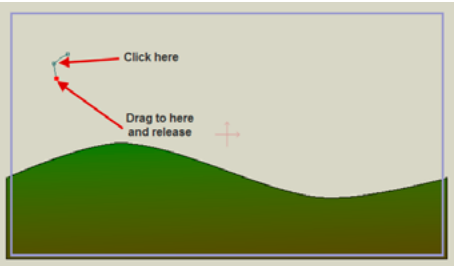


Reset colors and set line width to 1.

Click to set the start point for a new line segment. Without releasing the mouse, drag the cursor and release the mouse to create the end of the segment. The finished segment is shown below.



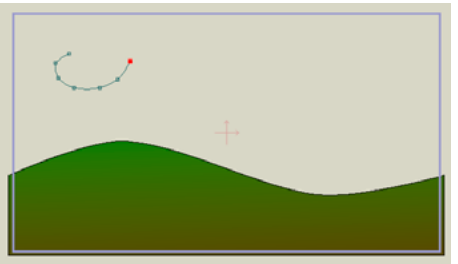
Add a line segment.



Add another segment to the end of the curve.

Next, click on the end of the new line segment and drag to stretch the curve out like this:

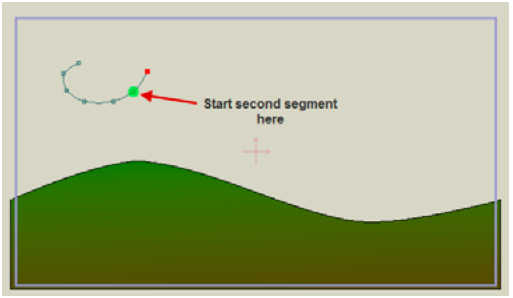
Do this a few more times until you have the curve below:



Several more segments added.

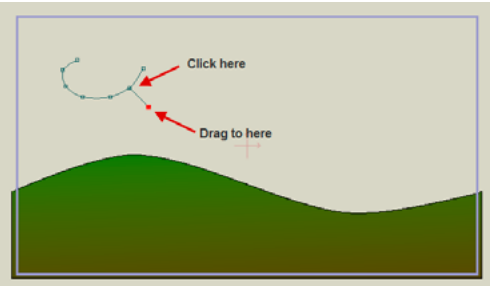
The key point to remember is in order to extend a curve, you need to click on one of its endpoints and then drag the mouse to where you want the new point to be. Remember, if you make a mistake at any time, just choose the **Edit > Undo** menu command.

Now we're going to add a second puff to the cloud. Move your mouse to the point just before the end of the previous segment. The "Auto Weld" option for the Add Point tool should be turned on by default. When turned on, the node will turn green when you can automatically weld the new segment to the existing one. When Auto Fill is turned on, the cloud will automatically fill with color when the shape is closed.



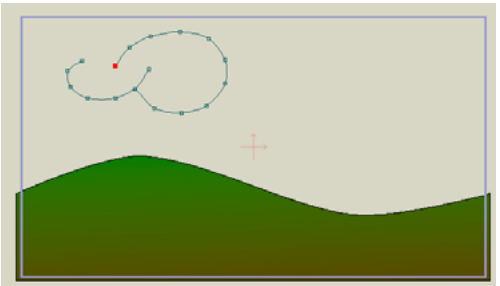
Add a new curve at this point.

Click on the second to last point in the curve, and drag down and to the right, as shown below. When you use the **Add Point** tool on a point that is in the middle of a curve, what happens is that you start a new curve that is automatically welded to that point in the first curve. These two curves are permanently joined at that point, which becomes important when we get to filling the shape with color. Here's what your project should look like after adding the new curve segment:



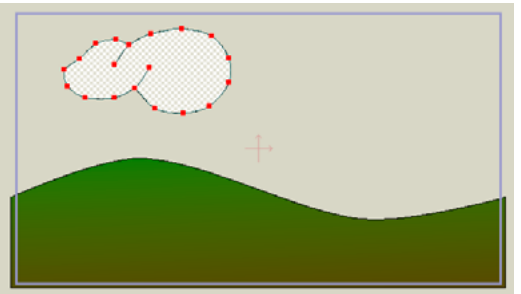
A new segment welded to an existing curve.

Add some points to the end of this new curve to get the shape below. Remember, to add a point to the end of a curve, click just on the last point of that curve.



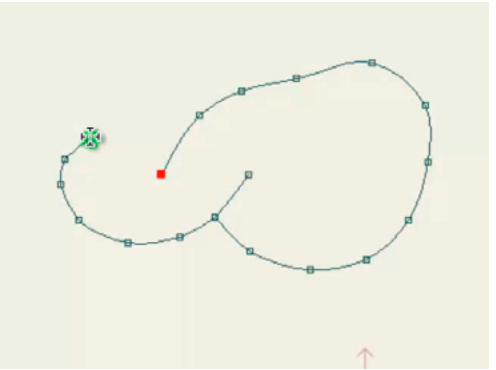
More new points.

Finally, add two or three more points at the beginning of the original curve. When you add the last point, drag it over to the right and line it up with the next to last point of the second curve before letting go of the mouse. Anime Studio will automatically weld those points together and fill the cloud with color to get the final shape below:



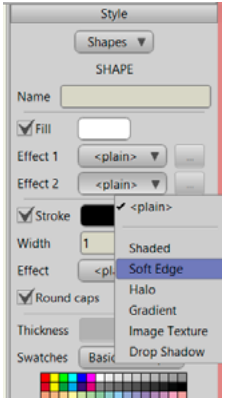
Finished cloud.

Sometimes it can be hard to follow this sequence of steps - let's take a moment to watch a movie of the cloud being created in Anime Studio. Pay special attention to where the mouse is clicked in order to weld the two curves together.



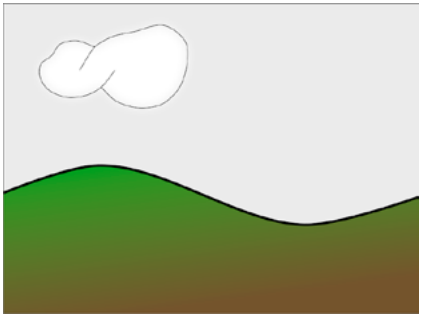
Click the video to watch how to draw the cloud.

We will add a line effect to make the cloud a bit softer. In the Style window, check the Advanced button to display the advanced style options. Select 'Soft Edge' from the Stroke Effect pop-up menu. Accept the default settings and click OK.



Soft Edge effect.

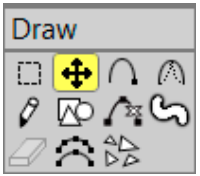
Now would be a good time to select the **File > Preview** command to see what your final result looks like:



The rendered cloud.

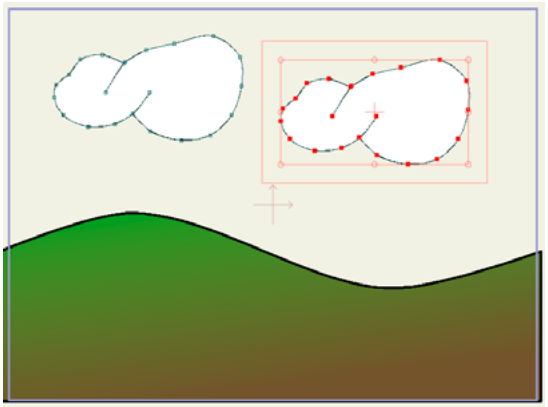
A Second Cloud

Let's make another cloud. With the Clouds layer selected, choose **Edit > Select All** from the menu. Now choose **Edit > Copy**, followed by **Edit > Paste**. Next, pick the **Transform Points** tool from the toolbar.



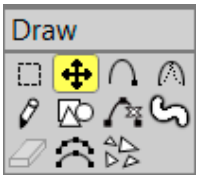
Transform Points

In the working area, click and drag to the right to move the new cloud away from the original. (When you paste an object from the clipboard, it is positioned directly on top of the original.)



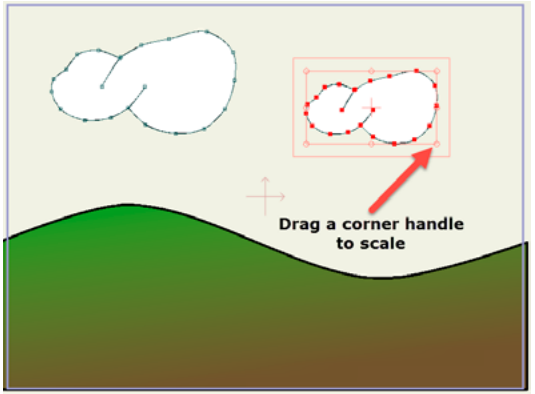
Duplicated cloud.

Use the **Transform Points** tool to resize this new cloud, making it smaller than the original.



Transform Points

The Transform Points tool can resize an object both vertically and horizontally, and will scale whether or not the object is selected beforehand. In this case, we don't really want to change the cloud's shape like that. With the Transform Points tool active, click and drag inward on one of the corner handles that appears around the cloud, thus making it smaller without changing its overall shape. Continue using the Transform Points tool until you get the new cloud in a position you like.

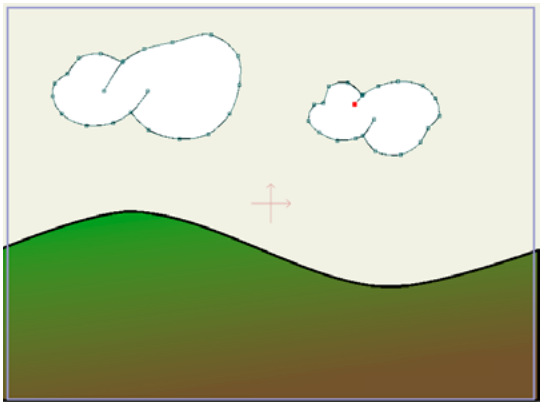


Second cloud scaled down and positioned.

Next, use the **Edit > Select None** command (or press the enter key) to de-select all the points in the new cloud.

Now you can use the Transform Points tool to click and drag individual points to reshape the second cloud.

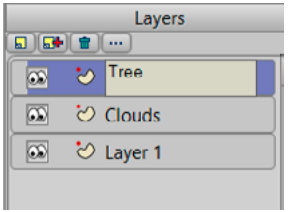
In this case, since only one point is selected at a time, the Transform Points tool is used to re-shape the cloud, not move the entire object. Just re-shape a few points here and there so that the two clouds don't look exactly the same.



Modify some points.

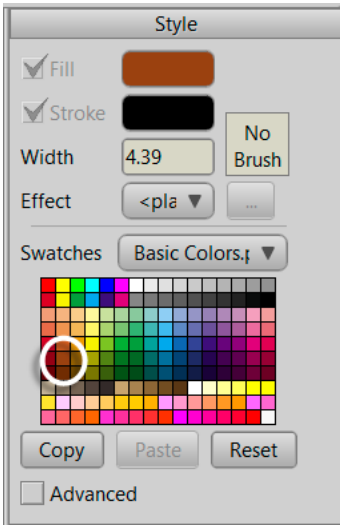
Plant a Tree

Good - we're moving right along, but this scene needs some plant life. Add a new layer to the project by clicking the new layer button in the Layer window. Again, choose "Vector" from the popup menu. Name it "Tree".



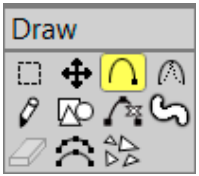
Rename the layer to Tree

Select a brown fill color from the Style panel.



Select a brown fill color.

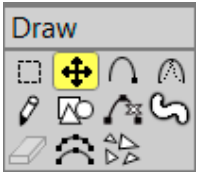
Using the **Add Point** tool, along with the welding feature, draw a shape that resembles the trunk of a tree.



Add Point

Here are a few things to remember as you go: First, you can always use the **Edit > Undo** command to back up if you make a mistake.

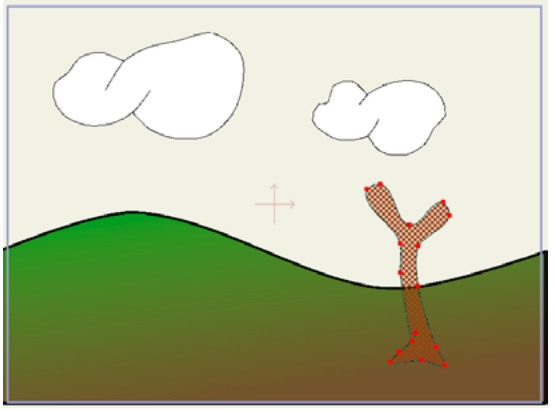
Second, you can switch to using the **Transform Points** tool to reshape part of the object, even if you haven't finished drawing the whole thing yet.



Transform Points

Third, the Transform Points tool lets you pick individual points by clicking on them - if you want to get rid of a point, but it's too far back to use undo, select it with the Transform Points tool and press the backspace or delete key on your keyboard.

Feel free to be creative with your tree trunk, you don't really have to stick to the sample below.



Draw a tree trunk

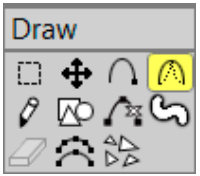
There are a few tools that may be useful when building your tree that haven't been introduced yet. The **Pan Workspace** and **Zoom Workspace** tools can be used to move around the workspace.

Pan Workspace Tool

Zoom Workspace Tool

Note that these tools are not used to manipulate your drawing - they just let you move your view so that you can focus in on a particular area of interest. To reset your view to its original position, select the **View > Reset** command from the menu bar.

Another useful tool is the **Curvature** tool. Using this tool, you can click and drag on a point to adjust how round or pointy the curve is as it passes through that point.



Curvature

The last thing we'll add in this tutorial is some greenery to the top of the tree. The shape for the treetop will be similar to the clouds, so follow similar steps to create it, but there is one tricky part. Because the treetop overlaps the trunk of the tree, it can be easy to click on the wrong part and add a new point to the trunk instead of the treetop.

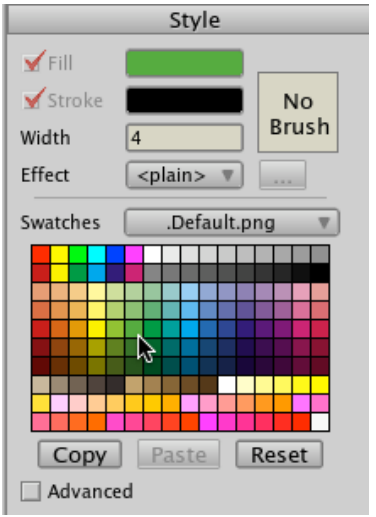
There are two ways to avoid this problem.

One, use the Pan and Zoom tools to move in close to the top of the tree so that it's easier to avoid clicking on the wrong thing.

- The second approach is to draw the treetop off to the side where there's plenty of empty space. Then, when the treetop is finished, drag it back into position at the top of the tree. For the second approach, when you're ready to move it back into position, use the Transform

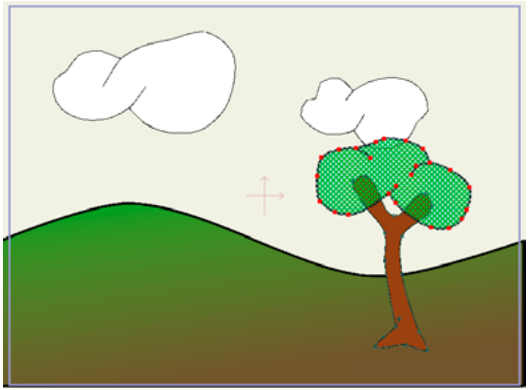
Points tool and click to select one point on the treetop. Then use the **Edit > Select Connected** command to select the rest of the treetop. Finally, drag the treetop into place, and use the Transform Points tool to resize it if necessary.

- Select a nice leafy green fill color in the Style panel. Set the line width to 4, you'll see why later.



Select a green fill color and set line width to 4.

Use the Add Point tool to draw your treetop. Here's the kind of look we're going for:



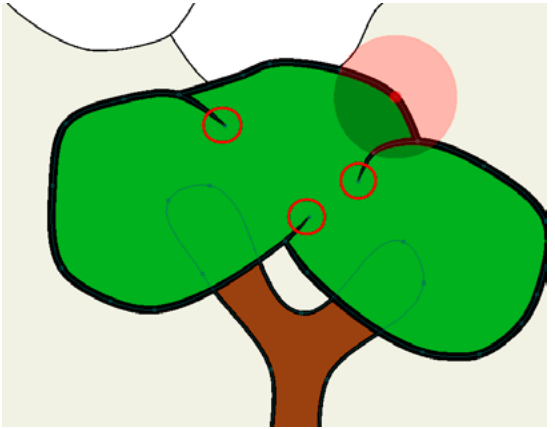
The treetop.

Choose **File > Preview** to see how the treetop looks. Notice how the ends of line segments look kind of squared off and blocky. We'll fix that using Anime Studio's variable line width feature.

Exit the render window and press Enter to de-select all points in the treetop.

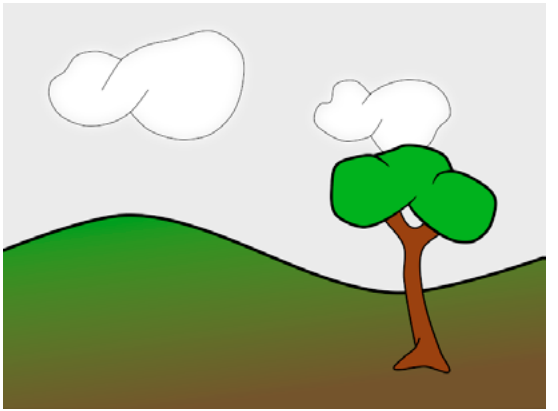
Now, using the **Line Width** tool, click on each of the points in the treetop that is at the end of a line segment. The area that the Line Width tool affects is indicated by a semi-transparent red circle. The default width is .5, which is quite large. Decrease the width to around .1 or less to obtain finer control over the area that you want to affect.

Line Width Tool



Changing line width.

Choose **File > Preview** again, and notice how the endpoints are now nicely tapered. This feature isn't limited to endpoints - experiment with using it on other points along a curve. Also, try dragging the Line Width tool back and forth to make lines thinner or thicker.



The completed background.

"Tutorial 1.4: Bone Setup" on page 31 *will move into using bones to control a character, and you'll learn how to set up some animation controls to make things move.*

Tutorial 1.4: Bone Setup

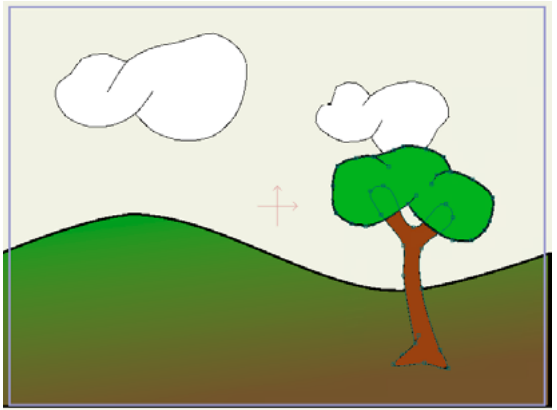
This tutorial builds on the results of the previous two, teaching you how to add bones to a character. You can either continue with the project you created in Tutorial 1.3, or you can open a file provided for you named "Tutorial 1.3". This file can be found in the "Tutorials/1 - Basics" subfolder within your custom content folder.

Bones are an important tool you can use in Anime Studio to help make animation easier. If you think of drawings in Anime Studio (like the ones you made in previous tutorials) as soft rubber, then bones can be thought of as stiff wires inside the rubber that help you move and position objects. Bones are never displayed in a final rendering, they're just used as tools during the animation process.

Bones are not absolutely necessary for animation. They are very helpful for animating certain types of motion as we'll show in this and the next tutorial, but there are other ways to animate in Anime Studio as well. As you gain experience using Anime Studio, you'll learn when bones are appropriate and when they're not.

Importing an Object

Launch Anime Studio and open the project from the last tutorial.

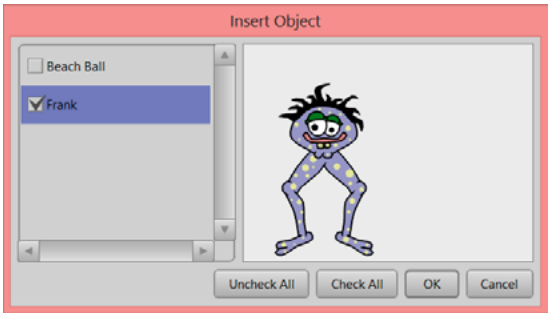


Starting point for this tutorial.

As you build a Anime Studio project, there are times you may want to re-use objects you created before. There's an easy way to do this, and we'll use it now to add a character to the project.

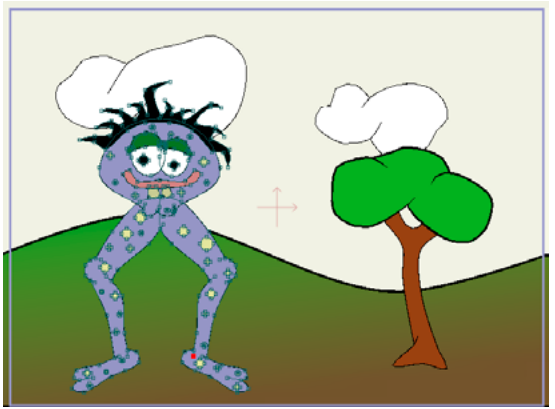
Select the **File > Import > Anime Studio Object**... command. In the file dialog that appears, navigate to your Anime Studio installation folder.

From your custom content folder, locate the Tutorials/1 – Basics folder and open the file "Tutorial Extras." A dialog will open asking you which object you want to use from this project:



Insert Object dialog.

