

Blender Lesson: Intro to Animation



Grade Level:

4th and up

Lesson Description:

This lesson serves as an introduction to animation with Blender. The lesson begins by talking about some core concepts of animation and motion pictures in general. We then create a couple of basic animated movements in Blender.

Goals/Objectives:

- Understand the concept of keyframes
- Know how to define keyframes in Blender
- Set multiple keyframes to make a multi-step animated sequence
- Set keyframes for multiple objects to simulate interaction between them

Materials/Tools:

- Blender installed on each student's computer
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Introduction: Frames and Keyframes

When we're watching a video, we're not actually looking at a constantly moving thing, like in real life. We're actually seeing a bunch of still images, one after the other. Because the images are changing so fast, they *look* like they're moving. A single one of these images is called a "frame".

How long does a single frame stay visible before it changes to the next frame. Hint: it's a fraction of a second. In fact, in most movies, we see twenty-four different frames in a single second! So each frame is 1/24th of a second. Some videos change their frames even more quickly. For example, a lot of modern video games will play at sixty frames per second!

So, let's say we're making a movie at 24 FPS (frames per second). This means that if you want just *one minute* of footage, you need 1440 separate frames. A 90-minute movie, then, would have 129,600 frames. That's over a *quarter million* individual images!

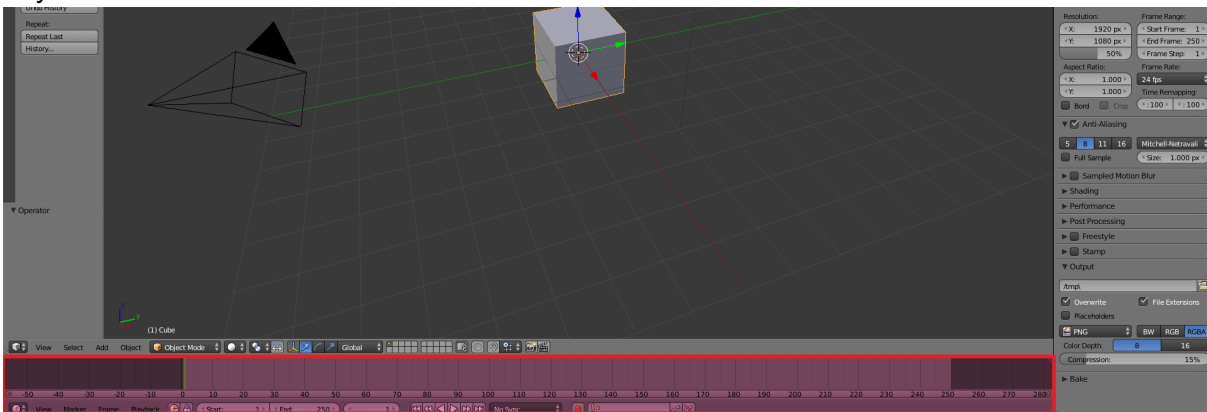
Luckily, we won't be having to create that many images ourselves. With Blender, we can set up what are called *keyframes*. If we want something in our scene to do a transition, we can set up

keyframes at the starting and ending times of that transition, and Blender will automatically generate the in-between frames.

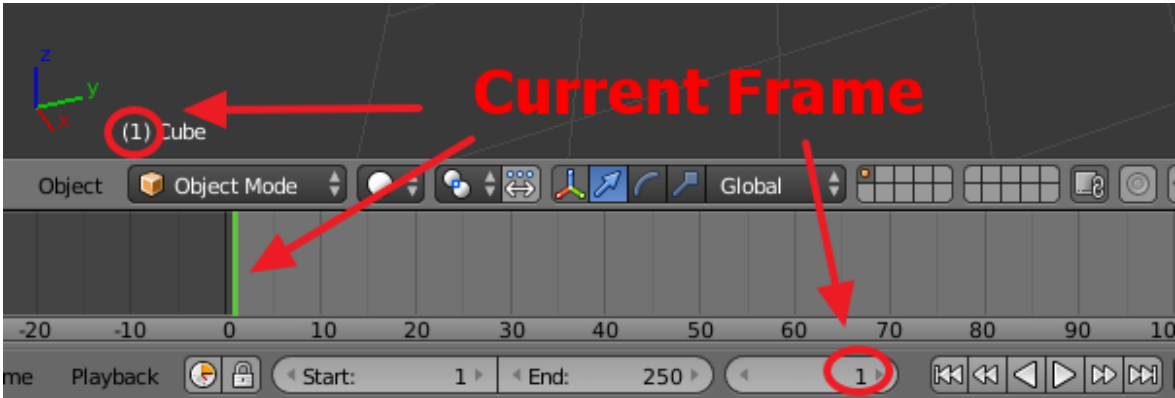
For example: let's say you're making an animation of a box that moves from the left side of the screen to the right side of the screen in one second. You set the first keyframe to be at Frame 1, showing the box on the left side. You then set the second keyframe at Frame 24, showing the box on the right side. All of the other 22 frames showing the box gradually traveling from left to right are automatically created by Blender! If you had set that second keyframe at Frame 48, Blender would have generated 46 in-between frames, and the animation would have taken two seconds to play. But in either case, you're only setting up two frames.

