



Animation in Bryce 3D

Animation Overview

Animation is the process of adding a fourth dimension to your scene—time. To create an animation, you arrange a scene then record your movements or transformations of objects over time. Bryce creates a motion path from your recorded movements and then generates an animation.

You can animate almost anything in your scene:

- the motion of objects, lights, and the camera
- object size and shape

- object materials
- terrain objects
- sky properties

The Animation Process

Animation is a cooperative process between you and Bryce. You set up the arrangement of objects and scene settings, and then you adjust those settings over time. Bryce steps in and fills in the gaps between adjustments. When you play the animation, motion is created.

The steps to creating an animation are as follows:

- Create objects using the Create tools or the Terrain Editor.
- Build a scene by arranging and transforming objects, lights and the camera.
- Adjust the position, orientation or scale of objects. Each time you make an adjustment, you create a *key event* which indicates a point where an object property was changed.
- Adjust the shape or placement of the motion path.

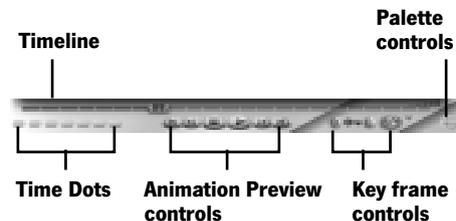
- Adjust the speed at which the object moves along the motion path using the Advanced Motion Lab.
- Render the animation as a movie file. You can render the animation as a QuickTime/AVI movie file or as a set of frames.

Animation Tools

Bryce 3D's animation tools are designed to help you quickly and easily animate the properties of your scene.

Animation Controls

The animation controls let you record an animation and preview it in the Working Window. You can also use the controls to change the current time or move to different points in time.



Use the animation controls to record and preview your animation.

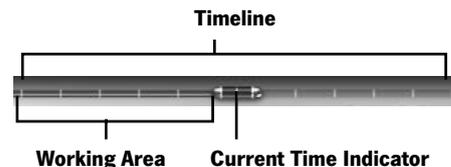
The Animation controls appears in three areas in Bryce:

- The Working Window
- The Materials Lab
- The Terrain Editor.

The tools have basically the same function in each area. The only difference is that controls in the editors let you create key events for the properties associated with the editor. This means that in the Terrain Editor you can only add key events for terrain objects, and in the Materials Lab you can only add key events for material properties.

The Timeline

The Timeline is a graphical representation of time. The darker gray area within the Timeline represents the current length of your animation.



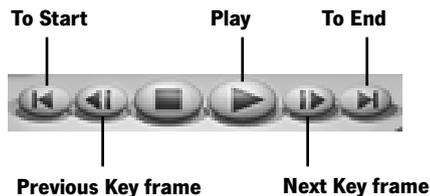
The Timeline indicates the length of your animation and the current time.

The colored section of the timeline represents the length of the Working Area. The Working Area can be used as a visual guide to help you isolate portions of your timeline. When you render the animation you can choose to render the entire timeline or just the Working Area. This is also the only area that is previewed when you use the animation preview controls.

The Current Time indicator lets you move to different points in time. This is the main tool you'll use to create animations. Every time you want to add a key event, you move the Current Time indicator to a different point on the timeline.

Animation Preview Controls

The Animation Preview controls let you move between the key frames in your animation.



Use the Animation Preview Controls to move between key frames in your animation.

The larger buttons move to the beginning and the end of the animation. The smaller buttons move to the next and previous key frames.

Time Dots

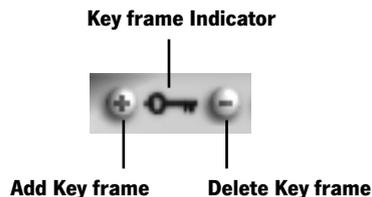
The Time Dots let you save positions on the timeline. You can use the dots to quickly jump between areas of the timeline you're working on.



Use the Time dots to quickly move between saved positions along the timeline.

Key Frame Controls

The Key Frame controls let you add and delete key frames from your animation.



Use the Key Frame controls to add and delete key frames from the timeline.

The Key frame indicator is only active when the current time is at a key frame.

The Add Frame button lets you add a key frame. In Auto-Record mode, Bryce automatically adds key frames for you, but when you disable the mode, you'll have to use this button to add key frames at points in the timeline.