Select the layer named "Frank" on the left side of the dialog. On the right side, you'll see a preview of Frank. Click OK. A new layer will be added to your project. This layer is a copy of the layer Frank from the "Tutorial Extras" project. Frank is fully drawn and filled in - you can see what the scene really looks like now by selecting **File > Preview**.

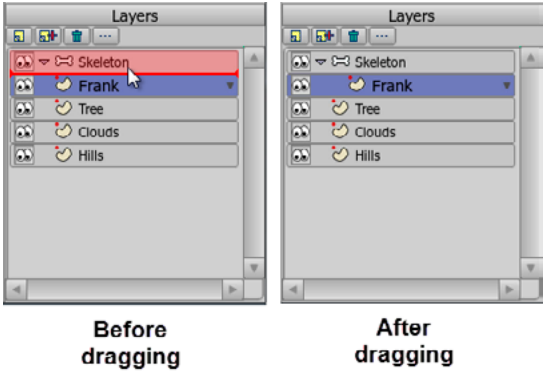


Frank added to the project.

Adding Bones

Lets give Frank some bones to make him easier to animate. In the Layers window, click the new layer button. In the popup menu that appears, choose "Bone". Rename this new layer "Skeleton."

Drag the Frank layer upwards "into" the Skeleton layer. **This step is very important - you will know that you're dragging the Frank layer to the correct place when the Skeleton layer becomes highlighted.** Finally, click the Skeleton layer to make sure it's active. When this is done, the Layer panel should look like this:

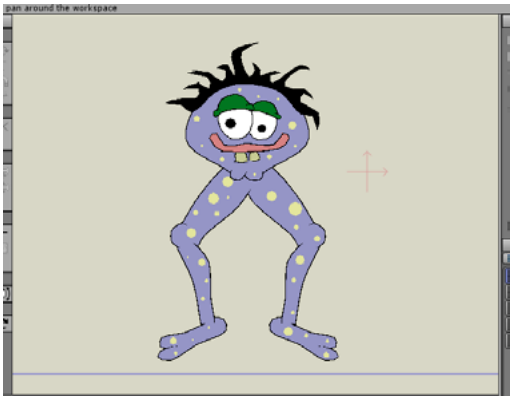


Frank inside a bone layer.

Make sure the layer "Skeleton" is selected in the Layer panel. While holding down the Alt key, click the eyeballs icon on the left side of the Skeleton layer to temporarily hide the other layers.

Select the Skeleton layer and hide the other layers.

Finally, use the Pan and Zoom tools to zoom in on the contents of this layer. Your window should now show something like this:

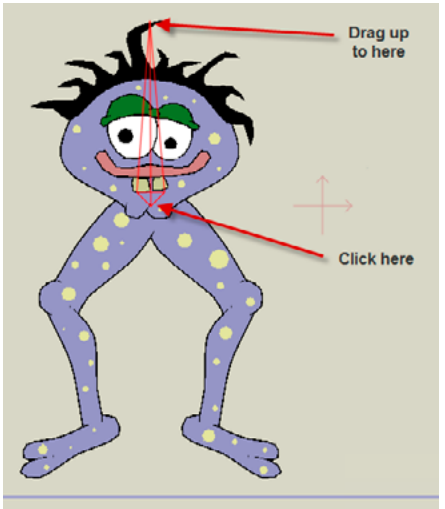


Zoomed in on Frank.

Add a bone to Frank by selecting the **Add Bone** tool and clicking and dragging upwards as shown below:

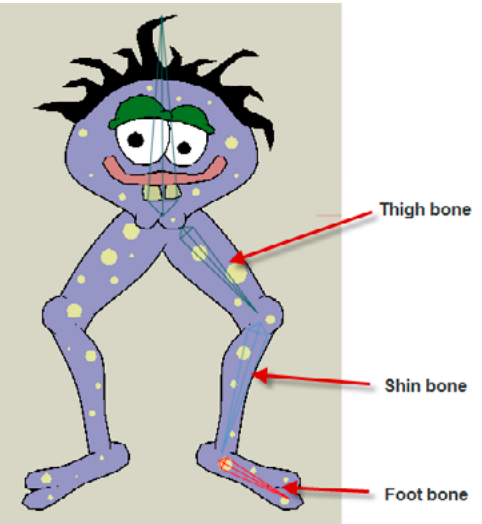
Add Bone Tool

This will be the main control bone - you could think of it as Frank's spine. It should look like this:



First bone added.

Click and drag out three more bones as shown below. It's important that you draw these three bones in order from top to bottom: thigh, shin, and foot.



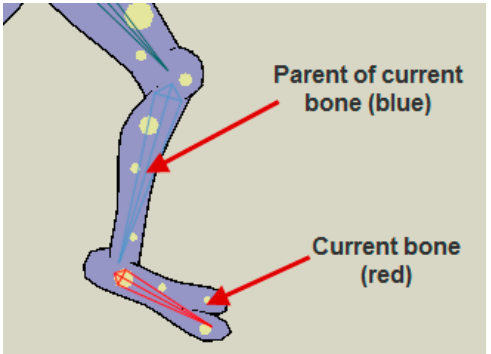
Right leg bones.

When a bone is selected, it is drawn in the highlighted color, red.

When you add a new bone, it becomes the "child" of the currently selected bone. The parent-child relationship for

bones means that the child can move around without affecting the parent, but if the parent moves, the child will move with it. This is why it was important to draw the previous three bones in order: the thigh bone's connected to the spine bone, the shin bone's connected to the thigh bone, and the foot bone's connected to the shin bone (at least in Frank's body).

When a bone is selected, it's displayed in red. Its parent also gets displayed differently: in blue. The parent is highlighted like this for your information - sometimes you may connect bones in the wrong order and looking for the blue parent bone can help determine where things went wrong.



A current bone and its parent.

OK, let's add bones to the other leg. But first, we need to select the spine again so that the second leg will also be attached to it. Use the **Select Bone** tool and click on the spine to select it.

Select Bone Tool

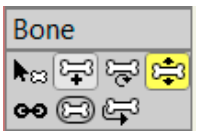
Next, use the **Add Bone** tool to add three bones to the other leg as shown below:

Add Bone Tool

Left leg bones.

Testing Bones

There's a bone tool that lets you test how your skeleton structure is working. Let's try that now. Select the **Manipulate Bones** tool and click and drag any of the bones you created. Try dragging several of the bones around to see what happens.



Manipulate Bones Tool

Moving Frank's legs.

Notice that Frank automatically moves with the bones. You may have also noticed that Franks looks quite "squishy" - when you move either of his legs, his head changes shape as well. The next step is to clean this up a bit by telling Anime Studio which parts of Frank should move with which bones.

The Manipulate Bones tool doesn't permanently move the bones. Click the **Select Bone** tool and all the bones will snap back into their original places.

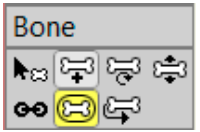
Select Bone Tool

Adjusting Bone Strength

When you use a bone layer to control a character, every bone in the skeleton has some influence on every part of the character. We saw that in Frank - when you move one of the legs, even the head moves a bit. This influence is strongest closest to each bone, so the head only moves a little bit, not as much as the leg itself.

We don't really want to see Frank's head move much at all when his legs move. Luckily, there's a way to control this: bone strength. Each bone has a "strength" value that controls how large its region of influence is. What we'll do next is adjust the strength of the bones that control Frank.

Select the **Bone Strength** tool and take a look at the bones.



Bone Strength Tool

Each bone has a semi-transparent region highlighted around it. (You also saw these regions when using the Manipulate Bones tool.) These regions show you the influence of each bone in the skeleton. A bone has the most influence inside its shaded region.

Regions of influence.

With the Bone Strength tool active, click and drag side-to-side on each of the bones in Frank's skeleton to adjust its strength. The goal here is to adjust the region of each bone so that it just encloses the corresponding section of Frank's body. For example, the region around the shin bone should just enclose the shin, and not much more. Don't worry about being too precise - pretty close is good enough. For Frank's head, don't make the bone region enclose the entire head - that would make the bone too strong. Adjust the bone strengths so that they look approximately like the following:

Adjusted bone strengths.

Testing Bones (Again)

Once you adjust bone strengths, it's a good idea to test the skeleton again to make sure everything works correctly. Pick the **Manipulate Bones** tool from the toolbar and click and drag on Frank's shin bones just above the ankle.

Manipulate Bones Tool

If everything was set up correctly, Frank should be able to move like this:

Bones in action.

Play around - move Frank's bones around into various positions and get a feel for manipulating the skeleton. "Tutorial 1.5: Animation" on page 42 will cover animation, and you'll learn how to make objects move around over time.

Tutorial 1.5: Animation

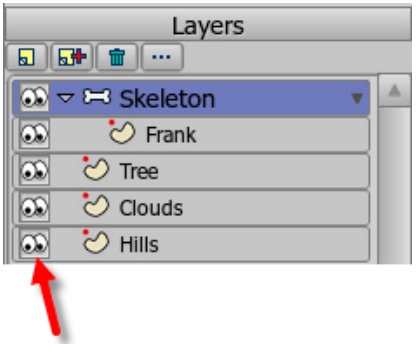
This tutorial continues on from the previous three, moving into the animation features of Anime Studio. You can either continue on with your project from the previous tutorial, or you can use a file that has been created for you - it's named "Tutorial 1.4" and it's located in the "Tutorials/1 - Basics" subfolder within your custom content folder.

There are three basic ways to animate objects in Anime Studio:

- animating an entire layer,
- using bones to animate parts of an object,
- animating the individual points on an object

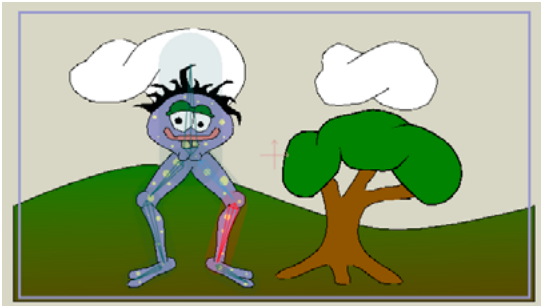
These three types can be combined to make very complex animations. This tutorial will walk you through all three types of animation.

Open your previous project (or the "Tutorial 1.4" file) in Anime Studio. Make sure all the layers are visible by clicking to turn on each layer in the Layers window.



Turn on all layers.

Your window should look something like this:



Starting point for this tutorial.

Layer Animation

Layer animation is the most simple way to make objects move around in a Anime Studio animation. It's limited in the way you can move the objects, but in some cases it's all you need. Layer animation moves an entire layer around as if it were painted on a pane of glass.

Click the Clouds layer in the Layers window to activate it. Next, set the current time to frame 72. This is done in the Timeline window. To set the time, scroll the timeline panel sideways (if necessary) until you see the number 72 in the ruler at the top. Click on the number 72 and the time marker will jump to that frame, as shown below:

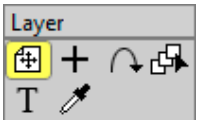
Time set to frame 72.

> **NOTE**: *If you do not see multiple channels in the timeline, you may have Anime Studio set to collapse them. Choose* **Edit > Preferences,** *and uncheck the "***Consolidate timeline channels***" option in the Options tab. This displays all animation channels in the timeline.*

In Anime Studio, an important concept is to learn the importance of frame zero. At the far left end of the timeline is a frame marked zero. When the time is set to zero, you are in Anime Studio's creation mode. For now, you should only draw, add bones, or create other objects at frame zero. When Anime Studio is at any other frame, you are animating the objects you have created. As you get more comfortable with Anime Studio, you can choose

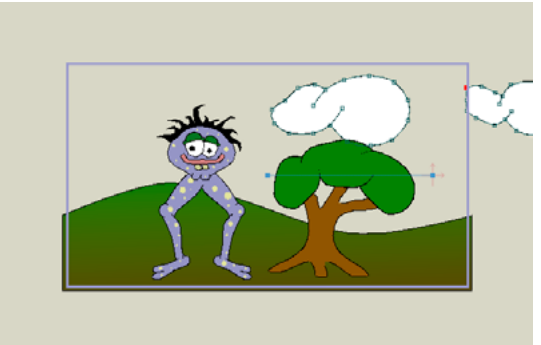
to draw objects at other frames, but for now it's best only to create new objects when the time is set to frame zero. You can switch back to frame zero at any time by pressing the rewind button, or by clicking on the number 0 in the timeline. For now, leave the time at frame 72.

Select the **Transform Layer** tool from the toolbar.



Transform Layer

Click and drag to the right in the working area to move the cloud layer to the right. You can press the Shift key, if desired, to constrain the movement to a straight line.:



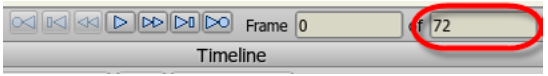
Moving the cloud layer.

Notice that a marker appeared in the timeline at frame 72. (You may have to scroll downwards to see the marker.) This marker represents a keyframe - a point in time at which the layer has been given a position. There are several animation channels displayed in the Timeline panel. This keyframe appeared in the Layer Translation channel, because that's what type of action you just performed - you translated (moved) a layer.

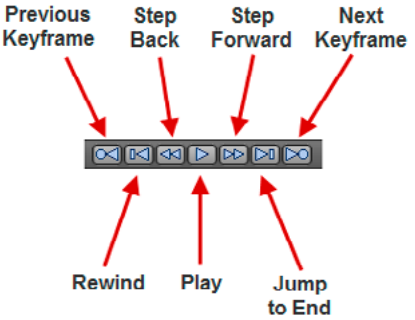
The new keyframe.

Try out the animation so far: press the play button at the bottom-left of the main window. The animation loops when it reaches the end (in this case frame 240). When you've seen enough, press the stop button.

If you prefer, you can shorten the length of the animation to 72 frames, so that it will loop back to the beginning once it reaches the last keyframe. Simply change the total number of frames to 72 as shown below.



Shorten the length of the animation to 72 frames, if desired.

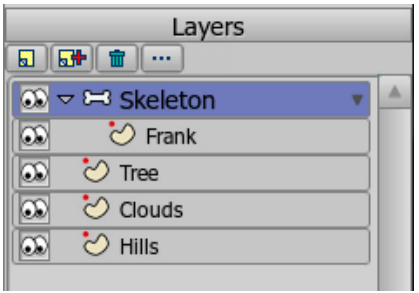


Playback controls.

Bone Animation

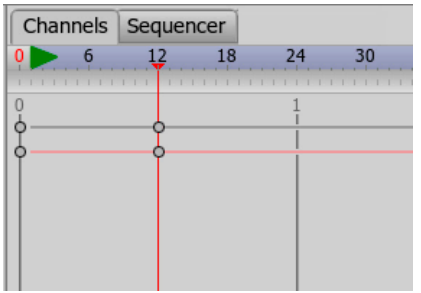
Bone animation uses skeleton structures to move an object around. You got a good feel for how bones work in the previous tutorial when you used the Manipulate Bones tool. When animating bones you use very similar tools.

Activate the Skeleton layer by clicking its entry in the Layer panel.



Activate the Skeleton layer.

Set the time to frame 12 by clicking the number 12 in the Timeline window. (You may have to scroll the Timeline window before you can see the number 12.)

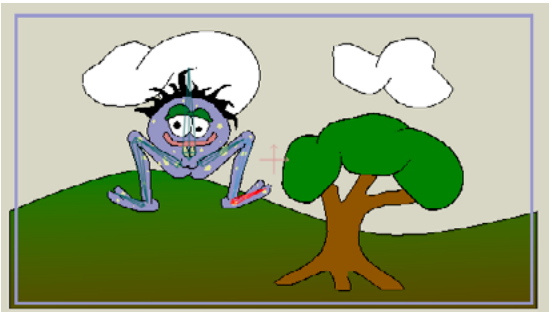


Set current frame to 12.

Now, pick the **Manipulate Bones** tool in the toolbar.

Manipulate Bones Tool

Click and drag the bones in Frank's legs until they are positioned as shown below:



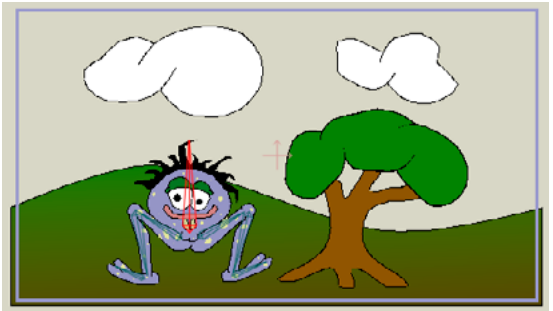
Move Frank's legs.

Note that the Manipulate Bones tool works differently at frame 12 than it did at frame 0 in the previous tutorial. At frame 0, this tool is used to test a bone system, and doesn't permanently modify the bones. However, when you are animating bones (at any frame other than 0), the bones do hold their new position.

Next, pick the **Transform Bone** tool. Click on Frank's spine bone and drag it downwards a bit:

To transform the bone, drag from the bottom control point on the bone. For more information about the control points in the Transform Bone tool, see **"Transform Bone" on page 68 in your Anime Studio Users Manual.**

Transform Bone Tool

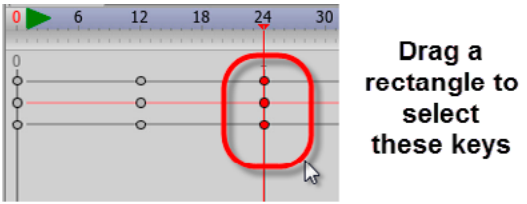


Lower Frank's entire body.

Next, set the time to frame 24 and choose the **Bone > Reset All Bones** menu command. Press the play button to watch your animation, and press stop when you're done.

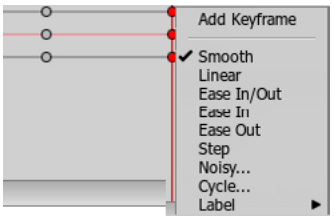
When you played back the animation, you probably noticed that after frame 24, Frank doesn't move any more. You could add more keyframes by setting the time to some later frame and moving Frank's bones some more, but let's try out Anime Studio's animation looping feature.

In the timeline, you should see a group of keyframes at frame 24. These keys represent bone movement (the spine bone moving up and down) and bone rotation (the bending legs). Drag a rectangle around these four keyframes to select them:



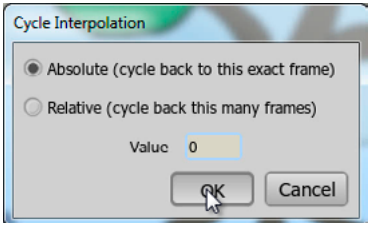
Select bone keyframes at frame 24.

Next, right-click on one of these selected keys. A popup menu will appear. Select "Cycle..." from the popup menu.



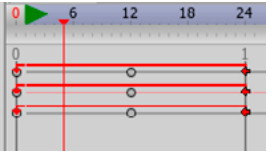
Select Cycle

What you're telling Anime Studio is that you want these keys to cycle back to an earlier point in the timeline. A dialog will appear asking you what frame to cycle back to - enter the settings shown below. You're telling Anime Studio that on this keyframe, the bone movement should cycle back to frame 0.



Cycle settings.

Click OK and press the play button to see the difference. An animation channel with cycling turned on will repeat its animation over and over indefinitely. Typically this would be used for some kind of background element, not a foreground character like Frank, but it's a great time saver. In the timeline you can see an indication of the cycling in the bone channels:

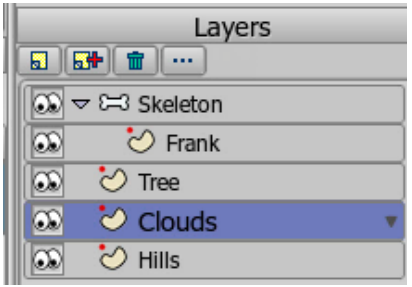


Cycling indicated in the timeline.

Point Animation

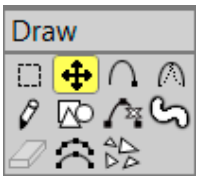
Using point animation, you drag around individual points (or groups of points) on an object. In theory, you could animate the same types of motion as with bone animation - bones just save you a lot of work. Point animation is more typically used when you want to change the shape of some object.

Click the Clouds layer in the Layer panel to activate it.



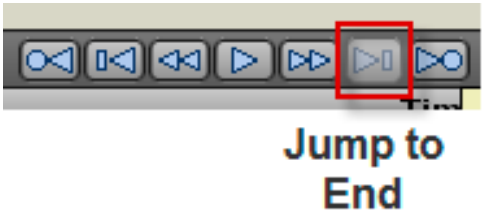
Activate the Clouds layer.

Pick the **Transform Points** tool from the toolbar.



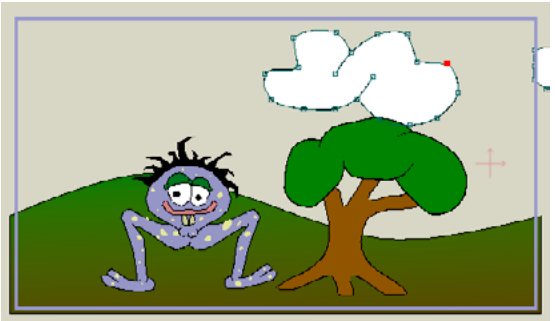
Transform Points

Press the enter key on your keyboard to make sure no points are selected. Finally, click the Jump to End button to jump to the end of the animation.



Jump to End button.

Click and drag individual points on the clouds in small amounts, just to reshape the clouds a bit. This will cause the clouds to change their shapes slightly from the beginning of the animation to frame 72.



