

# The Principles of Animation

## Ease-In and Ease-Out: Lesson 6

### Understanding the Principle of Ease-In and Ease-Out

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Ease-in and ease-out (also referred to as “slow-in and slow-out”) is a transition principle that is demonstrated when a character or object moves between extreme poses. Ease-in and ease-out makes animation appear more realistic by placing keyframes closer together or further apart at transitional movements to create the illusion of an object speeding up or slowing down.

For example, a jumping frog speeds up when it leaves the ground (ease out), then slows as it rounds the top of its jump (eases in) and speeds up again as it heads back toward the ground (eases out). It also moves through extreme body movements as this is happening, since its body is crouched together at the bottom of the jump and stretched out when it’s in the air.

### Related Project Files

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The following related project files are located in the ASCurriculum-Lesson6.zip file that accompanies this course:

- **Jace on Swing.anme** - A prepared character, with a boy sitting on a swing.
- **Tutorial 6.1.anme** - A final version of the project that you will complete in this lesson.
- **Tutorial 6.1 with Fixed Rope.anme** - This final version of the project shows an optional step that you can complete to improve the appearance where the rope hangs from the tree.
- **Tutorial 6.1.mov** - A final render of the project that you will complete in this lesson.
- **Tutorial 6.1 How To.mov** - A step-by-step video tutorial of the project that you will complete in this lesson.

### Tools Used

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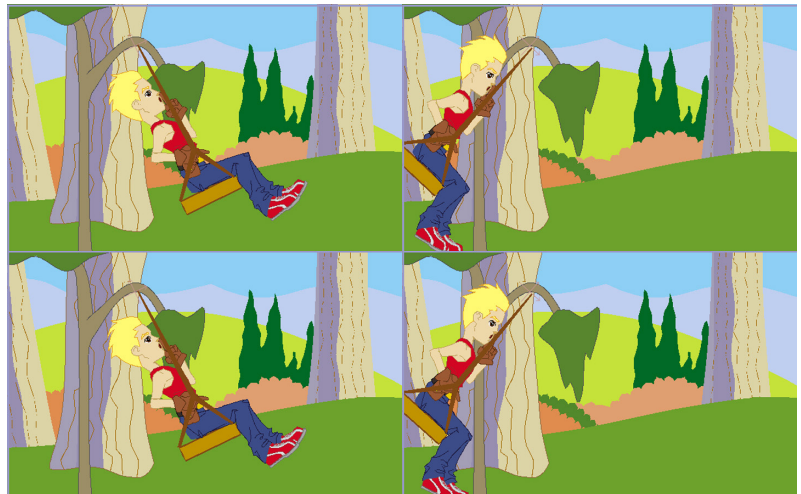
- **Scale Layer** tool, **Scale Points** tool, **Select Points** tool, **Translate Layer** tool, **Translate Points** tool, **Freehand** tool, **Rotate Layer** tool

### Tutorial 6: Overview

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In this tutorial we’ll animate a character swinging back-and-forth on a swing, also known as a “swing cycle” in animation. To make this easier to achieve we’ll use a ready-made character that is already positioned on a swing.

A swing cycle is a good way to demonstrate ease-in and ease-out, because the character’s movement eases in, accelerating as he swings toward the ground and eases out, slowing as he changes position. Anime Studio includes an Ease-In and Ease-Out feature that will help you accomplish this movement.