The Delete Key button deletes the selected key event or a specific type of key event. In the Working Window, deleting a key event deletes all the frames at the current time. In the editors the Delete Key button only deletes key events for the properties associated with the editor.

Animation Options

The triangle icon to the right of the animation controls, displays Auto-Key option menu. This menu lets you turn the animation system on or off.



Use the triangle icon to access the animation options menu which lets you enable or disable the animation system.

When the animation system is enabled, every change you make to the scene is recorded as a key event. Changes can include things like moving an object, changing a material, or changing the shape of a terrain.

When the animation system is disabled, your changes are not recorded. To record a key event you have to use the Add Key Frame button. The animation system is enabled by default.

Swap Button

The Swap button lets you switch between the Animation controls and the Selection palette.



Use the Swap button to switch between palettes.

Advanced Motion Lab Button

The Advanced Motion Lab button opens the Advanced Motion Lab.

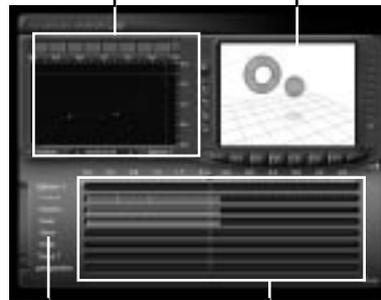


Use the Advanced Motion Lab button to display the Advanced Motion Lab.

The Advanced Motion Lab

The Advanced Motion Lab contains tools that let you control the detailed properties of your animation. You can use the lab to view object hierarchies, remap key events and adjust the position of key frames on the timeline.

Time Mapping Curve Editor Preview Area



Hierarchy Area Sequencer

The Advanced Motion Lab lets you control the speed of objects along a motion path and the placement of key frames on the timeline.

Hierarchy List Area

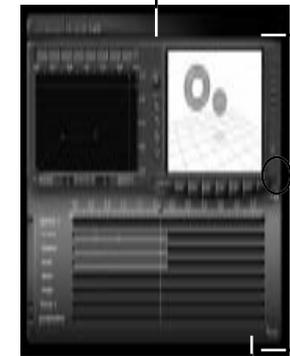
The Hierarchy List Area displays the scene's hierarchical structure, including links, and groups. You can view all the hierarchies expanded or just the parent

objects in the scene. You can also expand an object's listing to show all of its properties.

The Sequencer

The Sequencer lets you see the key frames recorded for each property within an object. Each property has its own timeline *track*. Key frames are displayed as white marks on the timeline. The current time is indicated by the Current Time bar.

Hierarchy List Object Timeline

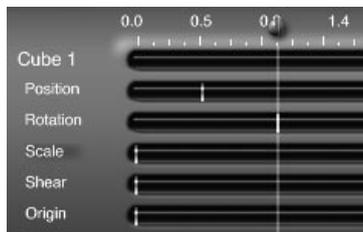


Key frame

Current Time Bar

The Sequencer lets you control the placement of key events on the timeline.

The Sequencer lets you see where in time a change in an object's property occurred and edit the position of that event. Different types of objects have different properties.



Each Object listed in the Hierarchy List area can be expanded to show the timelines of any transformations applied to it.

A scene contains more than just objects. You can expand the Hierarchy List to also display the properties for your scene's sky and the camera.

The display buttons along the left side of the hierarchy area let you hide or display an object in the animation preview. This can help you isolate objects in a complex scene.



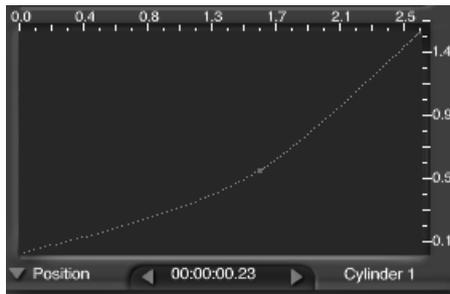
Use the display buttons to hide or show objects in the animation preview.

Time Mapping Curve Editor

The Time Mapping Curve editor lets you control the length of time between key events. Each property listing in the Hierarchy List has its own time mapping curve.

The curve acts like a time filter which remaps the time in your animation. Depending on the shape of the curve, the events in your animation may take longer to complete, or may all occur very rapidly.