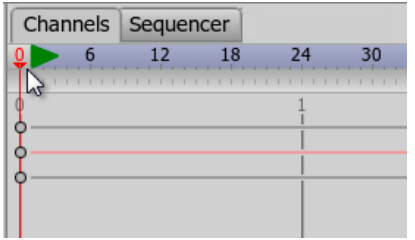
Point animation.

Use the play and stop buttons to see the result.

Importing Animation

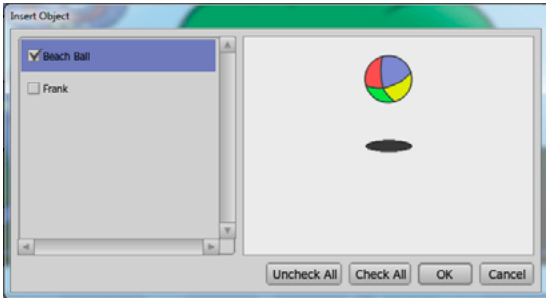
Remember how the Frank layer was imported into the project in the previous tutorial? Well, imported layers can also contain animation.

First, return to Frame 0 in your animation.



Return to frame 0.

Select **File > Import > Anime Studio Object**.... When prompted, locate the/Tutorials/1-Basics folder (in your custom content folder), and open the file "Tutorial Extras."In the dialog that pops up, select the Beach Ball layer and click OK.

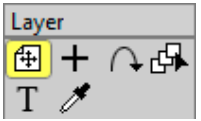


Import the beach ball.

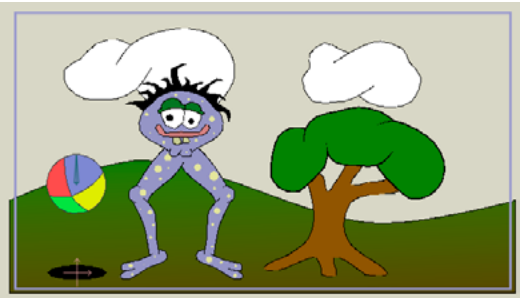
A bouncing beach ball will appear in your project. Press the play button to watch it go. It bounces all right, but it's not really in the right position.

Switch back to frame zero (press the rewind button in the timeline) to set the ball's initial position.

Using the **Transform Layer** tool, drag the beach ball to a better location.

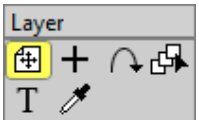


Transform Layer

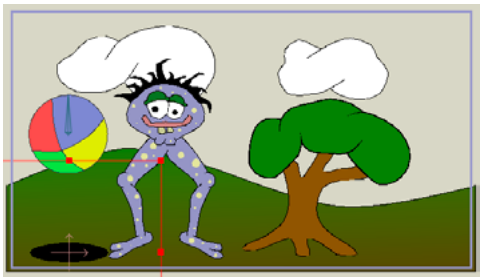


Repositioned beach ball.

You can also use the **Transform Layer** tool to resize the ball. (Drag one of the corner handles of the scale control box to resize the beach ball the same amount in width and height.) Press the Play button to view the final animation.



Transform Layer



Play the final animation.

You now have a pretty good grasp of how to draw, fill, set up bones, and animate in Anime Studio. Feel free to jump right in and start working with Anime Studio. Or, you can read more tutorials that dig deeper into specific topics.

Quick Start

Drawing

Tutorial 2.1: Welding

As you learned in the Quick Start tutorials, Anime Studio features an Auto Weld feature that automatically welds shapes and segments together when your cursor reaches a point that you can weld to. However, there are cases where you may want to manually weld points together.

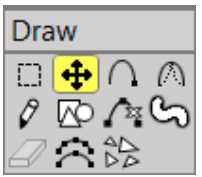
When drawing in Anime Studio's vector layers, the concept of "welding" points is very important. These tutorials will show you examples of how (and why) points can be welded, and will go on to show you some examples of good and bad welds you can do in Anime Studio.

When you weld two points together in Anime Studio, Anime Studio really is combining those two points into one. There are a couple reasons to do this: First, welding the two endpoints of a curve together creates a closed curve. Second, if two shapes join up at a particular point, and you want them to remain joined during an animation, then welding those points together will guarantee that those two shapes will remain joined.

How to Weld Points

There are two ways to weld points in Anime Studio: manually and automatically.

To manually weld two points together with the **Transform Points** tool, first uncheck the Auto-weld option for the tool.

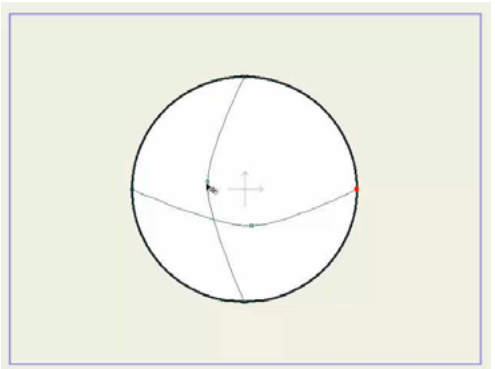


Transform Points

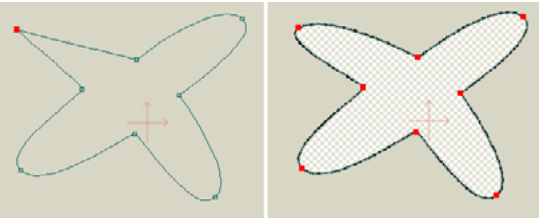
Auto-weld option unchecked

Drag one point on top of the other and press the spacebar. Here's an example of this method. Although you can't see the keyboard in the example, keep in mind that the spacebar was pressed at the moment when the two

points overlap. After welding, notice how the two points move as one.



Welding Example 1. (Click to play movie)



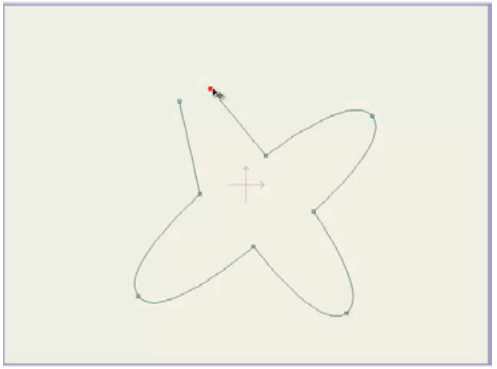
Before spacebar is pressed (left). After spacebar is pressed (right)

The second method of welding is automatic. For automatic welding to work, be sure that the **Auto-weld** checkbox is turned on in the tool options area when the Transform Points tool is active:

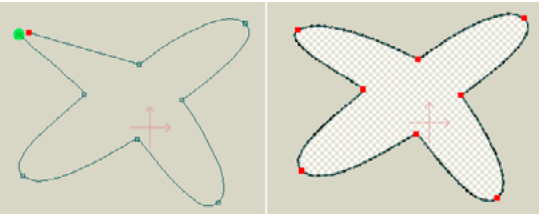
Make sure Auto-weld is on

Using this method, when you drag a curve endpoint on top of another point , the point turns green when it can be welded automatically. Let go of the mouse to automatically weld the points together.

Here's an example of automatic welding. In this case, the spacebar was not pressed to initiate the weld - as soon as the mouse is released, the two overlapping points are automatically welded together.

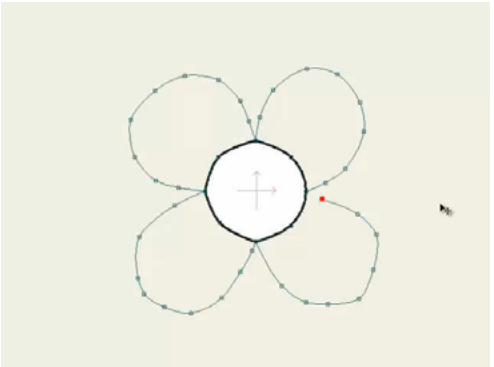


Welding Example 2. (Click to play movie)



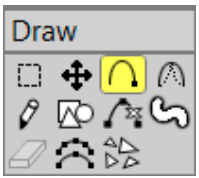
Automatic welding

Here's another example of automatic welding. Remember that only a curve endpoint can be automatically welded. However, the point that it is welded to does not need to be an endpoint:



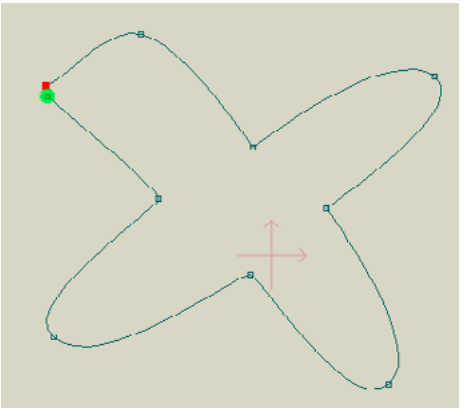
Welding Example 3. (Click to play movie)

Automatic welding also works with the **Add Point** tool.



Add Point

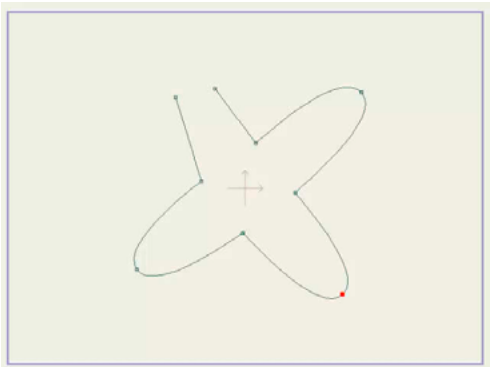
When you add a new point, you can drag it around as if you were using the Transform Points tool. As long as the new point you added is a curve endpoint, it can be automatically welded to another point. If the new point is not an endpoint, you can still weld it to another point manually by pressing the spacebar when it overlaps another point.



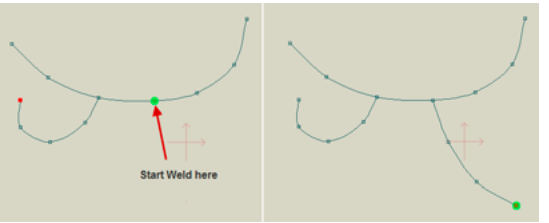
Add Point tool with Auto-weld option on

Besides welding two points together, Anime Studio can weld a point to the middle of a curve segment. This can

be done with either the automatic or manual welding methods. Here's an example:



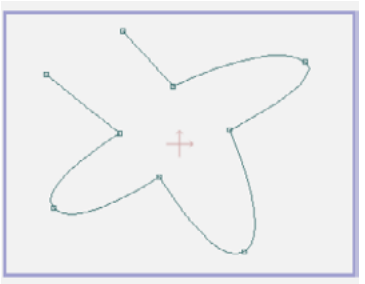
Welding Example 4. (Click to play movie)



Welding to a curve segment

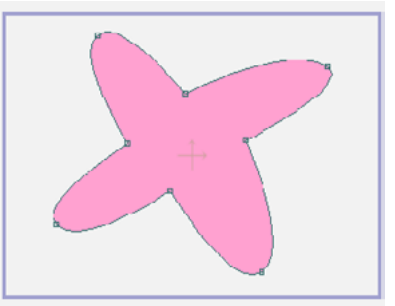
Why to Weld Points

OK, so that covers welding points, but why do you want to weld points again? The main reason is to create fillable shapes. In order to fill a shape with color, that shape should be completely closed, either by overlapping lines or by shapes that are welded together so that there are no gaps in the shape that you want to fill.



A non-closed shape

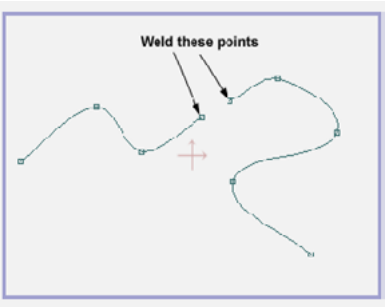
By welding the two endpoints together, we can create a closed shape that can then be filled:



A closed shape that can be filled

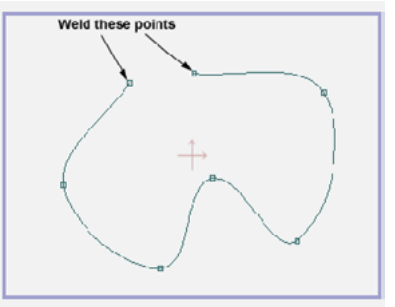
Examples of Good Welding

Let's look at some examples of good welding choices. First, the following two points could be welded to create a single, continuous curve:



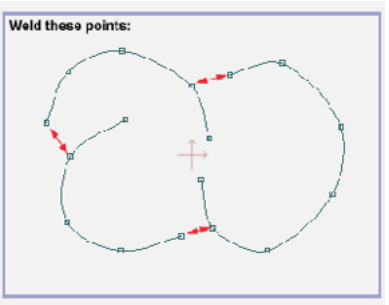
Joining two curves

The next case shows the classic case of welding a curve closed to create a fillable shape:

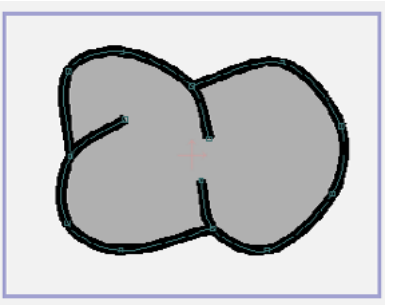


Closing a curve

Next, we show a shape made up of several curves. Notice that a closed, fillable shape does not need to be made up of a single curve. The shape below, after welding, is made up of three curve segments, but is still closed and can be filled with color:



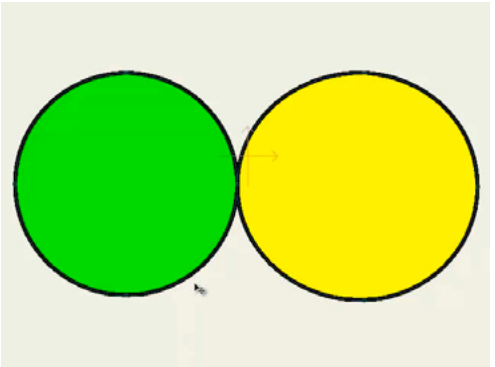
Joining multiple curves into a single closed shape



The welded and filled shape

Finally, the example below shows two circles lined up side-by-side. The two side points of the circles have been welded together so that when they move around during an animation they remain joined. If those points were not welded, moving them in sync like this would require a lot of extra work.

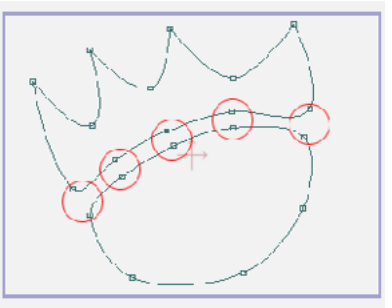
To maintain the separate colors in the two circles, Auto Fill is turned off before welding the two circles together at a common point.



Joined Circles. (Click to play movie)

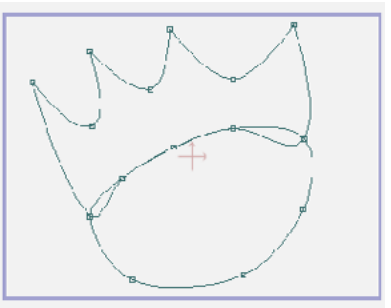
Examples of Bad Welding

Typically, when you weld together two points, one of them should be a curve endpoint. This isn't always true, but most often it is. If you find yourself welding together two points and neither is an endpoint, take a moment to think whether the weld is appropriate. Here's an example of a bad choice of welding. Suppose you had the following two shapes and you were considering welding the pairs of circled points:

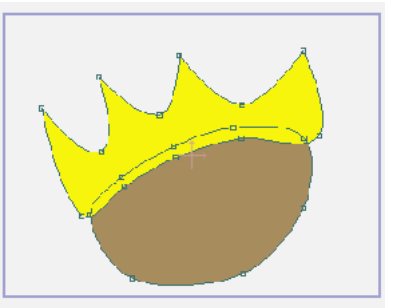


Before welding the marked points

Although Anime Studio will let you perform those welds, it isn't really a good idea. What you would end up creating is a shape with lots of little holes in it. Along the section of curves that you welded together are little bubbles that make it impossible to fill the two main shapes:

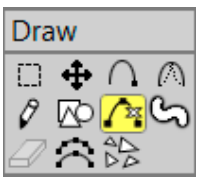


Bad welding



Fill the shapes without welding them together

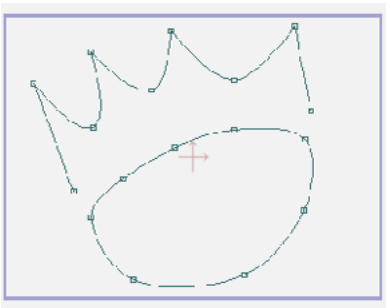
Instead, a better approach is to just move the two shapes closer together without any welding at all. In this case, welding the two shapes together doesn't have any benefit.



Delete Edge

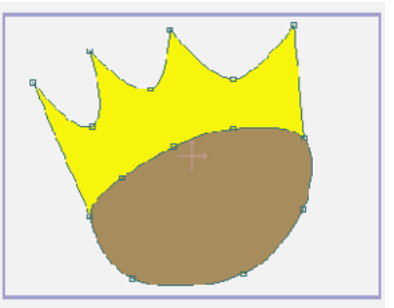
Another approach in this situation would be to cut the top shape apart with the **Delete Edge** tool and then weld the

remaining endpoints to the lower shape. First, cut the top shape apart:



Cut the redundant curve away

Then, weld the newly-created endpoints onto the lower shape. With this approach you don't end up with a double curve all welded together. The resulting shape is much cleaner and easier to work with:



Weld the new endpoints

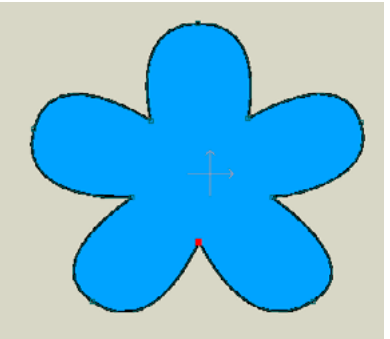
Tutorial 2.2: Drawing Shapes with Holes

Drawing shapes with holes is very easy in Anime Studio, but many new users don't realize that this can be done. There's really no trick at all - just follow the basic rules for creating a fill.

Reminder of Fill Rules

Create Shape Tool

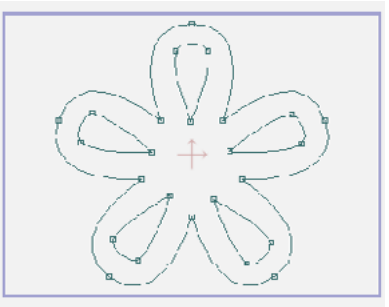
As a reminder, let's consider the rules for creating a fill shape: A fill must be composed of closed curves that define the border of the shape. So, as an example, below is a valid fill shape.



A basic fill shape

Creating Holes

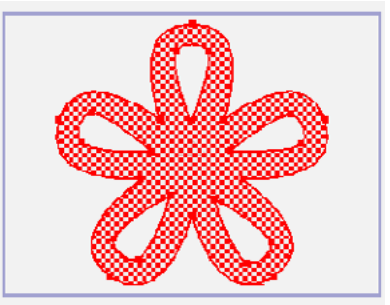
So a fill shape is defined by the curves on its border. If we want to create a hole, then all we need to do is create curves that outline the shape of the desired hole(s). Below we've added some extra curves before creating a fill shape:



New curves added

Create Shape Tool

Once you've set up curves to define the shape of the hole, all you need to do is select the outline and the hole(s) using the **Create Shape** tool. Notice that Anime Studio automatically identifies the inner curves as borders of holes in the shape. There's nothing in particular you have to do, just draw the holes and Anime Studio will know what to do with them. When you've selected all the correct points, press the spacebar to finalize the shape.



Selected points for filling

Finally, here is the resulting shape. (The Line Width tool was used to narrow the width of the outline at the corner points.)

The finished shape

Another shape with a hole

Here's another example of a shape with a hole:

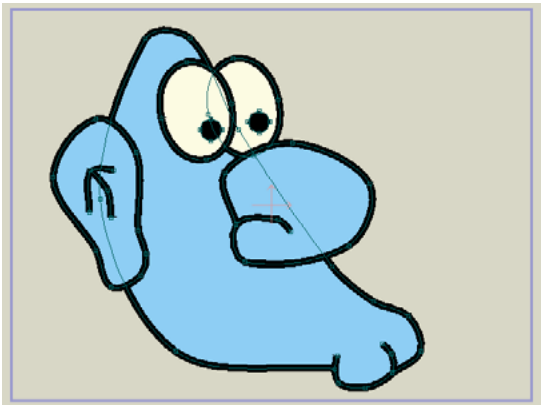
Tutorial 2.3: Hidden Edges

When drawing more complex objects like faces, you will often run into situations where you want an outline to only go **partway** around a shape. There's an easy way to accomplish this in Anime Studio.

Start With a Sample File

For this tutorial, we'll start with a project file that's almost finished. It's named **Tutorial 2.3** and it's located in the

Tutorials > 2 - Draw subfolder within your custom content folder. Open this file in Anime Studio and you should see something like this:



Starting point for this tutorial

Hidden Edges

The drawing we're working with could be the beginning of a character's face. In this face, the nose and ear are separate shapes from the main head outline. The general shape looks OK, but where the separate parts join up we don't want to have lines separating them. To fix this, activate the **Hide Edge** tool.

Hide Edge Tool

There are two edges we want to eliminate from this drawing. Click on these two edges as shown below. If you don't see an immediate result, try dragging the mouse across the lines in question to make sure you hit them.

