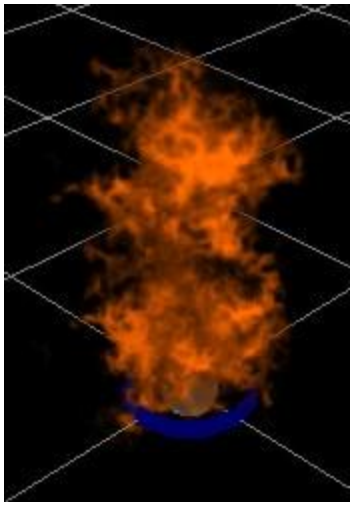
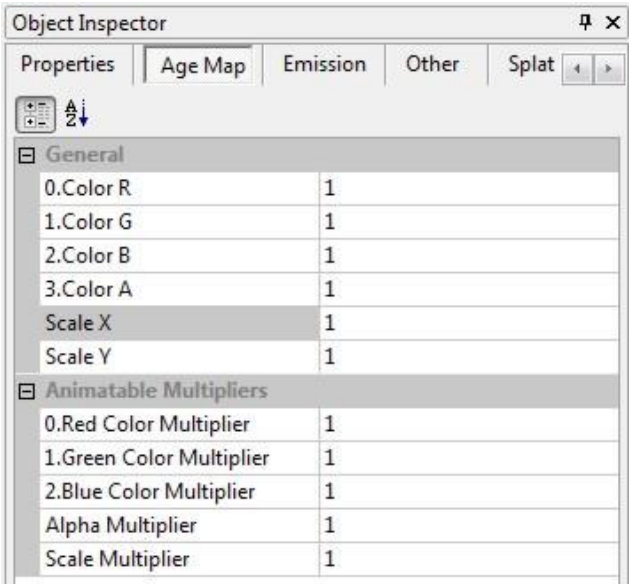
VFX Tutorial #2 version 1 – Introduction to the Time Line

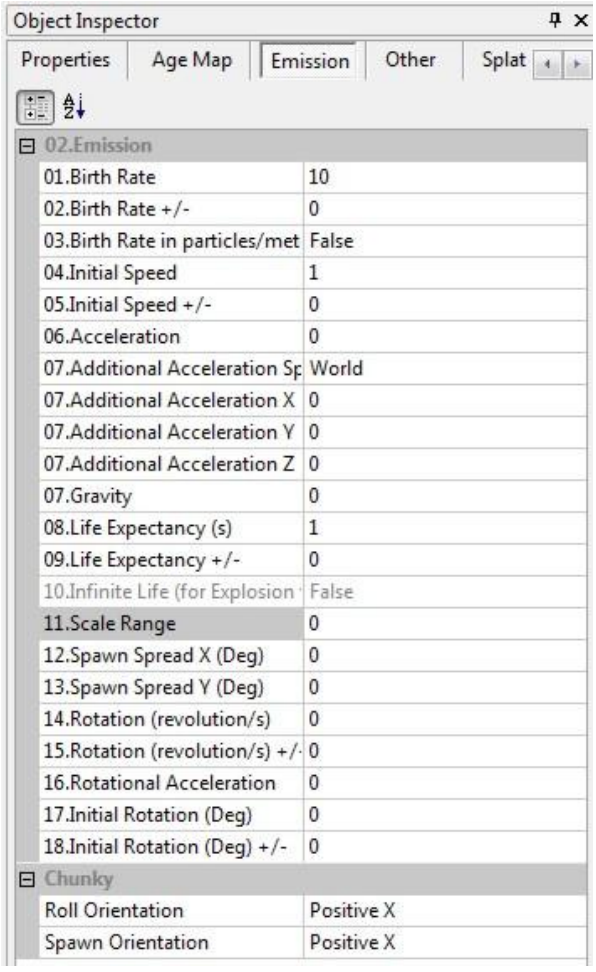


In tutorial #1 we created a good bone fire as a base and up until now we only changed the values directly in the properties on the effect. As we can see this works well for simple effects. Changing the values in this manor alters the effect over its entire life time.