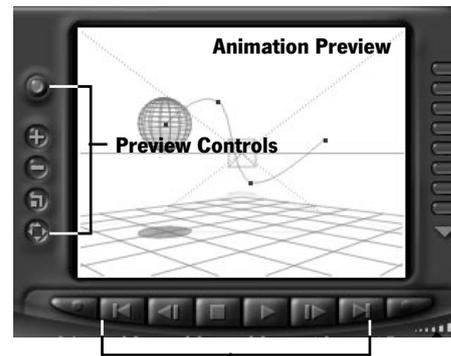
A time mapping curve can speed up events while slowing down others. You can even reverse the action in your animation. Refer to "Time Mapping Curves" on page 367 for more on working with Time Mapping Curves.



The Time Mapping Curve editor lets you remap the time in your animation.

Preview Area

The Preview Area contains tools that let you preview your animation.



Preview VCR Controls

The Animation Preview area lets you see any changes you make to the velocity of objects.

The Preview Area has three parts:

- The Animation Preview area displays a wireframe preview of your scene. Any changes you make in the Time Mapping Curve editor or the Sequencer are updated to this area.
- The Preview VCR controls let you play the animation like a movie. You can stop, play, move forward one key frame, or back one.

- The Preview Display Controls let you zoom in/out of the preview, switch between Camera View and Director View, pan the preview and reset the preview.



Animation Features

Bryce 3D has several special features that let you add extra effects to your animations:

- Time Mapping Curves
- Animating Transformations
- Animating Materials
- Animating Terrains
- Animating Skies

Time Mapping Curves

Time Mapping Curves are graphical representations of the time mapping filter. The filter remaps the time in your animation, so that the events that occur at specific times in your animation occur differently in actual time.

By adjusting the shape of the curve, you can control how fast events occur. When you create a sharp jump in the curve, you speed up the events in your animation. When you flatten the curve, you slow down key events.

Each property of your scene can have a different curve, so you can have key events occurring at different speeds.



Refer to *“Time Mapping Curves”* on page 48 for more on Time Mapping Curves.



Animating Transformations

When you're in Auto-Record mode, every transformation you apply to an object is recorded as a key frame.

In the Hierarchy area you can see where the key frames for these transformations appear in the timeline. By moving these key frames you can control the order in which transformations are applied. For example, you can take an object that grows larger and then moves left, and turn it into an object that moves left and then grows. Several animation techniques, like squash and stretch, can be simulated using transformations.



Refer to *“Animating Transformations”* on page 48 for more on animating transformations.



Animating Materials

The Materials Lab has its own set of animation tools that let you animate material properties. You can animate almost any property or texture.

When you're animating between textures, Bryce interpolates between patterns and colors over time. You can have a rocky terrain turn into a desert during the course of your animation.



Refer to *“Animating Materials”* on page 385 for more on animating materials.



Animating Terrains

The Terrain Editor has a set of animation tools that let you animate a terrain over time. You can animate the shape of the terrain, or the filtering effects like Erosion or Mounds.

Using these tools, you can create a terrain that changes shape as time passes.

Refer to *“Animating Terrains”* on page 393 for more on animating terrains.

Animating Skies

The Sky & Fog palette and the Environmental Attributes dialog have a number of controls that let you set the properties of your environment. By changing these properties over the course of an animation, you can animate your environment. For examples, you can make clouds move, or gradually change the time of day.

Refer to *“Animating Skies”* on page 389 for more on animating skies.

Managing Your Project

Storyboarding

If you are attempting anything other than a brief animation, it's a good idea to create a storyboard first. A *storyboard* is a series of drawn images showing the key actions in an animation. The storyboard helps you quickly work out the animations viewpoint, framing and composition. Because you're just sketching, it's easy to make changes and other arrangements. Your work on the storyboard will give you an idea of the types of objects you'll need to model and how to arrange the scene.

You can make sample storyboards by drawing a series of horizontal screen outlines on a sheet of paper, using a 4 to 3 aspect ratio (ratio of width to height). Draw the screens as large as necessary, and leave a block of space for the

narration or description. You can also purchase cartooning storyboards at art supply stores.



You can use a storyboard to help layout the action in your animation.

Simplifying Your Scenes

In general, the 3D scenes you create for animation need not be as complex as a typical illustration scene. The viewer's eye tends to be drawn toward motion and foreground elements. Static objects and background elements are scanned only casually.