Edges to click on

After clicking on these edges, they should disappear from view, and the result should be as follows:

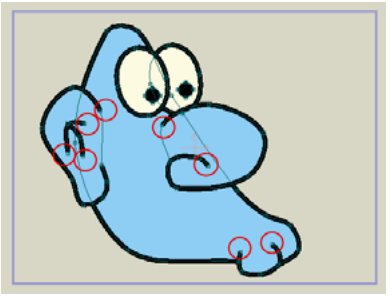
After hiding the edges

The Hide Edge tool works by simply hiding the selected edges of an outline. It does not affect the underlying curve - the curve is still there, you just can't see the outline on that particular section of the curve. Because it works on the outline, and not the curve itself, be sure you only use the Hide Edge tool **after** you've created the outlines. Otherwise, with no outline, you would not see the result of hiding some edges.

The other thing to know about the Hide Edge tool is that you can also un-hide edges. If you change your mind, or hide the wrong edges, just click on a hidden edge to re-show it.

Finishing Touches

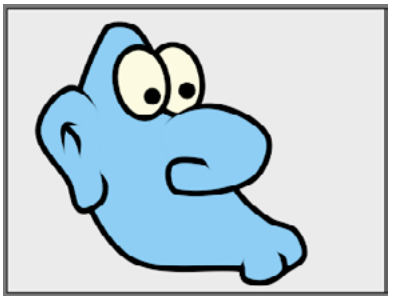
If you hide the edges of a thicker line, you'll often end up with abrupt ends to the outline. You can see this below:



Blocky curve ends

Line Width Tool

A nice way to finish off these endpoints is to use the **Line Width** tool. With this tool, click on the endpoints to set their width to 0. You can also click and drag to adjust the width of any other points you choose. After cleaning up the endpoints, you should get a result like this:



Tapered endpoints

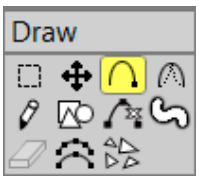
Tutorial 2.4: Varying Line Widths

Anime Studio allows you to change the width of a stroke at any point along the curve. Line width information is stored as a percentage value, rather than as an absolute value.

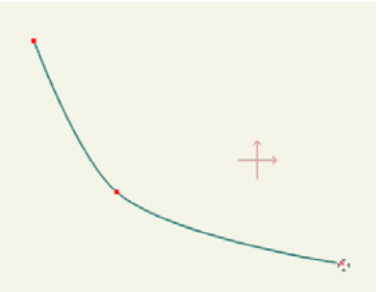
You can use varying line widths to create outlined shapes that maintain consistency when they are bent and animated.

Start With a New Project

Create a new project. In the Style window, select a color that you want to use for the outline color. Set the width of the stroke to around 100. Use the **Add Point** tool to draw a three-point curve. Bend the curve slightly, like an arm.



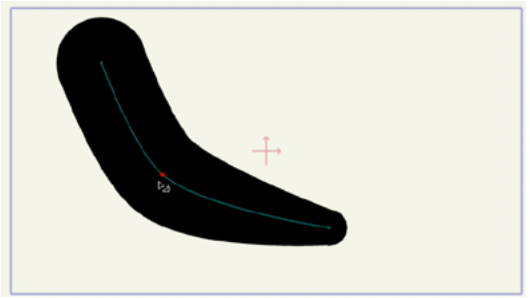
Add Point



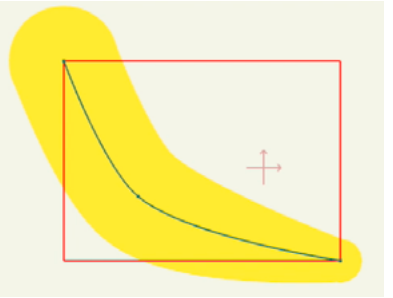
A simple three-point curve bent like an arm

Then use the **Variable Line Width** tool to increase or decrease the width at the points until you have a shape resembling an arm. Your arm should look similar to the figure shown below.

Line Width Tool



The curve reshaped to look like an arm

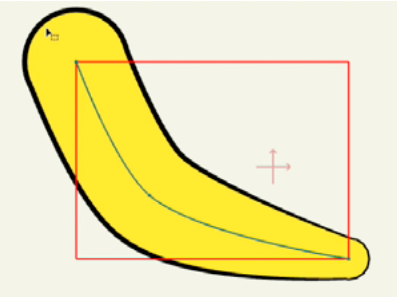


Change the color of the top stroke

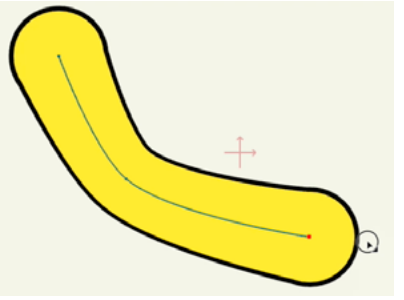
Select the curve and copy it into your clipboard (**Command/Ctrl+C**). Then paste another copy directly on top of the existing curve (**Command/Ctrl+V**).

Now you have two strokes that are superimposed directly on top of each other. You can use the top stroke as a fill, but you'll need to make some adjustments. With the second stroke selected, change the **stroke color** for the second stroke to the color that you want to use for the **fill** of the arm (such as yellow, shown here).

Reduce the width of the top stroke to a value between 90 and 95 (depending on how thick you want your "outline" to be). Your project should now look similar to the figure shown below.



The curve reshaped to look like an arm



Line width and transformation changes made on the points or curves affect both strokes at the same time.

Remember that in this method, you are not working with a stroke and a fill. Instead, you are working with two strokes of different colors that are controlled by the same curve.

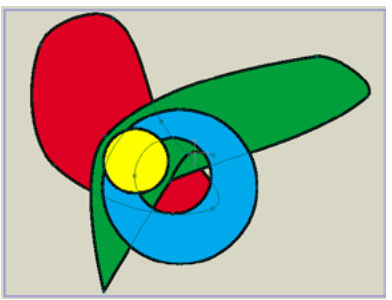
Now you can use the variable line width tool to adjust the width of both strokes at the same time, or make other transformations with the Transform Points tool to reshape or animate both curves at the same time. This allows you to quickly create character elements, such as arms or legs, which are easier to animate because they have fewer points to manipulate.

Tutorial 2.5: Shape Ordering

In an Anime Studio vector layer, shapes are ordered from back to front. This ordering determines which shapes will appear in front of or behind others. This tutorial will show you how to work with shape ordering.

Start With a Sample File

For this tutorial, we'll start with a project file that's almost finished. It's named **Tutorial 2.4** and it's located in the **Tutorials > 2 - Draw** subfolder within your custom content folder. Open this file in Anime Studio, and you should see something like this:



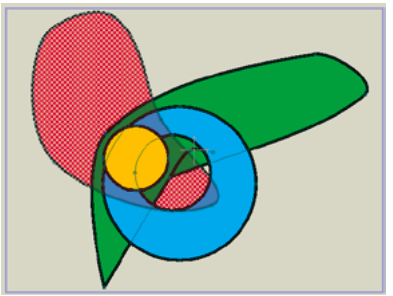
Starting point for this tutorial

As you can see, there are four shapes in this file. By the way they overlap one another, you can also tell their ordering. From back to front, there is a red shape, a green shape, a blue shape, and a yellow circle.

Raising and Lowering Shapes

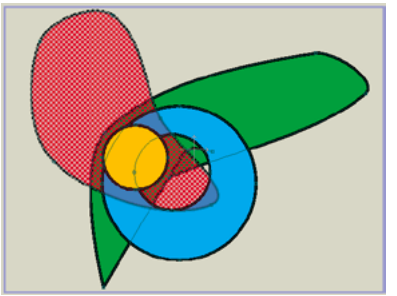
Select Shape Tool

If you want to change the order of some shapes, the first thing you need to do is select a shape to work with. Using the **Select Shape** tool, click anywhere on the red shape. It will become highlighted with a checkerboard to indicate that it is selected. Notice that you can also see it faintly beneath the other shapes - this is so that you can see the entire selected shape, even if it is normally obscured by other shapes.



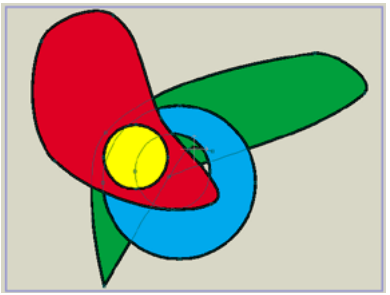
Selected shape highlighted

To raise the shape, press the Up arrow key on your keyboard. Notice that the red shape has now moved one step up in the layer order, above the green shape:



Raised shape

Right now, press the enter key to de-select all objects in the layer. The red shape will switch back to normal to indicate that it is not selected:

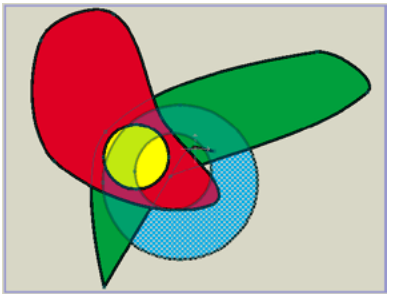


De-select the shape

Next, use the **Select Shape** tool and click on the blue shape to select it.

Select Shape Tool

Press the Down-arrow key twice to lower the blue shape below the red shape, and then below the green shape:



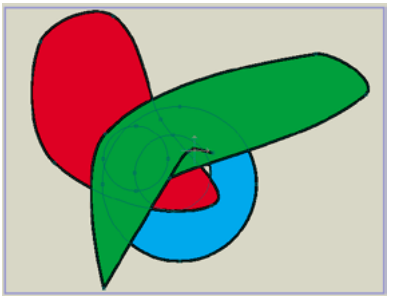
Lowered blue shape

You can also raise a shape to the top (above all others in that layer) or lower it to the bottom (behind all others in that layer). Select the green shape and hold down the **Shift** key while pressing the Up-arrow key. With a single key press, the green shape moves all the way to the top of the layer's shape order.

Selecting Hidden Shapes

If you now press the enter key, the green shape will be de-selected. Notice that at this point the yellow circle is behind the green shape, and can't be seen. You can still see the

curves that make up the yellow circle, but the shape itself, being behind the green shape, is not visible:

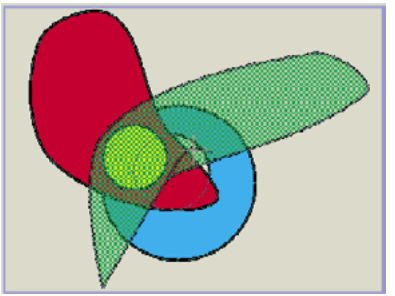


Hidden yellow circle

Now we want to bring the yellow circle back to the front. Using the **Select Shape** tool, click on the yellow circle, even though it's hidden.

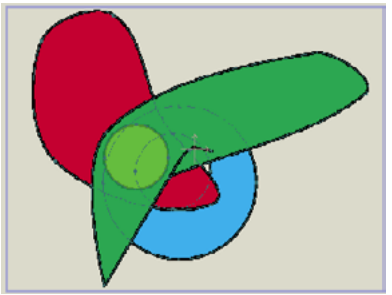
Select Shape Tool

As you may have expected, the green shape gets selected because it is in front:

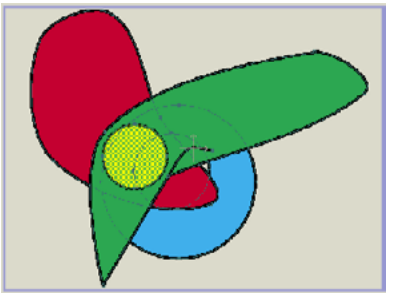


Selected green shape

Now comes the trick for selecting shapes lower in the ordering. Hold down the **Ctrl** key (Windows) or **Cmd** key (Mac) while pressing the down-arrow key. This tells Anime Studio to pick the next deeper shape in the layer ordering at the same point you just clicked. The yellow circle will now be selected. It will be kind of faint to remind you that it is actually behind other shapes in the layer:



Selected yellow circle



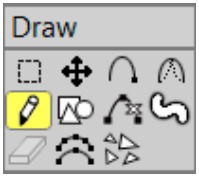
Raised yellow circle

Finally, hold down the **Shift** key while pressing the up-arrow to bring the yellow circle all the way to the top of the layer ordering, making it fully visible once again:

Tutorial 2.6: Brushes

Anime Studio allows you to apply brush effects to outlines if you choose. It's really easy to use brushes, and this tutorial will show you how.

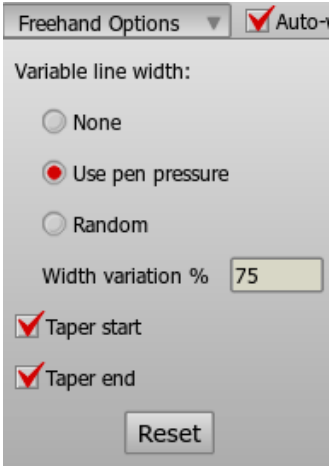
Draw Some Freehand Curves



Freehand

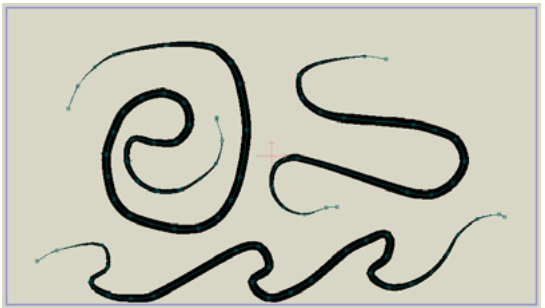
Start with a new, blank file in Anime Studio. In the Style window, set the line width value to 16. Next, activate the **Freehand** tool. In the tool options area at the top of the main Anime Studio window, adjust the settings for the Freehand tool to match those shown below:

- **Variable Line Width**: Use Pen Pressure
- **Width Variation:** 75%
- **Taper Start**: Checked
- **Taper End**: Checked



Freehand settings

Draw two or three curvy lines using the Freehand tool in the editing view:



Freehand curves

Because of the line width set in the Style window, these curves should be rather thick. The tapering settings in the Freehand options should make the ends of these lines taper down to narrow points. If you select **File > Preview** now, the result should look pretty much like what you see in the editing view:

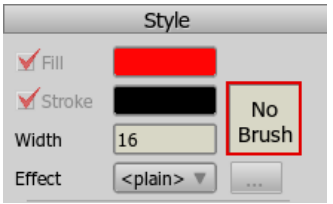
Rendered curves

Close the rendering window, and use the **Select Shape** tool to select one of the curves:

Select Shape Tool

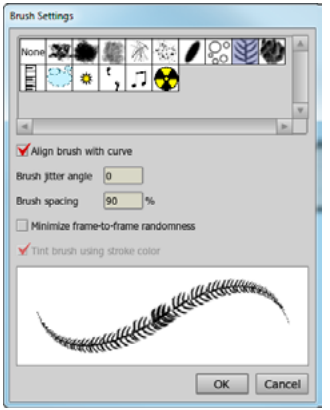
Selected curve

In the Style window, click on the box that currently says **No Brush**.



No Brush

In the brush dialog that appears, select one of the brush shapes that interests you - you'll see a preview of the brush at the bottom of the dialog:



Brush Dialog

Click OK to close the brush dialog, and select **File > Preview** again. In the rendered result you can see the applied brush shape:

Rendered curves

Different brush shapes

Try applying other brush shapes and Stroke colors to the other curves:

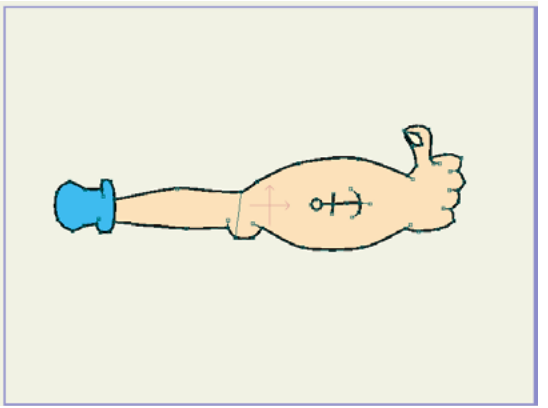
Bones

Tutorial 3.1: Bone Binding

The purpose of bones in Anime Studio is to provide high-level objects that are easy to manipulate in place of moving around lots of individual points. In order for bones to do their job, vector control points and other objects must first be bound to the bones. There are three ways to bind objects to bones: automatic binding, manual binding, and layer binding. This tutorial will show you the difference between the three.

Start With a Sample File

For this tutorial, we'll start with a project file that contains some artwork to get started with. It's named **Tutorial 3.1** and it's located in the **Tutorials > 3 - Bones** subfolder within your custom content folder. Open this file in Anime Studio, and you should see something like this:

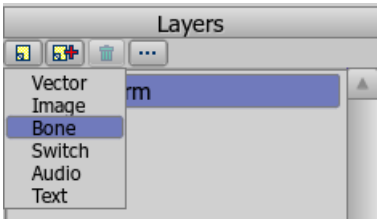


Starting point for this tutorial

Automatic Binding

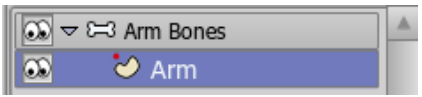
The most common method of binding objects to bones is also the easiest - automatic bone binding. Whenever you draw new artwork in Anime Studio (or import image files as image layers), those objects are set up for automatic bone binding. All you need to do is add the bones.

1. In the Layers window, click the New Layer button, and select **Bone** from the popup menu.



Create a new Bone layer

2. Double-click the new bone layer to bring up the Layer Settings dialog. Name the new layer **Arm Bones** and click **OK**. Finally, drag the **Arm** vector layer upward to move it into the bone layer:

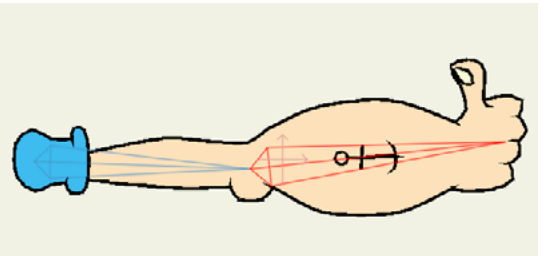


Arm layer placed inside a bone layer

Make sure the bone layer is selected, then activate the **Add Bone** tool.

Add Bone Tool

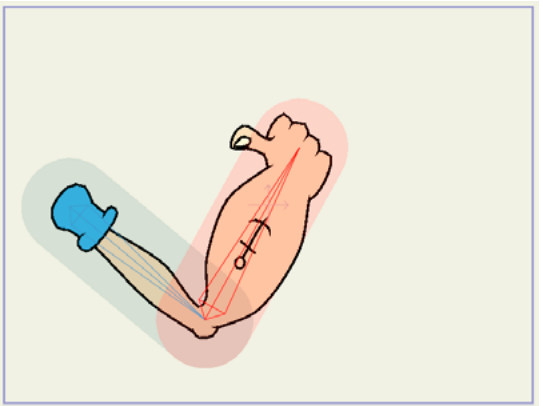
In the main editing view, create two bones: the first one starting at the shoulder and ending at the elbow, and the second starting where the first left off and ending in the hand. And that's all it takes for automatic bone binding.



Create two new bones

Use the **Manipulate Bones** tool to try moving the bones around. The arm will move with the bones automatically, since it was, well, automatically bound to them.

Manipulate Bones Tool



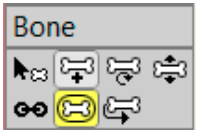
Test moving the bones

This arm setup works pretty well as it is, but let's try to refine it a bit. Double-click the bone layer to bring up the Layer Settings dialog. Go to the Bones tab, set the binding mode to **Region binding**, and click OK:

Turn on region binding

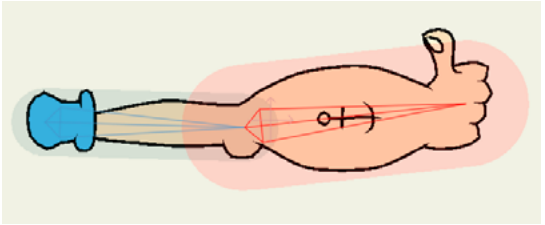
Flexible binding (the default for new bone layers) uses a method of bone binding where every bone has some influence over every point in a vector layer. The farther away a point is from a bone, the less influence that bone has over the point. However, you can still experience some rubbery movement where a moving arm can cause a toe to twitch a little bit.

With region binding, on the other hand, every bone has a cutoff radius, outside of which it will not affect the movement of vector points. This can be used for cleaner movement, but requires a little extra setup. Now that region binding is in effect, activate the **Bone Strength** tool.



Bone Strength Tool

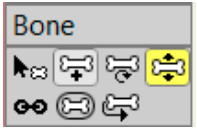
Around each bone you will see its region of influence. Vector points are controlled by the bone(s) whose regions overlap them. If a vector point is not within any region of influence, it will move with the closest bone. Using the Bone Strength tool, click and drag on each of the bones to resize its region of influence. The idea is to make the regions just large enough to contain the body part that the bone is meant to control:



Resized regions of influence

Don't worry about the parts of the forearm that are outside the forearm bone's region of influence - they will just move with the closest bone, which is in fact the forearm.

Use the **Manipulate Bones** tool again to try moving the arm. The movement should be a little cleaner than it was with flexible binding.



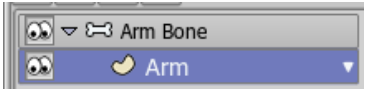
Manipulate Bones Tool

Manual Binding

Manually binding points to bones is a process that exists mostly for compatibility with older versions of Anime Studio. Automatic binding, combined with bone regions of influence is the easiest way to work with bones in Anime Studio. However, there may be some times where you want more control over exactly which bones control which points.