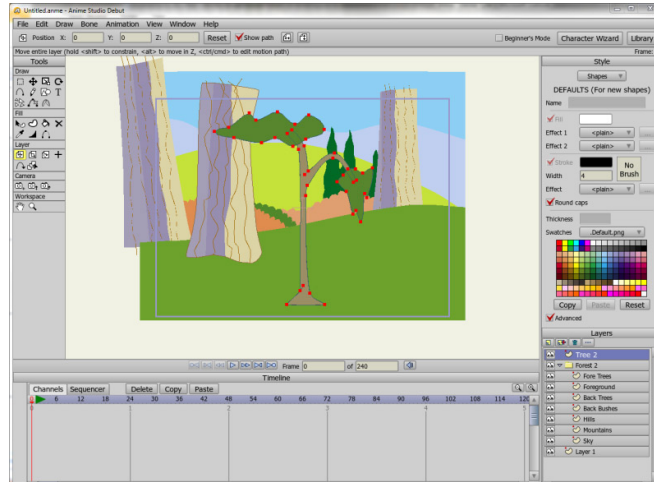
## Tutorial 6: Step-by-Step

### Step 1: Add a Forest and Trees

Start with a new scene. Choose **Window > Library** to open the Library and select the **Scenes > Backgrounds** category. Add **Forest 2** to the scene.

Navigate to the **Library > Props > Scenery** folder. Add **Tree 2**. Close the Library window when you're done.

Save your project at this point, naming it Lesson6\_YourLastName.



### Step 2: Place the Tree

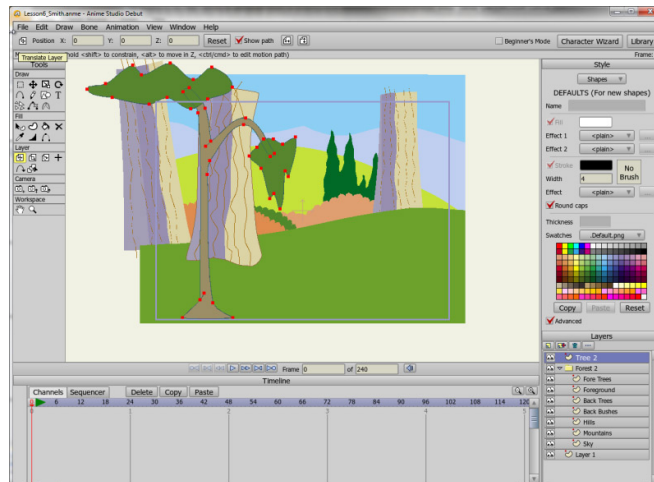
Make sure that the **Tree 2** layer is selected in the **Layers** window. All of the points on **Tree 2** should be selected when you load it.



If not, you can use the **Select Points** tool in the **Draw** section of the toolbox to select them by clicking-and-dragging the mouse over the tree.



With the points in **Tree 2** selected, use the **Translate Points** tool to move the tree into position, and use the **Scale Points** tool to scale the tree.



For further information on the **Select Points** tool, refer to the Anime Studio Debut Users Manual.

For further information on the **Translate Points** tool, refer to the Anime Studio Debut Users Manual.

For further information on the **Scale Points** tool, refer to the Anime Studio Debut Users Manual.

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## Step 3: Place the Swing

Next, you'll import a character that is already made for you. You'll find it in the ZIP file that contains the files for this lesson. Choose **FILE > Import > Anime Studio Object** and navigate to the Lesson 6.1 folder. Choose **Jace on Swing.anme**. The character appears in the scene under a folder named **Layer 5**.



With the **Layer 5** layer selected in the **Layers** window, click the **Scale Layer** tool to size the character appropriately so that the swing can hang from the tree while his feet are above the ground. Use a scale of somewhere around 85 percent.



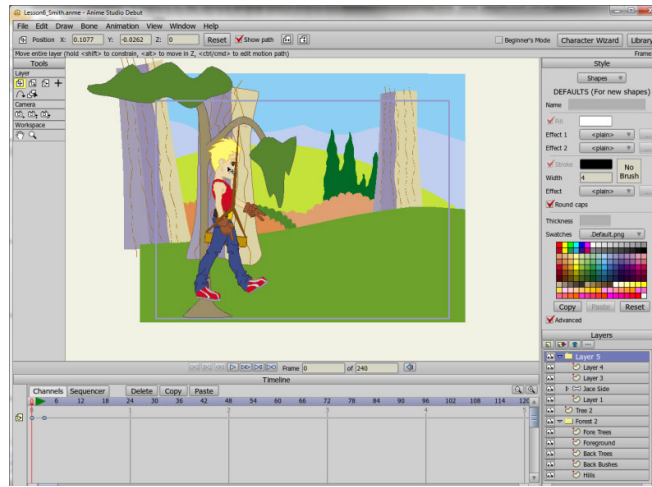
Then position the character so that the rope looks like it is hanging from the tree.