The Timeline

Animation in Blender mostly takes place in the Timeline panel, which can be found at the bottom of your screen.



The numbered bar represents the frames of your animation. You can left-click on the timeline to change which frame you're currently viewing, as represented by the green line in the timeline. You can also see what frame you're on by looking at the number in parentheses at the bottom-left corner of your 3D View, or by checking the number field below the timeline.



Setting Keyframes

Whenever you want to set a keyframe for an object, you need to take the following steps, *in this order*:

1. **Choose your frame.**
2. **Set your transformation.**
3. **Lock the keyframe.**

The order here is important; taking actions in the wrong order can actually result in lost work! We will explain in greater detail in the sections below.

Step One: Choose Your Frame

Before doing any kind of transformation on your object, you need to decide what time in your animation you want to set your keyframe. Left-click anywhere on the timeline to change your current frame. You'll see the green bar move to where you clicked. So, for example, let's say you want your cube to start moving one second after the animation starts. This first keyframe, then, should be at Frame 24. Left-click the timeline to change your current frame to Frame 24.

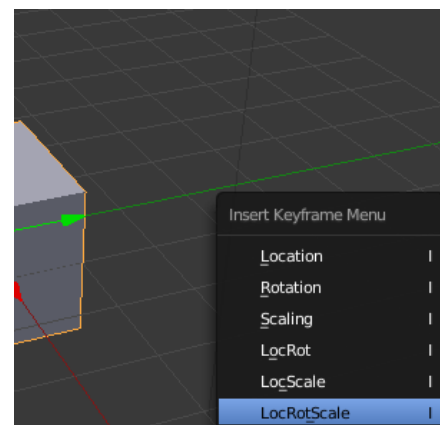
Step Two: Set Your Transformation

Once you've chosen your frame, you can transform (e.g. move, scale, rotate) your cube. Set it up to be however you'd like it to look at this point in time during your animation. ***Do not change your frame while doing this!*** If you make a transformation, and then move your "current frame" before locking the keyframe in step three, your cube will revert to whatever keyframes are already in the animation!

Step Three: Lock the Keyframe

Once you've transformed the cube, press "i" on your keyboard to bring up the Keyframe menu. This menu allows you to choose what kind of information about the cube you'd like Blender to remember for this keyframe. Almost always, we want to choose "LocRotScale", which stands for "Location, Rotation, and Scale". This tells Blender that at this particular keyframe, you'd like the cube's location, rotation, and scale to be just as you've set it.

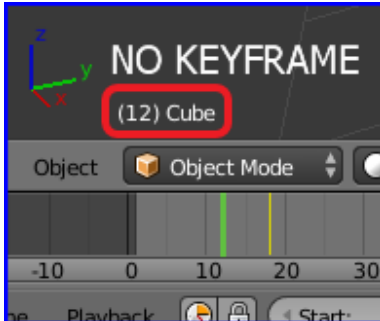
You should now see an orange bar appear in the same place as the green bar on the timeline. This orange bar represents the keyframe you just set.



Adjusting Your Animation

To Delete a Keyframe:

1. In Object Mode, select the object whose keyframe you'd like to delete.
2. Move the green slider in the Timeline to the keyframe you'd like to delete. You'll know that the current frame has a keyframe when the frame number in the lower-left corner of the 3D View is orange instead of white.



3. Press Alt-i on your keyboard, and select "Delete Keyframe".