To manually bind the arm points to bones:

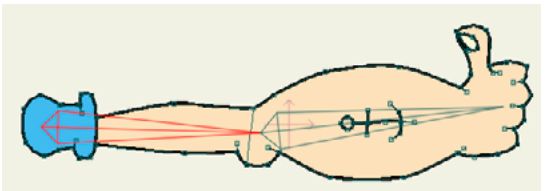
1. Select the Arm vector layer.



Arm Vector Layer

2. Use the **Select Bone** tool to select the upper arm bone:

Select Bone Tool

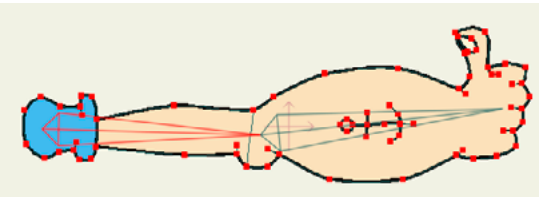


Select the upper arm

3. Activate the **Bind Points** tool.

Bind Points Tool

4. Drag a rectangle around all the points in the arm to select them, and press the spacebar to bind the selected points to the selected bone:

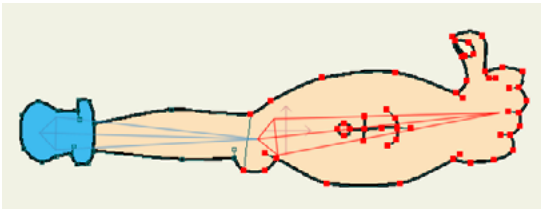


Bind all points to the upper arm

5. With the Bind Points tool still active, hold down the **Alt** key and click on the lower arm bone to select it. Notice the following:

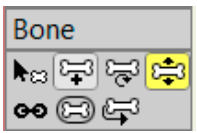
   - When you select the lower arm bone, notice that no points are selected.
   - When you select a bone with the Bind Points tool, the points that are bound to that bone are also selected. Because there are currently no points bound to the lower arm bone, no points are selected.

6. Drag a selection rectangle around the points in the lower part of the arm, as shown below. Press the spacebar to bind the selected points to the selected bone:



Select the lower arm bones

You're done - you have manually bound points to both bones in the arm. Now test it out with the **Manipulate Bones** tool.



Manipulate Bones Tool

Although this method does work for binding points to bones, we don't really recommend it unless you have a special need to bind specific points to specific bones. You may have noticed that the arm doesn't move so smoothly with manual point binding. This is because the points around the elbow only move with one bone or the other, and so stretch apart and get distorted. With automatic binding, on the other hand, the points around the elbow move under the influence of both bones, and so move more smoothly.

Manual point binding can also be very labor-intensive, especially when your artwork has lots of control points. Finally, automatic bone binding can be used to warp image layers, while manual binding can't - another reason to stick with automatic bone binding (using either flexible or region binding mode).

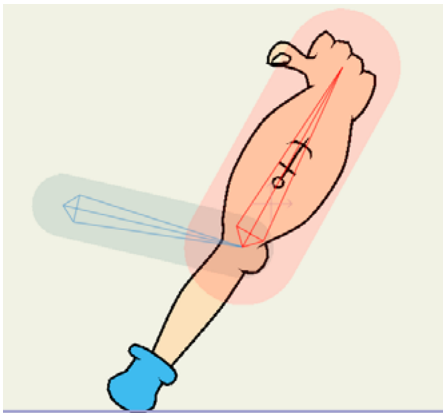
Layer Binding

The last way to bind an object to a bone is to bind an entire layer to a single arm.

Make sure the Arm vector layer is still selected and activate the **Bind Layer** tool.

Bind Layer Tool

7. Click on the lower arm bone to bind the entire Arm layer to the lower arm bone.



Bind the Arm layer to the lower arm bone

8. Select the Arm Bone layer and use the **Manipulate Bones** tool to try moving the bones around. Notice that the entire arm moves rigidly with the lower arm bone - the entire layer is bound to that one bone.

Manipulate Bones Tool

This isn't very useful for this particular arm, but binding a layer to a bone is useful when you want to attach an object to a character. For example, a switch group containing multiple mouth shapes can be attached to a bone in the head. Or, if you want to make a character hold an object in its hand, you might bind that object to the character's hand bone.

Go Back to Automatic Mode

Let's undo all of this extra binding and go back to automatic mode.

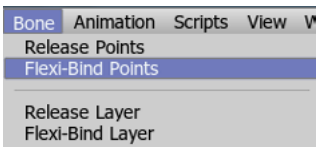
1. Reselect the Arm layer in the Layers window.

2. With the **Bind Layer** tool, click on some empty space in the editing view - this tells Anime Studio to not bind the layer to any bone.

Bind Layer Tool

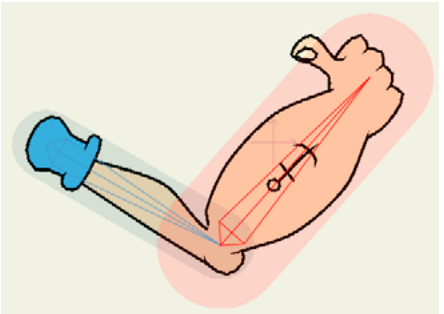
3. Select the **Edit > Select All** menu command to select all the vector points.

4. Choose the **Bone > Flexi-Bind Points** menu command to flexibly bind the points, as they were at the very beginning.

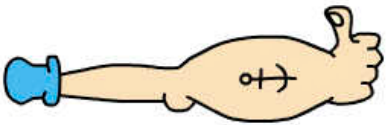


5. Chose Bone > Flexi-Bind Points to flexibly bind points as originally set in the beginning.

6. Reselect the Arm Bone layer, and use the Manipulate Bones tool if you wish to confirm that the points are automatically bound again.



The arm under bone control.



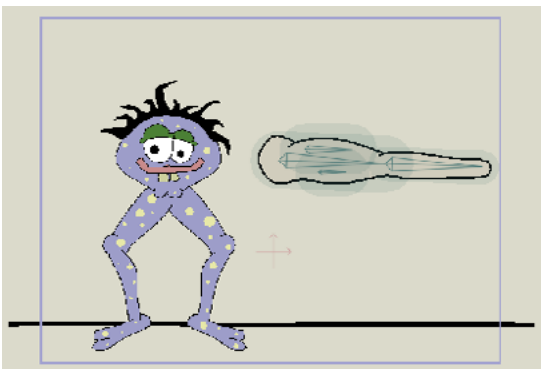
Tutorial 3.1 Result. (Click to play movie)

Tutorial 3.2: Bone Constraints

This tutorial demonstrates Anime Studio's bone constraint features. Bone constraints allow you to define limits on the way bones can move, simplifying your animation work. When used carefully, bone constraints can let the bone structures do some of the work for you.

Start With a Sample File

For this tutorial, we'll start with a project file that's almost finished. It's named **Tutorial 3.2** and it's located in the **Tutorials > 3 - Bones** subfolder within your custom content folder. Open this file in Anime Studio, and you should see something like this:



Starting point for this tutorial

This file contains two skeleton layers that have no constraints set up. We're going to add constraints to these skeletons to show how useful they can be.

Bones

Angle Constraints

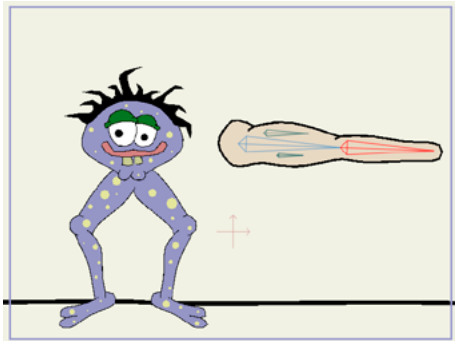
The first type of bone constraint is angle limits. By limiting the angle that a bone can rotate, you can prevent arms and legs from bending backwards.

Make sure the Arm layer is selected.

Select the Arm bone

7. Use the **Select Bone** tool to select the bone in the Arm as shown below:

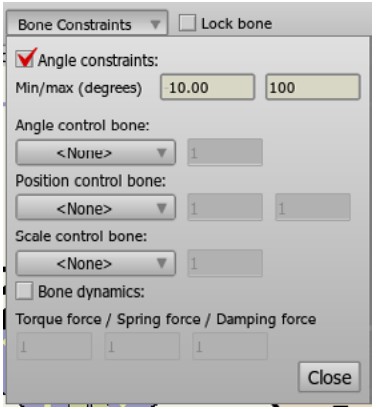
Select Bone Tool



Select the lower arm bone.

8. When the Select Bone tool is active and a bone is selected, the Bone Constraints popup box will be available in the tool options area of the main Anime Studio window. Click the Bone Constraints popup to open it.

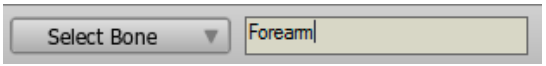
9. Adjust the settings as shown below. Specifically, turn on the **Angle constraints** checkbox, and set the min/max angle fields to -10 and 100.



Set angle constraints

10. Click the Close button to close the constraints popup box.

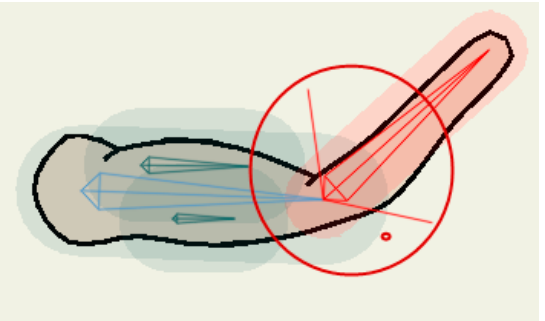
11. Set the bone's name to **Forearm** in the toolbar options.



Name this bone **Forearm**

12. Once you've set up angle constraints, you can see them in the working area as two lines around the bone that indicate the minimum and maximum angles the bone is allowed to rotate between. Try using the **Manipulate Bones** tool and move the forearm - notice how Anime Studio doesn't allow you to move the bone beyond the minimum and maximum angles you set up.

Manipulate Bones Tool



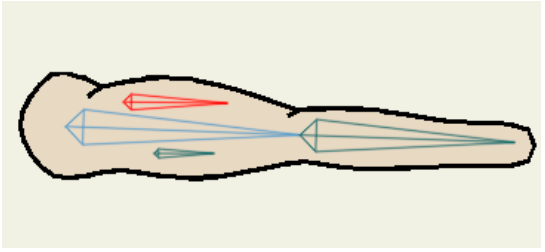
Visual display of angle constraints

Here's a handy little trick. Often, it can be hard to judge the correct numerical angles for bone constraints. There's an easy way to adjust them if you have a mouse with a scroll wheel. Hold the mouse over the angle constraint you wish to change (in the Bone Constraints popup), and roll the mouse wheel up and down. The angle will change, and the display in the editing view will update to match. With this method, you can watch the display in the editing view and not worry so much about the actual numerical value.

Control Bones

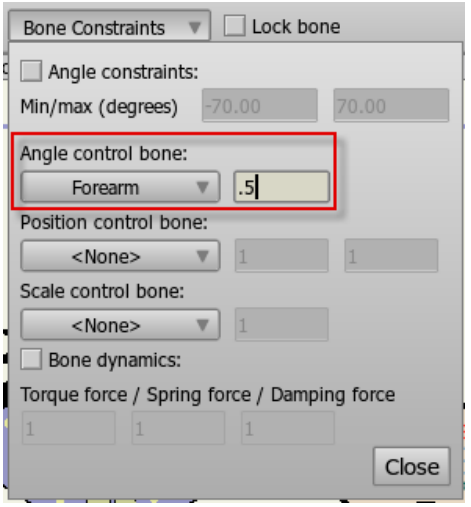
The next type of bone constraint allows one bone to control the motion of another. This is a way to set up simple automatic animation.

Use the Select Bone tool to elect the small bone above the upper arm:



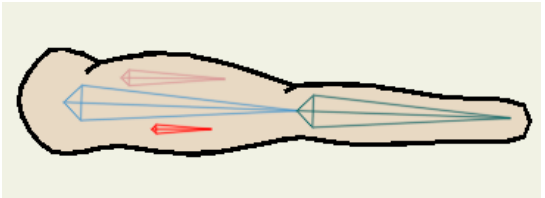
Upper forearm bone selected.

13. Bring up the Bone Constraints popup again, and select **Forearm** from the **Angle control bone** popup menu (this is why we named it earlier), and enter the value 0.5 in the angle control field as shown below:

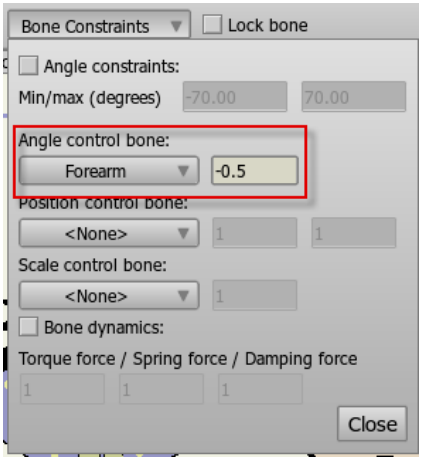


Angle control setup

14. We'll do something similar for the small bone below the upper arm. Select that bone, and set **Forearm** as the angle control bone, but this time set the angle control value to -0.5.

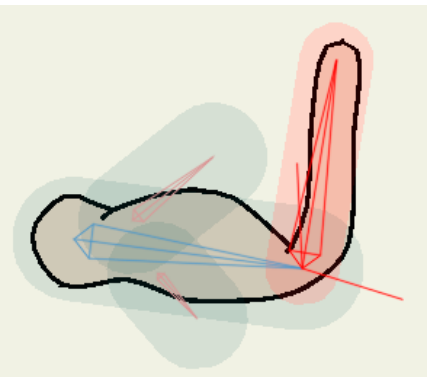


Lower forearm bone selected.



15. Finally, use the **Manipulate Bones** tool again to move the forearm. Notice that now the muscles in the upper arm move automatically - this is what the Angle Control Bone does - it tells other bones to move automatically when it moves.

Manipulate Bones Tool



Upper Arm bones move automatically

Bone Locking

The third category of bone constraint is **bone locking**. When you lock a bone, you're telling Anime Studio that you don't want it to move. Anime Studio will try to keep the bone still by moving its parents as necessary to keep the bone in place. This isn't always possible (depending on what else is happening in the animation), but it is still an extremely useful feature.

Bone locking is often used to keep a character's feet from moving around on the ground. To do this, Anime Studio needs to move the character's legs automatically. Thus, it helps to use angle constraints to keep the knees from bending backwards.

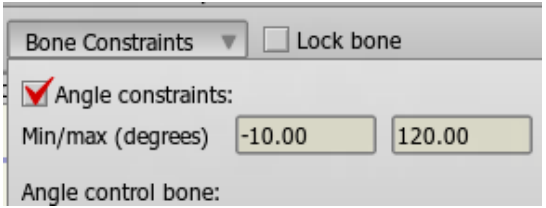
1. Select the Frank w/Skeleton layer in the Layers window.

Select the Frank w/Skeleton layer.

2. Use the Select Bone tool to select Frank's left shin bone as shown:

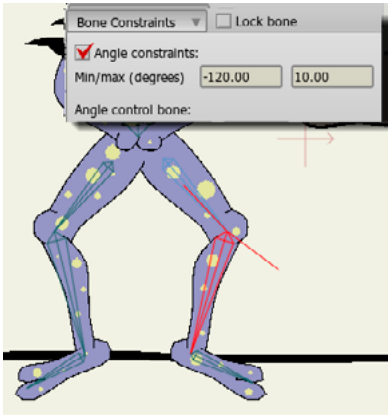
Select the left shin

3. Now set up angle constraints for this bone. The minimum angle should be -10, and the maximum should be 120:



Angle constraints for left shin

4. Now select the right shin, and set its angle constraints to -120 and 10.



Angle constraints for right shin

5. Now that the legs are prepared, set the time to frame 24. Use the **Transform Bone** tool to drag Frank's spine bone around a small distance. Notice that his feet move around and don't stay in place.

Transform Bone Tool

6. Choose the Select Bone tool again. Go back to frame 0 and select the left foot bone:

Select the left foot

7. In the tool options area, turn on the **Lock bone** checkbox for this bone. Next, select the right foot bone and turn on **Lock bone** for it as well.

Lock both foot bones

8. Now that the feet are locked, go back to frame 24, and use the **Transform Bone** tool again to drag Frank's spine around.

Transform Bone Tool

9. Notice that now Anime Studio tries to keep Frank's feet locked to the ground. If you lift Frank too high, his legs will completely straighten out and his feet will lift from the ground - there's really no helping that, the same thing would happen to you if you were lifted off the

ground. You can try rotating the spine bone too and see how the skeleton reacts.

Locked feet

Bone locking is an animated parameter. You can turn on and off bone locking as many times as you want during an animation. This is especially useful when making a character walk - lock a bone as soon as a foot hits the ground, and unlock it just before the foot is to leave the ground for its next step.

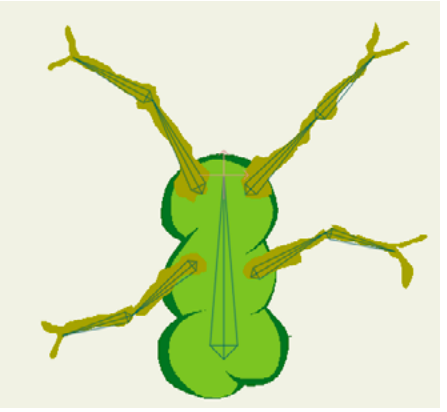
Tutorial 3.3: Bone Dynamics

Anime Studio's bone dynamics system can be used to automatically move bones around in response to higher-level movement. Anime Studio uses a physical simulation of springs to calculate dynamic bone movement, making it suitable for a wide range of movements, such as flabby body parts, bouncy hair, waving arms, etc.

Start With a Sample File

For this tutorial, we'll start with a project file that's almost finished. It's named **Tutorial 3.3** and it's located in the **Tutorials > 3 - Bones** subfolder within your custom content folder.

1. Open the Tutorial 3.3 file in Anime Studio. You should see something like this:



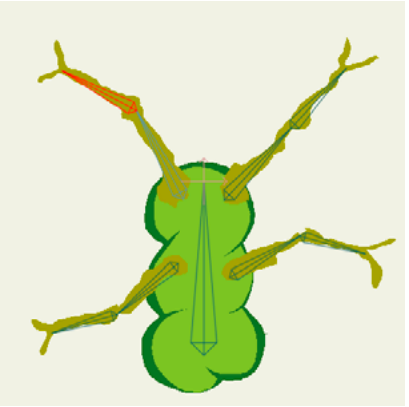
Starting point for this tutorial

2. Play back the animation to see what we're starting with. The entire structure will tilt side to side and bounce up and down, remaining rigid the whole time. Only the vertical bone in the center of the skeleton is animated - all the others move with it because they are its descendants. Rewind the animation to frame 0 when you've seen enough.

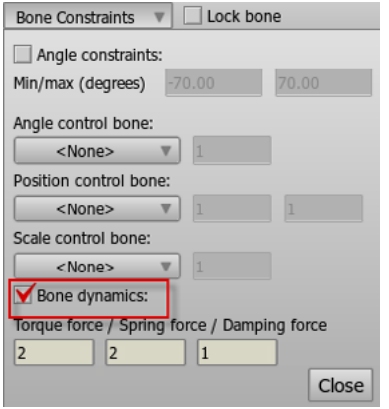
3. Use the **Select Bone** tool to select the top-left bone in the structure as shown below:

Select Bone Tool

Bones



Select this bone

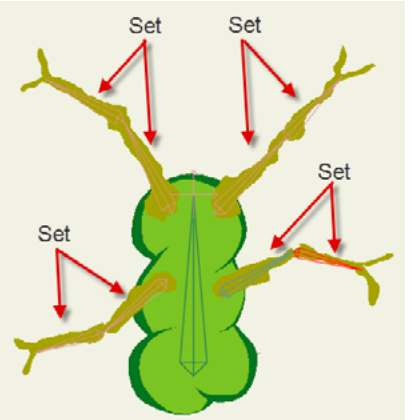


Turn on bone dynamics

4. In the tool options area at the top of the main Anime Studio window, click the **Bone constraints** popup box to open it. In the popup box, turn on the **Bone dynamics** check box. This tells Anime Studio to move the selected bone automatically according to the spring simulation.

5. Select seven more bones (two in each of the arms), and turn on bone dynamics for each one.

Here's a tip: you can leave the **Bone constraints** *popup box open the whole time, just click on each bone in turn, then turn on bone dynamics for each one. If the* **Bone constraints** *popup box covers up some of the bones, you can pan the editing view by dragging with the right mouse button to expose the hidden bones. At this point, you should have turned on bone dynamics for every bone in the structure except the vertical center bone.*



All eight leg bones set

Play back the animation to see the difference. Now as the structure tilts side to side, the arms will bounce around in response to the movement of the center bone.

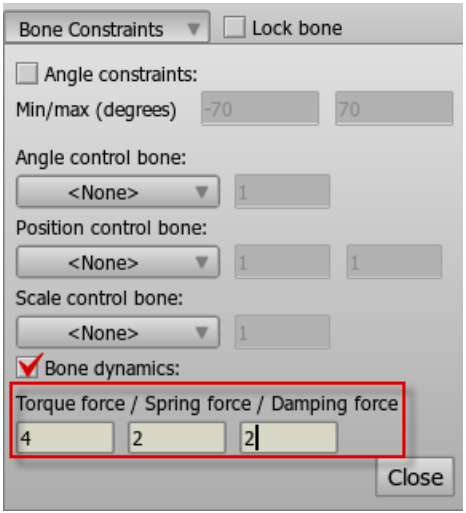
Adjusting Spring Parameters

So that shows the basics of how to use bone dynamics. Now let's take a look at how you can make adjustments to the bounciness of the springs.