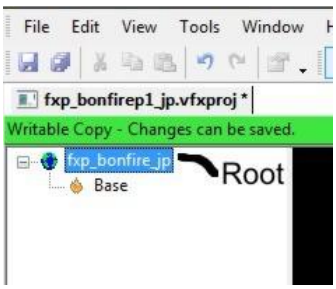
We have seen how to change the color and scale of the effect by changing the values in the properties age map. This is great for a basic flame but we want to add more life to it by making the flame vary in color and size over the length of the effect. To start, Set all the Values back to default as shown in the 2 pictures below.

Note: This tutorial assumes you have read Tutorial #1 or are familiar with the basics of the VFX editor.



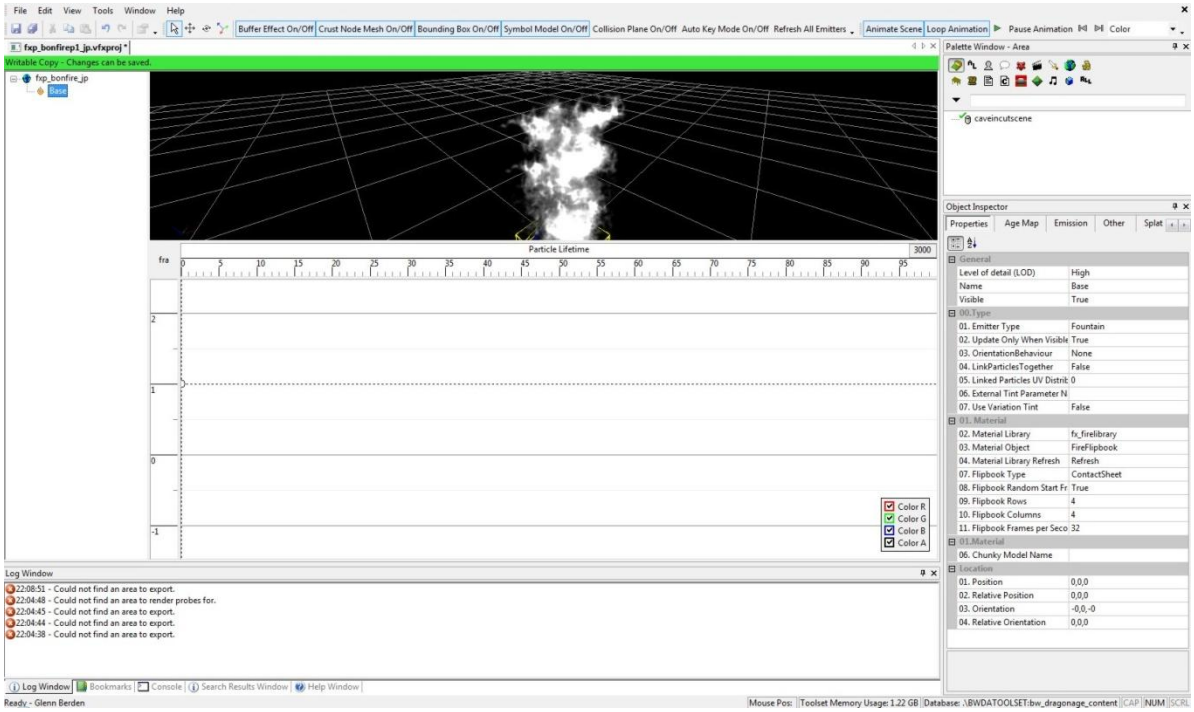


Setting any of these values directly will affect the visual over the entire length of the effect. Instead we want to vary these values so the flame will change from reds, yellows, and orange. We also want to change its size during the impact, duration, and cessation phases of the effect. To do this, we will use the time line to set colors and scale so they change over the course of the effect.