By reducing unnecessary detail, you can reduce rendering times dramatically and keep the size of your scene files manageable. When preparing a scene for animation, keep the following guidelines in mind:

- Refine your animation. Keep the objects as simple as possible. Detail is usually lost in an animation.
- Use fewer objects, and limit the number of reflective and transparent objects.
- Use the minimum number of lights required to achieve an effect. Additional light adds significantly to the rendering time.
- Limit the number of objects with complex materials.

- If a complex model remains in the background for the duration of the animation, try substituting a simpler version.
- If your camera view remains unchanged for an entire scene, consider rendering a still image with just the scene's background elements. Then use this image as a backdrop and animate only the foreground elements. This technique requires some planning to make sure that shadows and transparent objects don't give the "trick" away.

Rendering Without Compression

If you are not pressed for hard disk space, it usually makes sense to render your animation without compression. This ensures that you'll have a high quality copy of the animation to work with.

Working from your uncompressed original, you can save copies, experimenting with various compression settings until you are satisfied with both the image quality and playback rate.

An animation compressed multiple times degrades significantly, so you should always render without compression if you intend to do any postprocessing in another application.



Motion and Timing Principles

As an animator, the most important skill you can master is the ability to portray motion convincingly, whether it is intended to be realistic or exaggerated and cartoonish. No matter how good a 3D modeler you are, the timing of the events in your animation are of paramount importance.

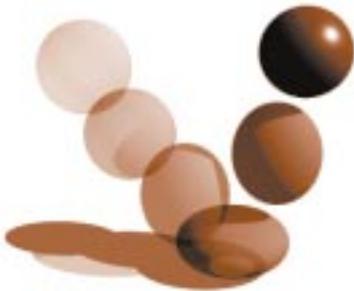
Many of the principles of timing and motion developed by cell animators apply to 3D animation with Bryce 3D as well. Many of these principles apply especially to character animation, but most are useful for any subject matter. For more information, you can refer to one of the many excellent books on cartoon animation.

Squash and Stretch

Squash and stretch are animator's terms for the exaggerated redistribution of an object's mass as it moves or shifts positions. Squash and stretch portray the qualities of elasticity and weight in a character or an object.

Think of a bouncing rubber ball. As it falls it stretches; as soon as it hits the ground it is squashed. If the ball failed to change shape, the audience would interpret it as a solid, rigid mass.

You can accomplish squash and stretch in Bryce 3D by transforming the object at different points in time.



This ball's bouncing motion is exaggerated by deforming its shape so that it stretches as it descends and squashes when it hits the surface.

Lag and Overlap

When an object moves from one point to another, not everything has to move at once. For true-to-life movement, action that is secondary to the main activity can lag and overlap. For example, when you animate swirling curves, the cubes at the top would swirl faster than those at the bottom. In Bryce 3D, an object's hierarchy can be used to create these effects.

Arc vs. Straight Line Movement

Character motion appears more realistic if it follows an arc or curved path instead of a straight line. Most objects affected by gravity also follow curved, rather than straight trajectories.

Bryce 3D's motion paths can be used to create any type of trajectory.

Secondary Motion

Secondary motion adds realism and credibility to a scene. A character turning his head to stare at something in disbelief shouldn't just turn his head; his jaw should drop and his eyes should blink as well. The viewer focuses on the main action, but registers the secondary motion as supporting it. Bryce 3D's Advanced Motion Lab gives you enough

control to manage even the finest details of your animation, so you can add this kind of secondary detail.

Exaggeration

Exaggerating an action emphasizes it, making it more prominent. For example, if intrigue is called for, have a character sneak instead of walk.

If you want your animation to resemble footage from a hand-held camera, give your camera an exaggerated bobbing motion. Virtually any type of action can be exaggerated to get an idea across.

Timing

Timing is as important in animation as it is in any dramatic form. Consider the difference between an abrupt stop and a gradual slowdown. Each conveys a completely different impression. In general, a motion that continues at the same pace lacks interest and seems unreal.

If you are trying to animate realistic character action, act out the sequence yourself, timing how long each pose is held and how long each action takes with a stopwatch.



Timing is one of the most difficult aspects of animation to master. The key events you define at different points on the time line need to be synchronized with those that came before and those that follow. Fortunately, you can use the interactive nature of computer animation to fine-tune your timing. Test your animation frequently by previewing it in the Working window or by dragging the Current Time indicator back and forth between key events. Adjust the event's position in the Advanced Motion Lab until you're satisfied with the timing.