Select the top-left bone again, and re-open the **Bone constraints** popup box.

1. Below the **Bone dynamics** checkbox are three parameters that allow you to fine-tune the effect. Set as follows:

    - Torque force to 4,
    - Spring force to 2
    - Damping force to 2

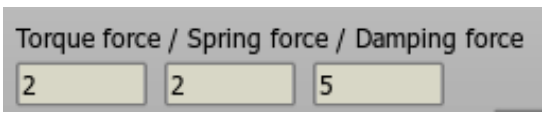


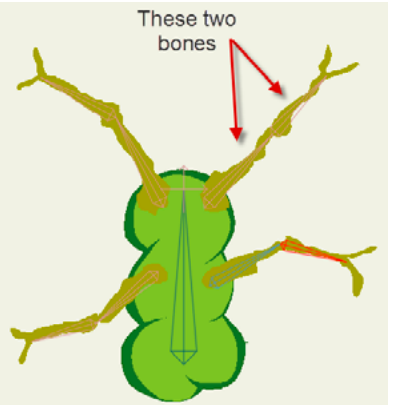
Adjusting dynamics parameters for both bones in the top left arm

2. Select the bone's immediate parent (the second bone in the top-left arm), and apply the same dynamics parameters.

A higher Torque force means that a bone moves more in response to its parent's movement, Spring force determines how quickly it bounces back, and Damping force controls how quickly a dynamic bone stops moving (you can think of damping like friction). In this case, a high torque force means that the bone will move more strongly.

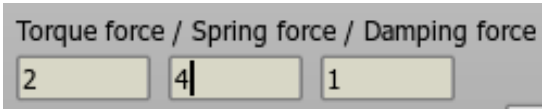
3. Next, select the two bones of the top-right arm (one at a time), and set the bone dynamics parameters to 2, 2, 5 (Torque, Spring, Damping). These settings will cause these bones to slow down their dynamic movement quickly - a high damping value is like making the bone move through a thick fluid.

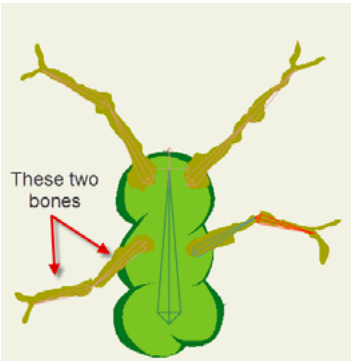




Set a high damping force on these bones

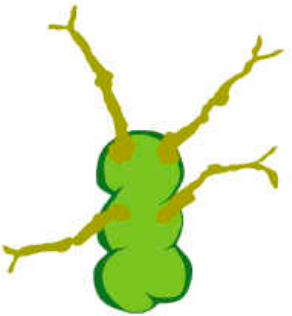
4. Finally, select the two bones of the bottom-left arm (one at a time), and set the bone dynamics parameters to 2, 4, 1 (Torque, Spring, Damping). The high spring force will cause this arm to bounce back very quickly.





Set a high spring force on these bones

5. Try playing back the animation again. As you watch the final animation, note the differences between the four arms. The top-left arm swings in a wide arc because it has a strong response to the parent bone's movement. The top-right arm's movement is subdued because the damping force causes it to slow down more quickly. The bottom-left arm is very springy, and the bottom-right arm moves in accordance with the default bone dynamics settings.



Tutorial 3.3 Result. (Click to play movie)

Tutorial 3.4: Character Setup

In this tutorial, you will learn how to set up the bone system for a complex character. This will involve splitting a character apart, creating bones, adjusting bone strength, and putting the character back together.

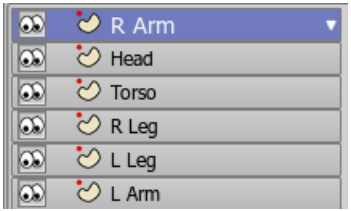
Start With a Sample File and Split Apart the Character

For this tutorial, we'll start with a project file that already has the artwork for the character drawn - you'll just set up the bones. It's named **Tutorial 3.4** and it's located in the **Tutorials > 3 - Bones** subfolder within your custom content folder.

To begin:

1. Open the Tutorials > 3 - Bones > Tutorial 3.4 file in Anime Studio. There are six vector layers in this project, containing the body parts for this character. Although all the artwork could be drawn in one vector layer, it is often easier to draw a character in multiple layers, arranging the body parts from back to front, as shown below:

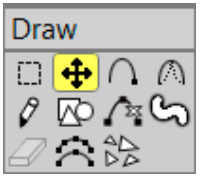
Starting point for this tutorial



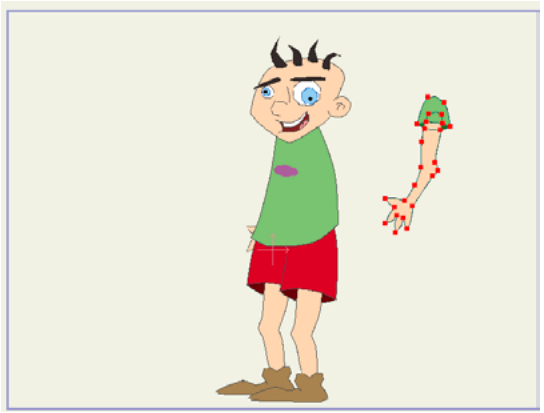
Starting point for this tutorial

2. In order to make bone setup easier, the first thing to do is split apart the character. Choose the **Edit > Select All** menu command. All the points in the right arm (your right, his left) should be selected.

3. Activate the **Transform Points** tool and drag the mouse to move the arm off to the side and up a bit:



Transform Points

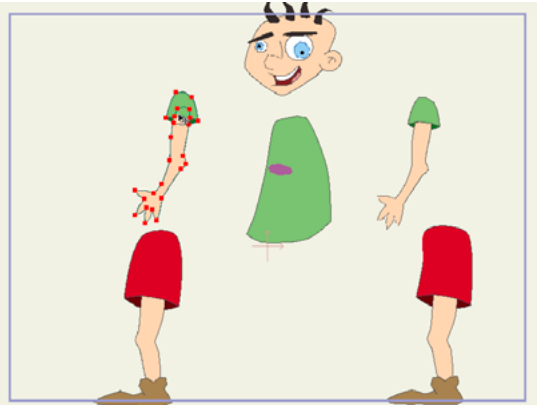


Arm moved off to the side

4. Select the Head layer, and select all of its points with the **Edit > Select All** command. Move all of its points upward.

5. Repeat the process for the **R Leg**, **L Leg**, and **L Arm** layers of the character (skip the **Torso** layer). Select all points on each of those layers, and move the body parts away from the center, as shown below:

The reason we split apart the character is so that we can add bones to each part, while keeping the bones independent of each other. Later in the tutorial we'll put the character back together again.



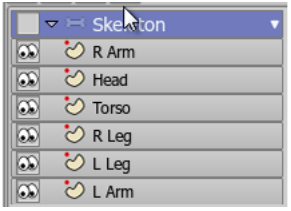
Body parts split apart

Bones

Add Bones

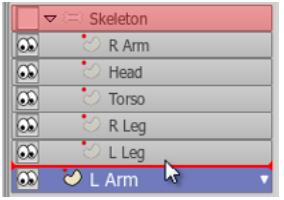
The next step is to add bones.

Add a new Bone layer to the project. Name the new Bone layer **Skeleton**. Move the new Bone layer to the top of the list if necessary.



Create a new Skeleton bone layer and move it to the top.

1. Move all the vector layers into the new Skeleton layer, keeping the same order they are in now:

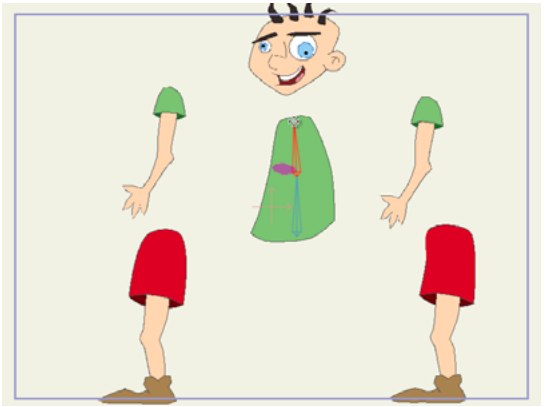


Move all of the body part layers into the Skeleton bone layer.

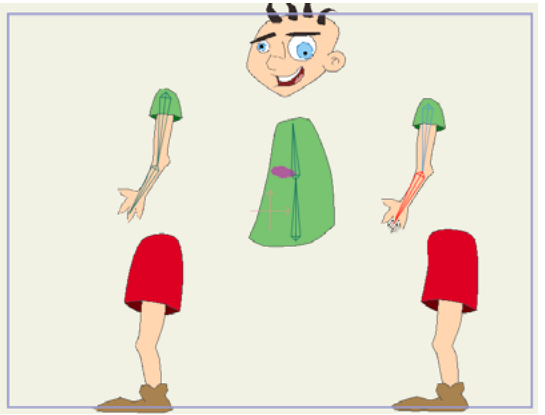
2. Double-click the Skeleton bone layer to open the Layer Settings palette. Switch to the Bones tab, and choose the **Region Binding** mode,

3. Using the **Add Bone** tool, add two bones going up through the torso, starting with the bottom one:

Add Bone Tool



Two new bones

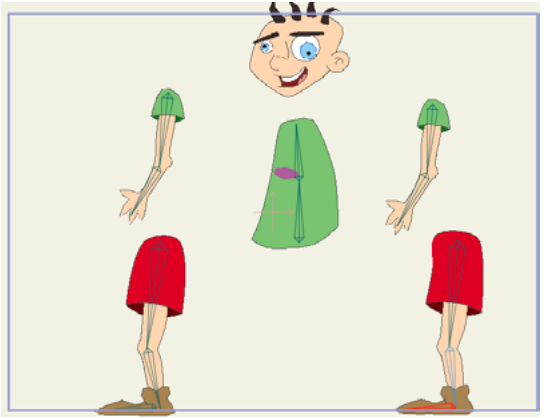


Arm bones added

4. Next, add two bones to one of the arms, starting at the shoulder and going down.

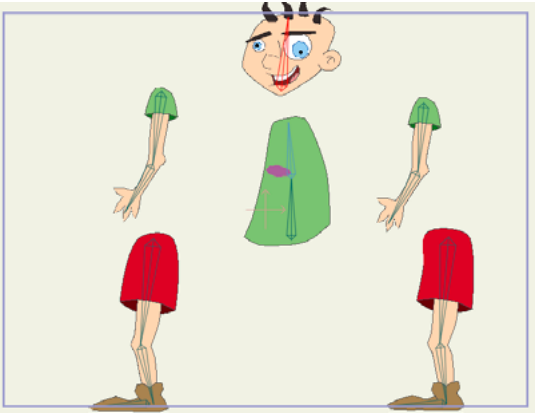
5. Before you add bones to the second arm, use the **Select Bone** tool to reselect the upper torso bone. Then switch back to the **Add Bone** tool to add two bones to the other arm. This parents the second arm to the upper torso bone instead of continuing from the first arm.

6. Use the **Select Bone** tool to select the lower torso bone. Then, select the **Add Bone** tool and add three bones to one leg, starting at the hip and moving down through the foot. Repeat the process for the other leg, making sure to reselect the lower torso bone first. The upper leg bones should be parented to the lower torso bone.



Leg bones added

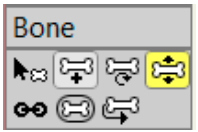
7. Use the **Select Bone** tool to select the upper torso bone, and then use the **Add Bone** tool to add one bone to the head.



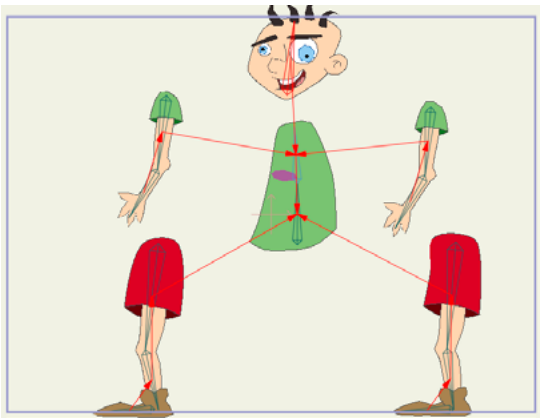
Head bone added

8. The next figure shows the parenting of all the bones. The parenting arrows point from child bone to parent bone, and can be seen by activating the **Reparent Bone** tool:

Reparent Bone Tool



Manipulate Bones Tool



All the bones added

Adjust Bone Influence

At this point, feel free to try using the **Manipulate Bones** tool to see how the bone system works so far. The body parts should mostly move how you would expect, but not totally cleanly - the next step is to clean up the bones' influence.

1. Double-click the **Skeleton** layer in the Layers window to bring up the **Layer Settings** dialog.

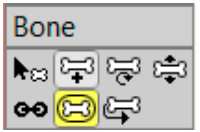
2. Go to the Bones tab and set the binding mode to **Region binding**:

Turn on region binding

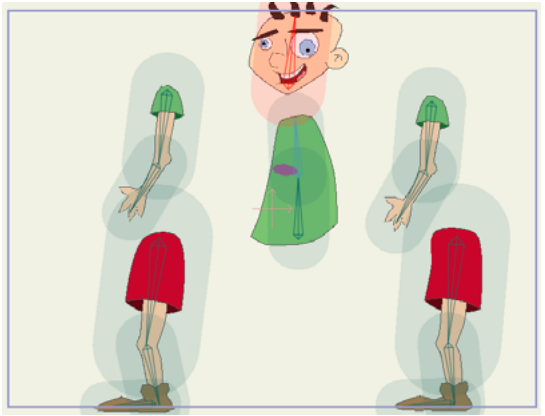
When region binding is used, bones only move the points that lie in their region of influence. If a point is overlapped by multiple regions of influence, it will be affected by all the corresponding bones. If a point is in no bone's region of influence, it will move with the nearest bone.

This is different from flexi-binding, where all bones affect all points. Flexi-binding can be quicker to set up, but leads to more rubbery motion, since moving a hand will always cause a little bit of movement in a foot. Region binding makes separate body parts truly separate.

3. For region binding to work, you need to adjust the region of influence for each bone. To do this, activate the **Bone Strength** tool to display the bones' regions of influence:

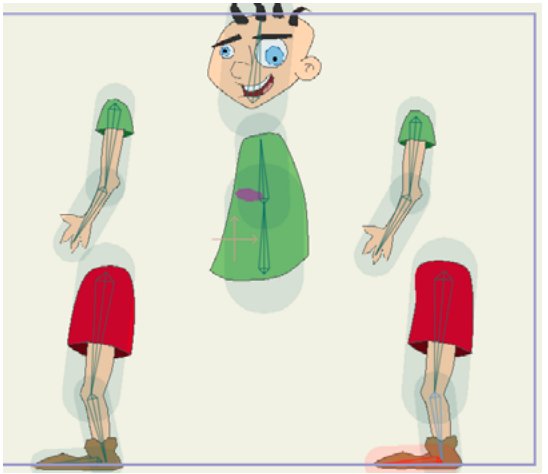


Bone Strength Tool



Initial regions of influence

4. Using the Bone Strength tool, click and drag on each bone in turn to adjust its region of influence. The correct adjustment for a region of influence it generally to surround the points along that section of bone. The most important regions are at the joints - the knees and elbows and such. Those are the areas where the regions of two bones overlap, and points will bend under the control of both bones. For parts like this character's head, the region of influence isn't very important - since there's just one bone, the points outside the region of influence will still move with that bone. Here's how you should adjust the regions of influence (don't worry about matching this exactly, just try to get kind of close):Adjusted regions of influence.



Adjusted regions of influence

5. Try using the **Manipulate Bones** tool again to test the bone setup. The character should move much more cleanly now - when moving an arm, for example, only that arm should move, and you should see no extra movement in other body parts.

Manipulate Bones Tool

Put the Character Back Together

The final step is to reassemble the character.

Activate the **Offset Bone** tool.

Offset Bone Tool

6. Click and drag on the top bone of each body part to move that part back into position. When each part is moved back into place, the character should look as shown in the following figure:

   - Move each arm by the upper arm bone
   - Move each leg by the thigh bone
   - Move the head by its single bone.

Re-assembled character

Frame 0 is considered the setup frame for bones. When the time is set to frame 0, the character will still appear split apart (unless you're using the Offset Bone or Manipulate Bones tools). However, at other frames in the animation, the character will be re-assembled according to how you used the Offset Bone tool.

7. Try moving the character around again with the **Manipulate Bones** tool. The body parts will still move independently, even though they now overlap. Because the bones were set up on a split-apart character, that character could be re-assembled while still keeping the body parts independent.

Manipulate Bones Tool

Final character

If you're interested in taking a look at the final Anime Studio file, it's named **Tutorial 3.4 Final** *and it's located in the* **Tutorials > 3 - Bones** *subfolder within your custom content folder.*

Tutorial 3.5: Flexi-Binding

Flexi-Binding

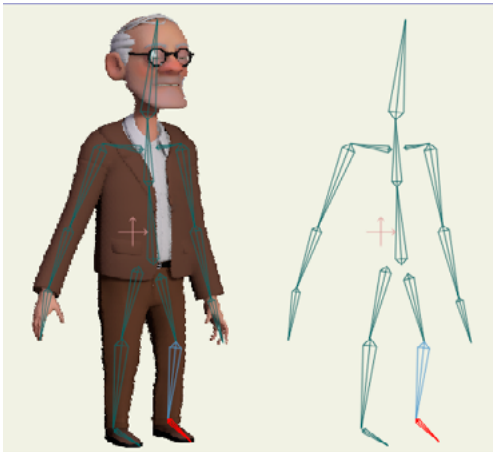
Anime Studio 9.5 introduced a new binding mode for bones, which is selected by default. If you have changed the binding mode for any reason, you can double-click the Bone group in the Layers palette, and switch back to Flexible binding in the Binding Mode section of the tab. **"Bones Tab" on page 160 in your Anime Studio Users Manual**.

For any layer that is a child of a bone group, you can select a subset of the bones in the bone group and then choose **Bone > Use Selected Bones for Flexi-Binding**. This allows you to isolate the influence of a set of bones from the rest of the skeleton (such as a Right Arm bone affecting only the right arm). This reduces the need for you to separate artwork on Frame 0 and then put it back together again with the Offset Bone tool.

To illustrate how this works, assume you have drawn a character in 2D format. The various body parts appear in separate layers in a layered Photoshop file that you have imported into Anime Studio.

Bones

Next, you create a bone layer and drag the layers for the character into the Bone layer. Then you use the bone tools to create a skeleton for the character so that you can animate it. An example for the character and skeleton are shown in the following figure.



A layered character and its bones.

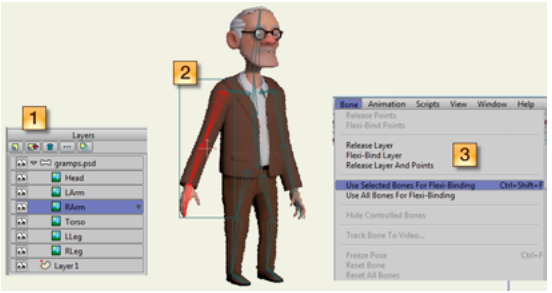
If you try to animate this layered character using standard flexi-binding, you find that the drawing distorts and stretches all the artwork. In previous versions of Anime Studio, you could break apart the bones and spread the artwork and bones apart, and then use the Offset Bone tool to put the parts together again, as described in "Tutorial 3.4: Character Setup" on page 109. However, sometimes it can be difficult to set up your character this way and it may not end up looking the way you want it to look.

The character distorts when the bones are manipulated.

Bones

To set up the project so that the arm artwork is only affected by the arm bones:

1. Select the Arm layer in the Layers palette.
2. Use the Select Bone tool to select the bones you want to control the arm.
3. Choose **Bone > Use Selected Bones for Flexi-Binding**.



Assigning selected bones for Flexi-Binding.

4. Repeat the above steps for each of the layers in your character. In other words, in this example we choose the Head layer and flexi-bind selected bones to it, then do the same for the Torso, Left Arm, Right Leg, and Left Leg.

Assigning selected bones for Flexi-Binding.

Images

Tutorial 4.1: Image Layers

This tutorial introduces another type of layer in Anime Studio: Image Layers. Image layers are a way of including artwork created in other programs in a Anime Studio project. Any application that can produce image files can be used with Anime Studio: photo editors, 3D modeling programs, natural media painting programs, the list goes on...

An image layer in Anime Studio contains a single image file that can be used as a background, or combined with a bone layer to build a character. Although they're called Image layers, an Image layer can also make use of a movie file as its source. Image layers and vector layers can be mixed and matched in the same project.

Alpha Channels

You'll notice that the images used in this tutorial do not appear rectangular. This is because they make use of an alpha channel to mark some parts of the image as transparent. We recommend using PNG images with Anime Studio because they support full alpha channel transparency. You'll need to use an image editing program (like Adobe Photoshop) to create images with transparency.

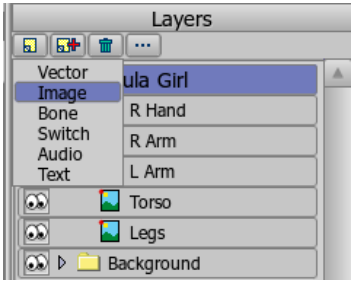
Start With a Sample File

For this tutorial, we'll start with a project file that's almost finished. It's named **Tutorial 4.1** and it's located in the **Tutorials > 4 - Images** subfolder within your custom content folder.

Open the T**utorials > 4 - Images > Tutorial 4.1** file in Anime Studio. This project is almost complete as it is. The only thing that's missing is the dancer's left hand.