## Step 4: Finish the Rope (optional)



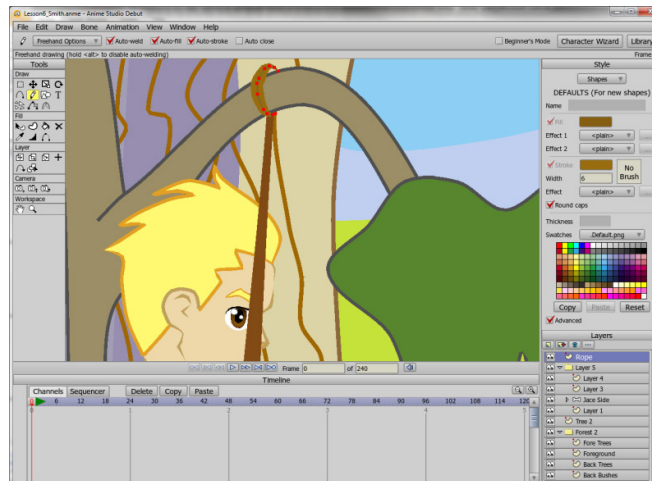
If you want to refine the appearance of the rope a little bit, you can add a new layer above **Layer 5** and draw a ring that attaches the rope to the tree.

This advanced step is optional and not necessary to complete this tutorial.



For further information on the **Scale Layer** tool, refer to the Anime Studio Debut Users Manual.

For further information on the **Translate Layer** tool, refer to the Anime Studio Debut Users Manual.



For further information on the **Freehand** tool, refer to the Anime Studio Debut Users Manual.

## Step 5: Create the Swing Poses

Click **Frame 3** of the **Layer 5** layer. You'll notice that the character is already positioned so that he is sitting on the swing. All you have to do is animate the swing cycle.



Move to **Frame 12**. Select the **Rotate Layer** tool and rotate **Layer 5** back to about the -40 degree position (it doesn't have to be exact).

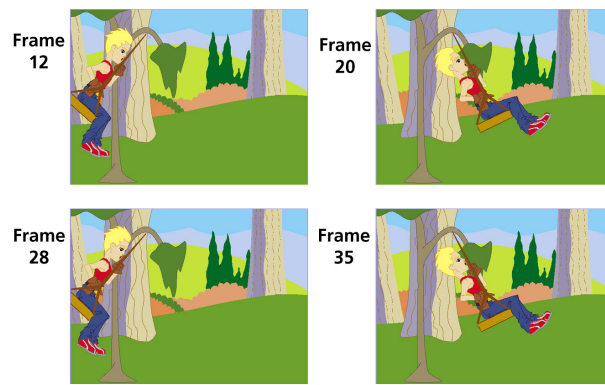
Then advance to **Frame 20** and rotate it to about 25 degrees.

At **Frame 28**, rotate the swing back again to around -40 or -45 degrees, and then forward again at **Frame 35** to around 25 degrees again. Play the animation to see how it looks.

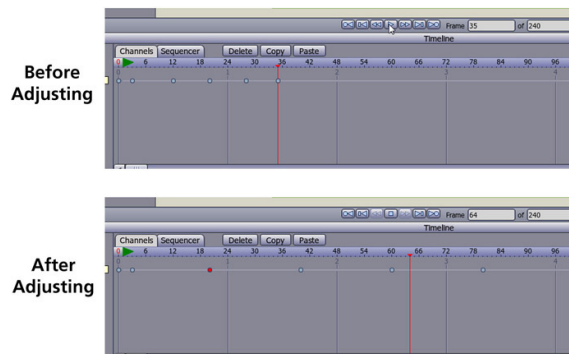
Save your project at this time.