5. Expand the **Hula Girl** layer in the Layers window, and you should see something like this:

Starting point for this tutorial



Create a new Image layer

6. Click on the layer named **L Arm** (we want the new layer to be just above the left arm).

7. Click the **New Layer** button in the Layers window to create a new layer. In the popup menu that appears, choose **Image**.

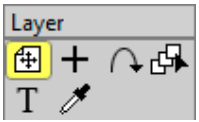
8. Anime Studio will prompt you to select an image file. Choose the **Anime Studio/Tutorials > 4 - Images** > **l_hand.png** image in your custom content folder.

9. In the Layers window, double-click the new layer and rename it **L Hand**. At this point, your Layers window should look like this:

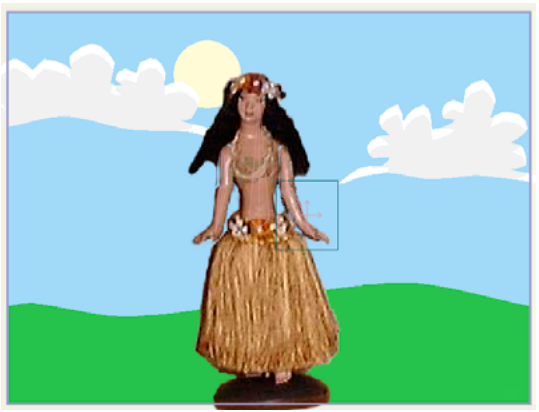
Left hand added

The new hand

10. You'll notice that new image layers are centered in the workspace, so the dancer's hand is not yet properly aligned: To position the arm properly, use the **Transform Layer** tool to drag the left hand into position at the end of the left arm. Allow for a little overlap between the two parts at the elbow:



Transform Layer



Left hand in position

11. The last step is to attach the new part to the dancer's skeleton. Select the **Bind Layer** tool, and click on the lower arm bone on the dancer, as shown below:

Bind Layer Tool

Bind the image layer to the forearm

You're done! To see the animation in action, press the Play button. Of course, we skipped over the process of building and animating the skeleton, but the basics of working with skeletons were covered in previous tutorials - all of that information applies when using bones with image layers.

Tutorial 4.1 Result. (Click to play movie)

Tutorial 4.2: Image Warping

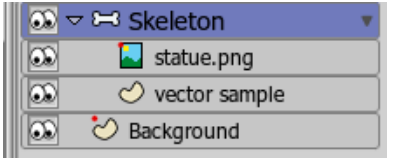
This tutorial demonstrates Anime Studio's image warping feature. This feature allows you to use a skeleton to distort an image. In this way, you can animate photographs, hand-drawn artwork, or anything you can get into an image file in a flexible way.

Start With a Sample File

For this tutorial, we'll start with a project file that's almost finished. It's named **Tutorial 4.2** and it's located in the **Tutorials > 4 - Images** subfolder within your custom content folder.

Open the **Tutorials > 4 - Images > Tutorial 4.2** file in Anime Studio.

1. Expand the **Skeleton** layer in the Layers window, and you should see something like the following figure. The **Skeleton** bone layer contains two sub-layers: an image layer (**statue.png**) and a vector layer (**vector sample**).



Starting point for this tutorial

2. Click the Play button in the timeline to play back the animation. Notice that only the vector layer moves with the skeleton. The reason that the image layer isn't moving is that it hasn't been connected to the bones yet (as the vector layer has been).

Only the vector layer moves

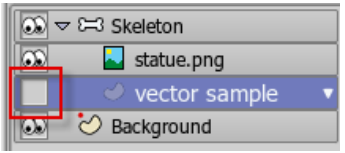
Using Image Warping

To warp the image layer with the skeleton, continue with the project as follows:

1. Double-click the **statue.png** layer, and go to the **Image** tab in the Layer Settings dialog. Turn on the checkbox marked **Warp using bones** and click OK.

Turn on the **Warp using bones** *option*

2. In the Layers window, turn off the visibility for the **vector sample** layer (it is only an example, and we don't want it in the final animation).



Hide the **vector sample** *layer*

3. Play back the animation again, and you should now see the image moving with the skeleton:

Image warping

Notice the horizontal bone at the base of the statue. This bone doesn't move at all in the animation, so why is it even there? When using image warping, the image is distorted by all the bones in the skeleton, and the nearest bone to any part of the image has the most influence. We don't really want the base of the statue to move, so an easy way to prevent this is to add a bone in the area we want to remain still, and not animate it. Another trick you might use when warping images is to break up an image into logical parts (for example, make the arms and legs of a person separate images from the main body). Then, use different skeletons to control the various re-assembled parts. This way, a leg bone can't have any influence over an arm.

Tutorial 4.3: Image Textures

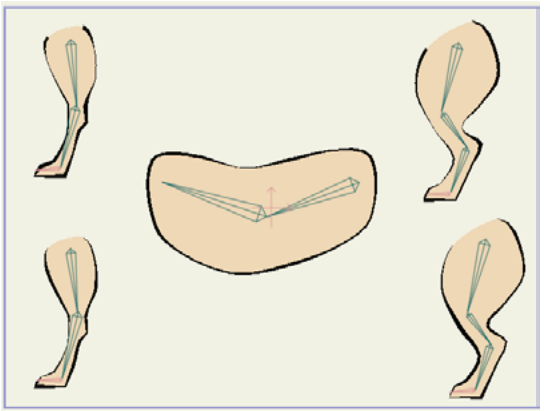
In this tutorial you will learn how to use images as textures to add detail to a character.

Start With a Sample File

For this tutorial, we'll start with a project file that's almost finished. It's named **Tutorial 4.4** and it's located in the

Tutorials > 4 - Images subfolder within your custom content folder.

1. Open the **Tutorials > 4 - Images > Tutorial 4.4** file in Anime Studio, and you should see something like this:



Starting point for this tutorial

2. Play back the animation to see what's going on.

3. Be sure to rewind the animation to frame 0 before you continue with the next section.

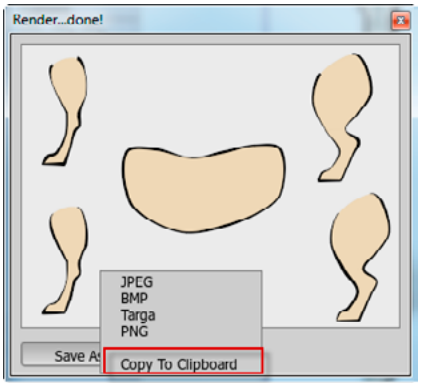
Images

4. Paint the Textures

What you're going to do is hand paint some texture details to go on this character. The first step is to paint some textures to go on this headless animal's body.

1. Select the **File > Preview** menu command to create a full-quality view of the animal's current state.

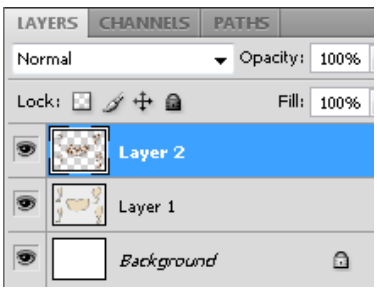
2. In the popup menu at the bottom of the Render window, select **Copy To Clipboard**.



Rendered animal

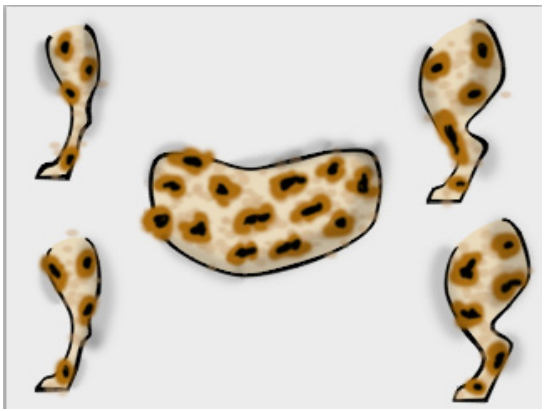
3. Start up your favorite image editing program (we recommend Adobe Photoshop) and create a new document the same size as the Anime Studio project (320x240 in this case). Paste the copied image into the new document.

4. Create a new layer in your image editing program and paint some kind of texture details onto the animal's body parts. It's very important that the texture be on a layer of its own. If you're using Photoshop, the layer arrangement would look something like this:



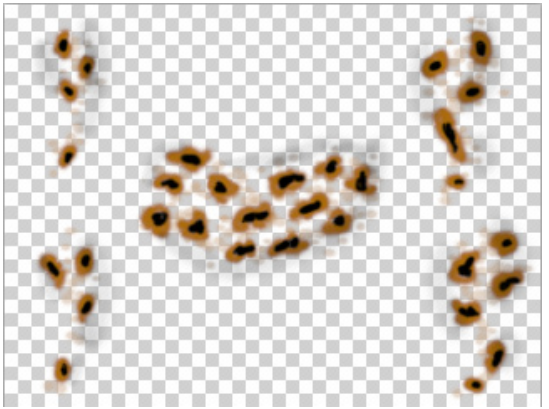
Layers in Photoshop

5. Paint whatever details you want. Here's an example of something you might paint in your image editor. Don't worry about painting outside the lines:



Painted on texture

6. When your texture is finished, get rid of the background layers so that only the texture is left with a transparent background (you're still working in Photoshop or similar program at this point):



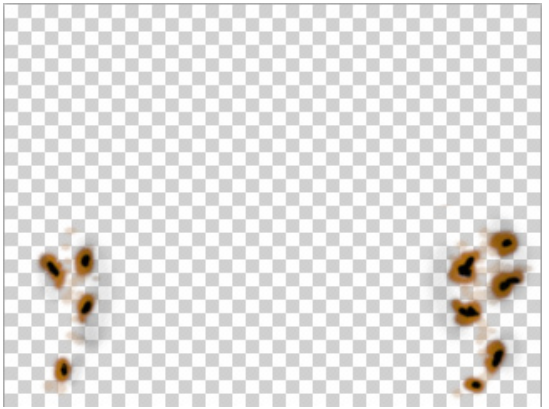
Background removed

7. You need to save the texture as three separate files. For each version of the texture, delete the parts of the texture that are not attached to the corresponding body parts. Save the images in PNG format, since PNG properly stores the transparent background. Examples of the three textures are shown in the figures that follow.

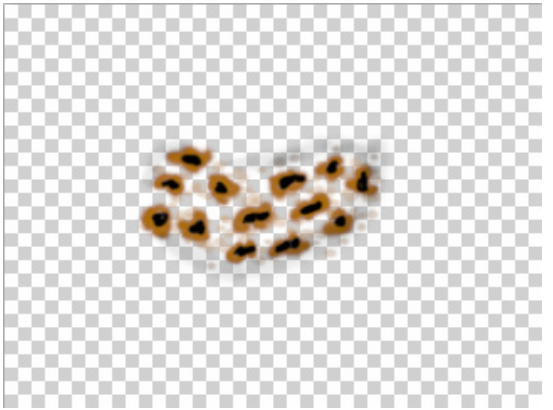
Images

   - Save an image for the back legs. Name the file **back_tex.png.**
   - Save an image for the torso. Name the file **body_tex.png.**
   - Save an image for the front legs. Name the file **front_tex.png**.

8. After you save your images, you can close the image editor. It's time to bring the textures back into Anime Studio.

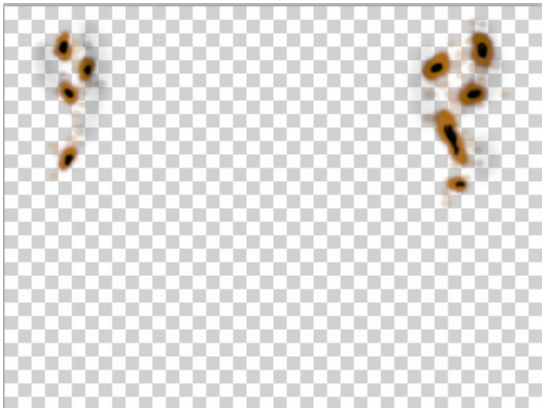


Back legs texture. back_tex.png



Body texture. body_tex.png

Images



Front legs texture. front_tex.png

If you're having trouble creating the image textures, we have provided some files for you to examine. Look at the file **Tutorial 4.4 Texture.psd**, *located in the* **Tutorials > 4 - Images** *subfolder within your custom content folder - this is the Photoshop file. Also, look at the files* **back_tex.png**, **body_tex.png**, *and* **front_tex.png**, *which are the finished texture files.*

Import Textures

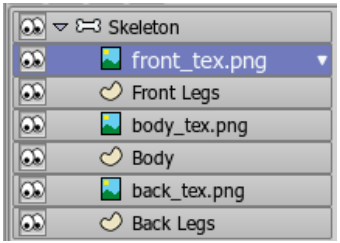
To import your painted textures in Anime Studio, follow these steps:

1. In the Layers window, highlight the Back Legs layer. The image file that you import will be placed above this layer.

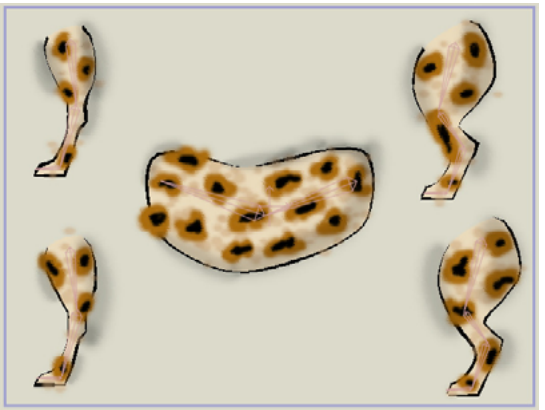
2. Create a new Image layer and select **back_tex.png** as the source image. The new image layer appears in the layers list.

3. Select the **Body** layer as the current layer. Create another image layer for **body_tex.png** . The new layer should appear above the **Body** layer.

4. And finally, select the **Front Legs** layer, and create a third image layer for **front_tex.png**. The new layer appears above the **Front Legs** layer. Here's how the new image layers should be arranged:



Three new image layers

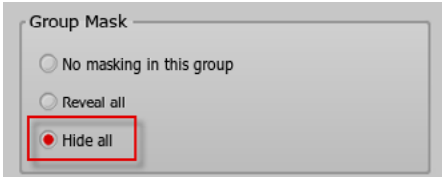


Textures applied in Anime Studio

Use Masking for Clean Edges

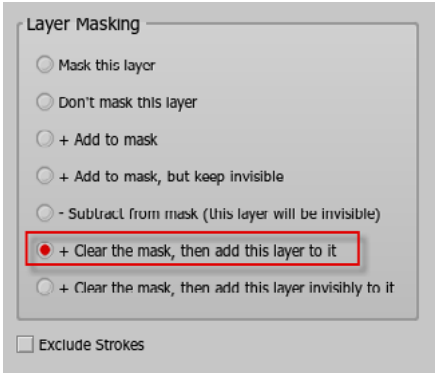
At this point, the textures are finished and in place, but they are a little messy, and go outside the bounds of the actual body parts. The final step is to clean up the texture edges using layer masking.

1. Double-click the **Skeleton** layer in the Layers window to bring up the Layer Settings dialog. Go to the Masking tab, and set the group mask to **Hide all**:

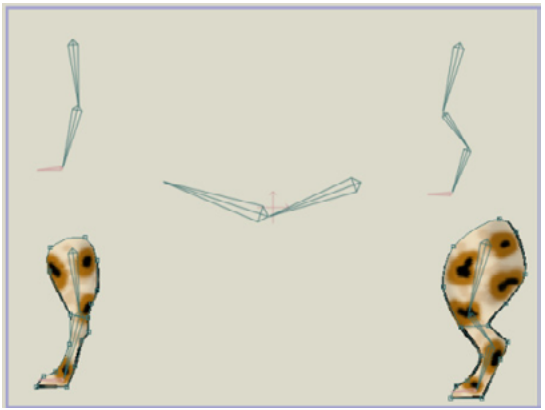


Turn masking on for the group

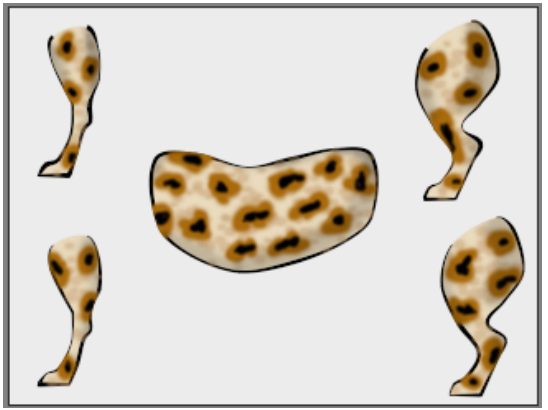
2. Next, double-click the **Back Legs** vector layer to bring up the Layer Properties dialog for that layer. Go to the Masking tab, and set the masking mode to **+ Clear the mask, then add this layer to it**. What this masking mode does is make all objects invisible, except where this layer has solid areas. So, the **back_tex.png** image layer will only be visible directly on top of the **Back Legs** vector layer, preventing the texture from going outside the lines of the back legs.



Set the masking mode for the Body layer



The Back Legs layer with mask



Textures cleaned up with masking

3. Repeat step 2 for the **Body** and **Front Legs** vector layers. Set the masking mode to **+ Clear the mask, then add this layer to it**, just like you did for the back legs. At this point, all the textures should be forced to stay inside the lines:

4. Play back the animation again and you'll see the image layers warp along with the vector layers in response to bone movement.

Images

Animation

After all the preparation time drawing your objects, assigning fill colors, and setting up bones, you move on to animating them. This is where things actually start to move around.

Animating in Anime Studio is based on the concept of keyframes. A keyframe is a point in time where you position some object (either a point, a bone, or an entire layer). A keyframe tells Anime Studio exactly where that object should be and when. Keyframes are set up at important moments in time - typically where an object begins moving, stops moving, or changes direction. Between keyframes, Anime Studio automatically calculates how to move an object so that it gets from one keyframe to the next in the amount of time allowed between the keyframes.

To create a keyframe, just set the current time to whenever you want the keyframe to occur, then move the object to the desired position. Controlling the current time and working with keyframes after they've been created is discussed in **"Chapter 16: The Timeline Window" on page 213 in your Anime Studio Users Manual**.

You can animate several types of motion in an Anime Studio project, and they can each be used alone or in combination. The first type is point motion. Point motion very basic - it just involves moving individual points around in time. Point motion is good for small distortions to an object where you want something to look soft and flexible (turning up the corners of a mouth into a smile, bulging out a belly, etc.). You can move a shape in any way you want with point animation, but it might require manipulating a lot of points - in many cases bone animation can simplify the job.

Bone animation involves setting up a skeleton system for an object and then moving the skeleton around. By carefully constructing a skeleton, you can easily move a character around like a puppet.

Layer animation is for very simple, large-scale motion. When you move a layer, everything in it moves together. This doesn't give you a lot of flexibility as far as what you can animate this way, but it's a good way to get certain effects. If you want an entire group of objects to pan side to side or zoom in or out, then layer animation is the tool to use.

The keyframes you define are visible in the Timeline, starting at frame 1. Frame 0 is a special frame in an Anime Studio project - the original placement of all your objects is stored at frame 0. If you want to modify an object's original shape or position, or add new objects, this should be done at frame 0. Whatever you do to an object in later frames can

never affect an object's original shape and position, so even if you think you really screwed something up, you can always delete some keyframes and get back your original drawings.

This chapter has a useful hands-on overview of how to animate in Anime Studio, using each type of motion (point, bone, and layer). Once you've mastered Anime Studio's animation tools, animating is a simple job of repeatedly using the tools you already know, keyframe by keyframe.

Tutorial 5.1: Automatic Lip-Sync

This tutorial uses Anime Studio's Switch layers to show you how to perform instant, automatic lip-syncing. A switch layer contains multiple sub-layers, but only one of the sub-layers can be displayed at a time. This makes it very useful for lip-sync animation: each sub-layer can be a mouth shape for a different sound.

The method of lip-sync described in this tutorial is quick and easy, though not always super-accurate (but give it a try - it may be accurate enough for your animation).

Start With a Sample File

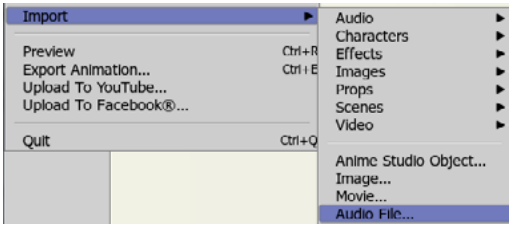
For this tutorial, we'll start with a project file that's almost finished. It's named **Tutorial 5.1** and it's located in the **Animation > 5 - Animation** subfolder within your custom content folder.

1. Open the **Tutorials > 5 - Animation > Tutorial 5.1** file in Anime Studio, expand the **Mouth** layer in the Layers window, and you should see something like this:

Starting point for this tutorial

2. Examine the sub-layers in the **Mouth** layer. Notice that from bottom to top they range from closed to wide open. This is the basic setup for automatic lip-syncing. The number and names of the sub-layers don't matter, as long as the lowest one is closed and the highest one is wide open.

Layers in the Layers window



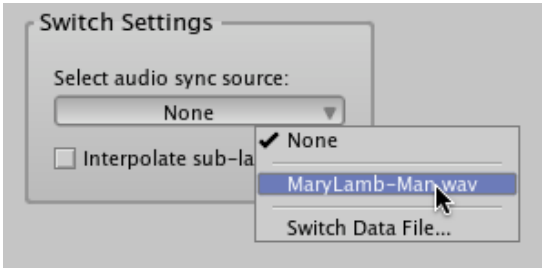
File > Import > Audio File command

3. Next, add the audio file that will go along with the lip-syncing. Choose the **File > Import > Audio File** menu command and select the **Tutorials > 5 - Animation > MaryLamb-Man.wav** file in your custom content folder.

4. Make sure that you select the **File > Import > Audio File** command from the lower section of the file menu. This differs from the **File > Import > Audio** command in the upper section of the menu, which is used to open files in the Anime Studio library.

5. Play back the animation now to hear the result. You'll notice that the mouth doesn't move yet. Stop the playback before proceeding.

6. Double-click the **Mouth** layer. When the Layer Settings dialog opens, click the **Switch** tab:



Layer settings for the mouth

7. Click the **Select audio sync source** button to select the file that will control the Switch layer. In the file dialog that appears, select the file **MaryLamb-Man.wav**. Click the dialog's OK button.

That's it! The audio file was analyzed and keyframes were attached to the Switch layer. When the audio is quiet, Anime Studio activates the lowest layer (the closed mouth), and when the audio is loudest, Anime Studio uses the highest layer (the wide open mouth). In between, Anime Studio switches on the in between mouths. Play back the animation to see and hear the result. In general, because automatic lip-sync is based on the actual sound in the audio file, it is important to use an audio file without background noise or music.

Tutorial 5.1 Result. (Click to play movie)

Tutorial 5.2: Phoneme Lip-Sync

This tutorial covers another method of animating lip-sync. With this method, the lip-sync is based on **phonemes**. Phonemes are the basic building block sounds that make up words. When you do lip-sync based on phonemes, it

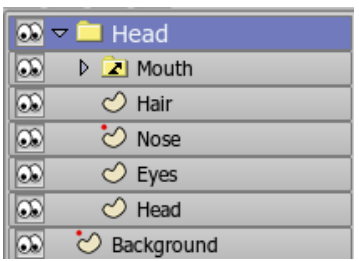
requires you to break down the words of dialog into their basic sound elements.

Start With a Sample File

For this tutorial, we'll start with a project file that's almost finished. It's named **Tutorial 5.2** and it's located in the **Tutorials > 5 - Animation** subfolder within your custom content folder.

1. Open the **Tutorials > 5 - Animation > Tutorial 5.2** file in Anime Studio.

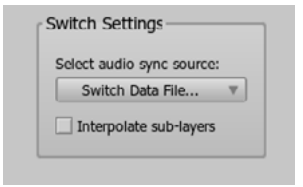
2. Expand the **Head** layer in the Layers window, and you should see something like this:



Starting point for this tutorial

3. This project is almost complete. The only thing apparently missing is the animation for the character's mouth. Play back the animation. The mouth is there (it's a switch layer), but no animation data has yet been assigned to it, so it doesn't move.

4. Double-click the **Mouth** layer. When the Layer Settings dialog opens, click the **Switch** tab:



Options in the Switch tab

5. Click the **Select audio sync source** button to select the switch data file that will control this switch layer. In the file dialog that appears, select the file **vista.dat** located in the **Tutorials > 5 - Animation** subfolder within your custom content folder.

The Mouth layer contains all the mouth shapes needed to speak any phrase. You can examine the Mouth layer to see the sub-layers it contains. Each sub-layer is named after a different phoneme. You can use any set of phonemes you choose. The mouth shapes in this mouth are based on the same default set used by a great (and free) lip syncing program that we recommend: Papagayo (http://www.lostmarble.com/papagayo/) is a good place to get started. To make the mouth speak a different phrase, just create a different animation data file in Papagayo, and select it into the mouth layer as we just did for the vista.dat example.

6. To hear the sound along with the animation, choose the **File > Import > Audio File** command from Anime Studio's menu and select the **vista.wav** file located in the **Tutorials > 5 - Animation** folder.

7. Now, when you play back the animation in Anime Studio you will hear the audio that goes with the lip-sync. Also, if you export the animation as a QuickTime or AVI movie, the audio will be included in the movie file.

If you plan to export your animations to Flash (SWF) format, you will need to use MP3 audio files instead of WAV audio files. In addition, if you plan to render to SWF format, you can only use a single audio file in the project.

Tutorial 5.2 Result. (Click to play movie)

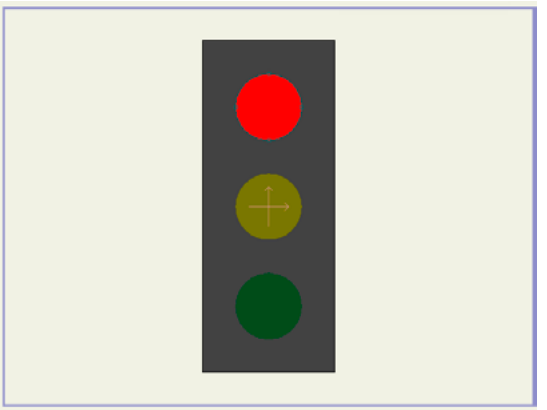
Tutorial 5.3: Cycling

It is possible in Anime Studio to automatically cycle a section of animation, repeating it over and over as many times as you wish. Cycling is a special type of keyframe interpolation, and this tutorial will show you how to set it up.

Start With a Sample File

For this tutorial, we'll start with a project file that's almost finished. It's named **Tutorial 5.5** and it's located in the **Tutorials > 5 - Animation** subfolder within your custom content folder.

1. Open the **Tutorials > 5 - Animation > Tutorial 5.5** file in Anime Studio.



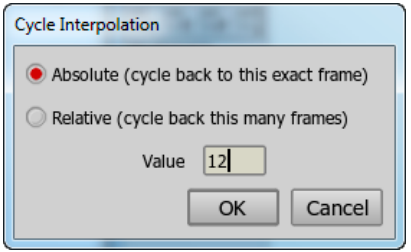
Starting point for this tutorial

2. In the timeline, you can see that the top layer, **Red Blinker**, has two keyframes in the Layer Visibility channel. The layer becomes invisible at frame 36, and visible again at frame 48. This is also shown by the red background in the timeline during the layer's invisible period:

Starting point for this tutorial

3. You can play back the animation to see what's going on. Basically, the red light starts off turned on, then it shuts off for a while and finally turns back on.

4. Using cycling, you can make the light blink over and over. Right-click on the second keyframe (the one at frame 48), and in the popup menu that appears, select **Cycle...**. You're telling Anime Studio that after this keyframe, you want the animation to cycle back to an earlier point in the animation. A dialog will appear asking you the specifics of the cycling. Enter 12 as shown below:

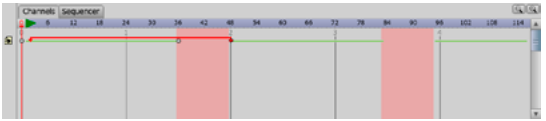


Cycle settings

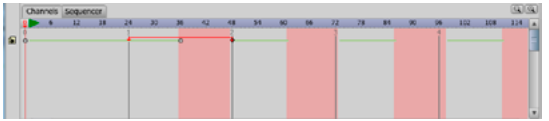
5. When you click OK in the cycle dialog, the timeline will update to show the cycle. There are three changes you will see:

6. The keyframe in question will change to a left-pointing arrow to indicate that it cycles backwards.

   - A long red arrow will point back to the point in the timeline that the visibility channel is cycling back to.
   - Later in the timeline you will see other sections with red backgrounds to indicate that the layer is invisible during those periods:



Cycling reflected in the timeline



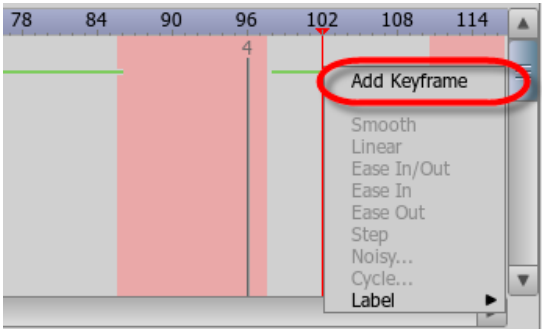
Adjusted cycle duration

7. You can play back the animation again to see the result. The **Red Blinker** layer will flash on and off multiple times, even though you didn't add any more keyframes - the Layer Visibility channel is just cycling back and repeating a section of animation over and over again.

8. Let's try adjusting the cycle duration. In the Timeline window, hold down the **Ctrl** key (Windows) or **Cmd** key (Mac) while you click and drag on the second keyframe (the one that cycles). As you drag the mouse side-to-side, you'll see that the cycle duration changes, as the arrow that points back from the cycling key gets longer and shorter. Adjust the cycle duration so that the keyframe cycles back to frame 24:

9. If you play back the animation now, you'll see that the light blinks more quickly now, since the cycle duration is shorter.

10. Finally, to break a cycle, all you have to do is add another keyframe when you want the cycle to end. Set the current frame to 102, right click in the Layer Visibility channel, and select **Add Keyframe** from the popup menu that appears. The new keyframe will appear, and at that point the cycling will end. Play back the animation to confirm this.



New keyframe at frame 102

Conclusion

Cycling can be used in any animation channel in Anime Studio. Any keyframe can be made to cycle back in time by setting **Cycle** as the key's interpolation method. You can cycle a channel all the way back to the beginning of an animation, or just back a few frames. Cycling will repeat itself forever or until a new keyframe is reached.

Effects

Tutorial 6.1: Shadow Tricks

This tutorial shows you how the layer shadow options can be used to create visual effects other than shadows. Glows and outlines are the two possibilities we'll look at.

Start With a Sample File

For this tutorial, we'll start with a project file that's almost finished. It's named **Tutorial 6.6** and it's located in the **Tutorials > 6 - Effects** subfolder within your custom content folder.

Open the **Tutorials > 6 - Effects > Tutorial 6.6** file in Anime Studio. Render this file to see what it looks like to start with:

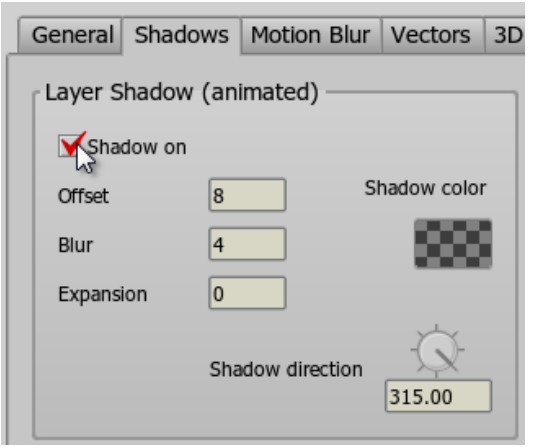
Starting point for this tutorial

Basic Layer Shadow

Before we try any tricks, let's take a look at a basic layer shadow.

Double-click the only layer in this file, Layer 1, to bring up the Layer Settings dialog.

1. Go to the Shadows tab, and leaving all the other settings alone, turn on the **Shadow on** checkbox. Click OK to dismiss the dialog.



Default shadow settings

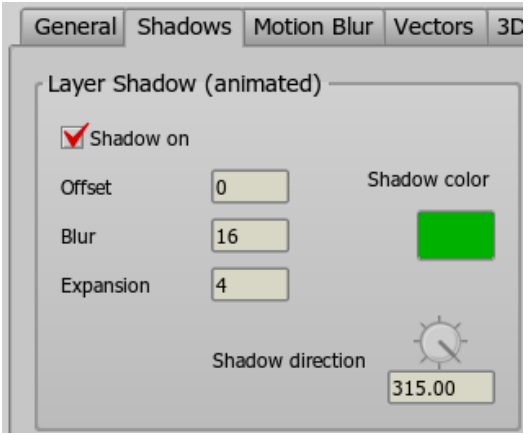
2. Try rendering the scene again, just to be sure that you have an idea what a regular layer shadow looks like in Anime Studio:

Layer shadow

Layer Glow

Now we'll change the shadow settings to create a glow effect.

Double-click Layer 1 again to bring up the Layer Settings dialog. Change the Layer Shadow settings to match the values below:



Glow settings

- An offset of 0 means the shadow will be centered under the layer that is casting it. With an offset of 0, the shadow direction has no significance.
- A high blur value of 16 gives the glow a nice soft edge.
- The expansion parameter tells Anime Studio to expand the shadow, making it bigger than the layer itself. Without expansion, the glow would just barely extend beyond the edge of the layer.
- The exact color you choose is not important - just be sure to make the color opaque (Alpha = 255). A transparent glow may be too faint to see.
- Render the scene again, and it should look like this:

Layer glow.

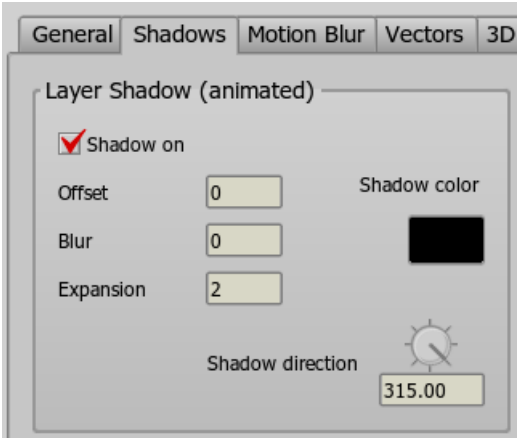
Layer Outline

Let's change the shadow options once again to create an outline effect. Some styles of animation use a heavier outline around the outside of objects than for interior lines. Adjusting the layer shadow values in the right way can make this style very easy to accomplish.

Double-click Layer 1 again to bring up the Layer Settings dialog.

1. Change the Layer Shadow settings to match the values below:

   - Again, we use an offset of 0 to keep the shadow centered under the layer.
   - A blur value of 0 is used to keep a hard edge on the shadow.
   - The expansion parameter is used in this case to set the width of the outline effect.
   - For this effect, it's important to make the color totally black and totally opaque (Alpha = 255) to match the interior lines.



Outline settings.

2. Render the scene again, and it should look like this:

Layer outline

Tutorial 6.2: Camera and Depth Effects

This tutorial demonstrates Anime Studio's camera tools. These tools allow you to move an entire scene around as if you were pointing a camera at it. With a little setup work, you can even create different layers of depth in the scene.

Effects

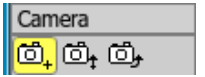
Start With a Sample File

For this tutorial, we'll start with a project file that's almost finished. It's named **Tutorial 6.7** and it's located in the **Tutorials > 6 - Effects** subfolder within your custom content folder.

1. Open the **Tutorials > 6 - Effects > Tutorial 6.1** file in Anime Studio, and you should see something like this:

Starting point for this tutorial

2. This file contains a few layers of simple scenery that we will move the camera across. To do this, select the **Track Camera** tool and drag the mouse around in the main editing area.



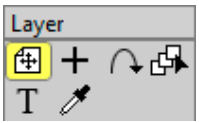
Track Camera Tool

3. Notice how all the layers move together, even though they aren't grouped. When you move the camera around, it affects **all** the layers in a project. In the tool options area at the top of the main Anime Studio window, click the Reset button to reset the camera.

Creating Depth

Now we'll introduce some depth into the scene.

1. Activate the **Transform Layer** tool and select the layer called **Right Hill**.

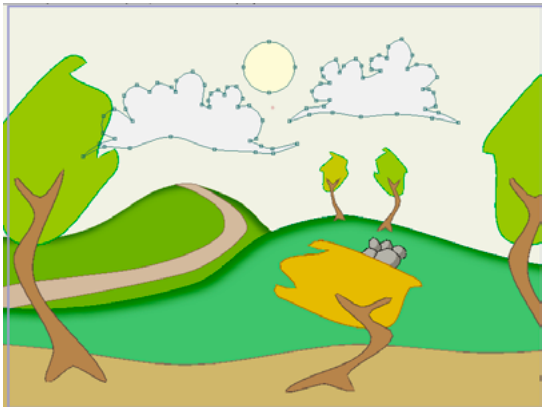


Transform Layer

2. In the tool options area at the top of the main Anime Studio window, change the Z value to -1 and press **Enter**. Below you can see where to set the Z value for the layer.

Setting a layer's Z value

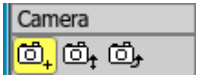
3. Now select the **Left Hill** layer, and set its Z value to -2. Finally, select **Sky**, and set its Z value to -20. When you're finished, your scene should look similar to the following figure.



Right Hill, Left Hill, and Sky layers moved on the Z plane

4. Try dragging the **Track Camera** tool around again and notice the difference. It's like driving in a car - nearby objects go by quickly, while distant objects seem to move slowly.

5. In the tool options area at the top of the main Anime Studio window, click the Reset button to reset the camera.



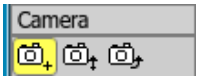
Track Camera Tool

6. When you've seen enough, select the **View > Reset** menu command to go back to the default camera view.

Animating Camera Movement

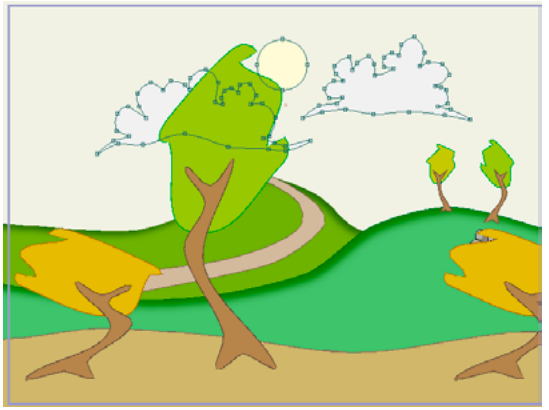
Now we'll try animating the camera.

1. Make sure the current frame is set to 0, and select the **Track Camera** tool.

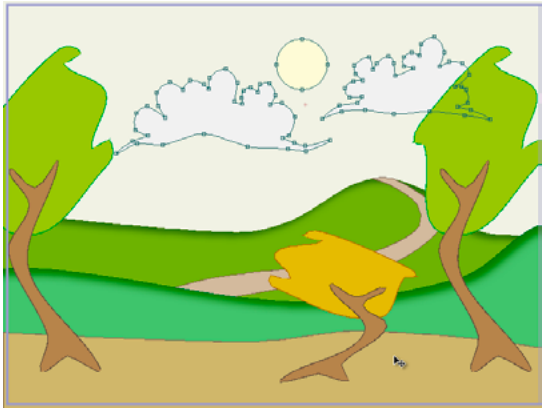


Track Camera Tool

2. Drag to the left in the main editing area until you set up a view that looks about like this:



Camera view at frame 0

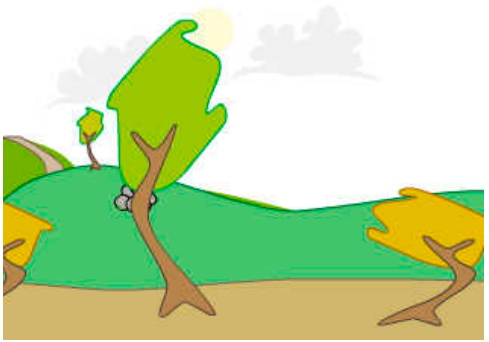


Track to the left

3. Next, set the current frame to 72, and drag to the right. This will pan the camera to the left - keep going until you have a view that looks like this:

4. Press the Play button in the timeline to play back this simple camera animation. Notice how the layers of the project seem to pass in front of and behind each other. This is a simple way in Anime Studio to create a sense of depth.

Effects



Tutorial 6.2 Result. (Click to play movie)

Tutorial 6.3: Moon and Clouds Effect

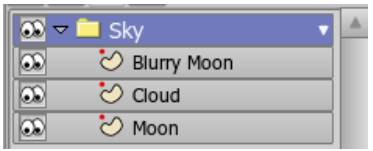
This tutorial shows you how to create the effect of clouds moving in front of a moon. Layer masking and blurring is used to create an effect that is not only good for a moon and clouds, but may inspire you to think of new ways to use layer masking.

Effects

Examine a Finished Animation

For this tutorial, we're going to examine an animation that is completely finished.

1. Open the **Tutorials > 6 - Effects > Tutorial 6.9** file in Anime Studio. The layers in this file are arranged as shown below:



Starting point for this tutorial

2. This animation relies on masking and blurring effects that aren't apparent in Anime Studio's editing view. To see what the final effect is, either export the animation as an AVI or QuickTime movie. (Because blurring is a key part of this effect, exporting to SWF is not an option - SWF export does not support blurs.)

The final result

Notice that the moon appears sharp until the cloud moves in front of it. Then, the parts of the moon obscured by the cloud become blurry. This effect is easy to achieve using layer masking.

How It's Done

There are two parts to this effect. First, there are actually two moons in the animation:

- The **Moon** layer is the regular, sharp version of the moon you see in Anime Studio's editing view.
- Two layers up is the **Blurry Moon** layer - this is a duplicate of the **Moon** layer, with some layer blur applied.

The trick is to control which moon is visible at which point in time in the final exported movie. To do this, we use layer masking.

Try double-clicking each of the layers in turn to bring up the Layer Settings dialog - then, go to the **Masking** tab. You'll find that the **Sky** group has masking turned on - by default, all objects are invisible. The **Moon** layer is set to be immune to masking, while the **Cloud** layer adds to the layer mask.

The result of these mask settings is that first the **Moon** layer is drawn - this is the regular, sharp moon - and is not affected by any masking. Next, the **Cloud** layer is drawn on top of that. When the cloud moves in front of the moon, it covers up the moon. Finally, the **Blurry Moon** layer is drawn on top of the cloud. Because of the mask, the blurry moon only appears on top of the cloud, it is not visible outside of the cloud object. Even though the blurry moon is in front of the

clouds, the effect looks like the moon shining from behind the clouds.

Here's another example of the same technique. In this case, we see a character who appears to be blurred by the smoke passing in front of him. The exact same blurring and masking trick is used as in the case of the moon:

Another example of blurring and masking