## Step 6: Repositioning Keyframes

You'll notice that the swing moves quite fast. You can slide the keyframes farther apart in the timeline by clicking-and-dragging them toward the right so that there is more space between them. Adjust the last four keyframes so that they appear at frames 20, 40, 60 and 80. Then play the animation again to see the difference.

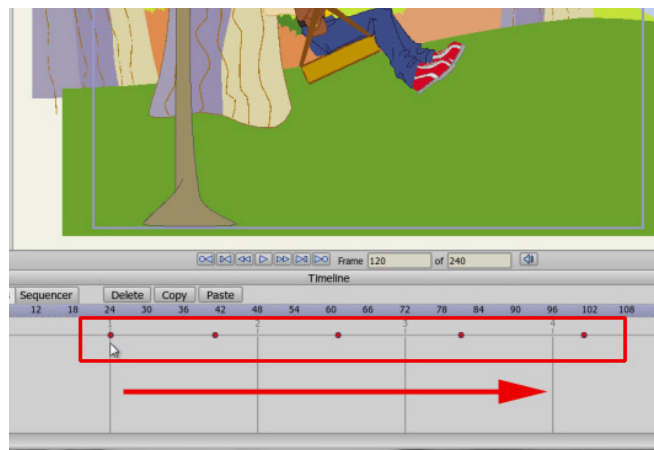


For further information on the **Rotate Layer** tool, refer to the Anime Studio Debut Users Manual.



## Step 7: Sliding Key Frames

To make the swing cycle start a little bit later in the scene, drag a rectangle around the keyframes from **Frame 3** onward. Then move the entire selection so that the first frame in the selection starts at **Frame 24**. To do that, click on any one of the red buttons that are now highlighted on the timeline, hold down the mouse button and move the keyframes to the right until the first one is on **Frame 24**.

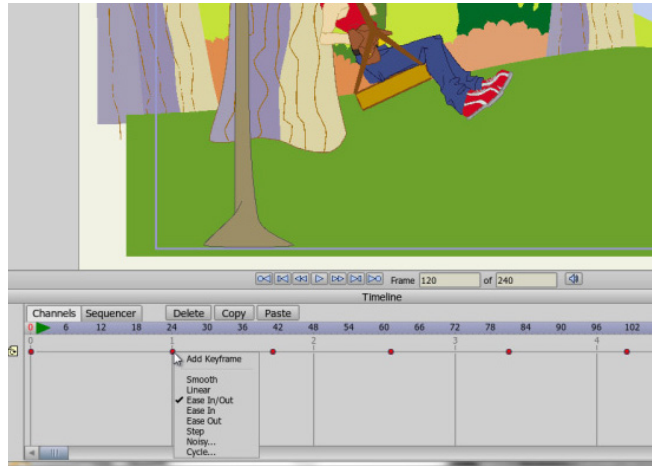


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## Step 8: Add Ease-In/Ease-Out

Now we'll add some ease between the frames. If you want a motion to stop briefly around a keyframe, select the keyframe and choose **Ease In/Out**. This combined feature is especially useful when selecting multiple keyframes that vary between two extremes. The swing is a good example since it moves back and forth consistently, like a pendulum (see example to the right).

Select all of the frames in the timeline, and right-click to choose **Ease In/Out** from the menu that appears. Play the animation again to see the result. Then save your project and render your animation.



You can also apply **Ease In** or **Ease Out** to individual keyframes.

**Ease In** slows down the movement following the keyframe it's applied to.

**Ease Out** starts the next movement following the keyframe at normal speed, but slows down the movement as it approaches the next keyframe. The result will be that the beginning of the movement will appear faster than the end of the movement.