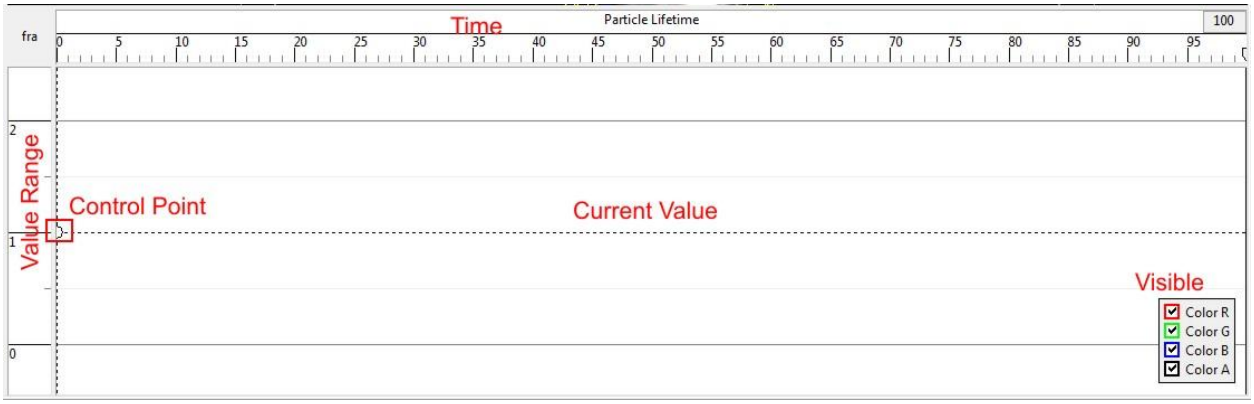
Before we continue, we need to make a small change. Select the Root of the effect and in the Object Inspector, change the Impact time to 5 sec and the Cessation time to 8 sec. The 5 sec impact will allow us enough time to see the changes in the flame as it grows and the longer cessation time is for the smoke we will be adding later on.

Select the “Base” object, at the top right corner there is a drop down window, select “Color” from the list. Note, when using the time lines, make sure you have the correct emitter object selected. In this case it is the Base emitter. You should then see a time line like the one below.



Notice at the top of the time line is reads “Particle Lifetime”. This means that the changes we make here will affect each partial over the lifetime of each particle. The lifetime of the particle is directly related to the “Lifetime” value setting in the Emissions Tab, which currently is set to 1 sec.

Parts of the Time line:

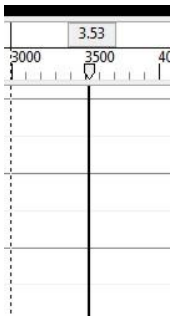


Control Point: The round dots allow you move the value up, down, left, or right within the time line.

Value Rang: The left side of the time line shows the value range. At this current control point, the value is 1, which is the current value for all 4 colors in the Age map.

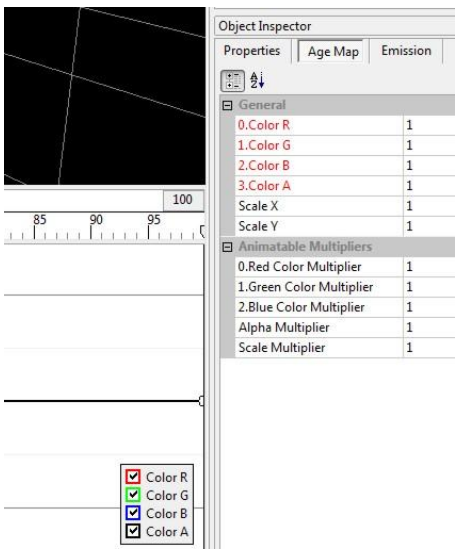
Current Value: The dotted line shows the current value any place on the time line. Currently it is set to 1 over the entire length of the particle lifetime. When a control point is added, the line between the 2 control points will become solid.

Visible: This box shows which time lines are visible, the dotted or solid line. You can select or unselect these time lines. Currently all 4 are selected and visible. All 4 also are set at the same value so you only see one control point as all 4 are stacked from top to bottom, Color A being the one on top.



Click here

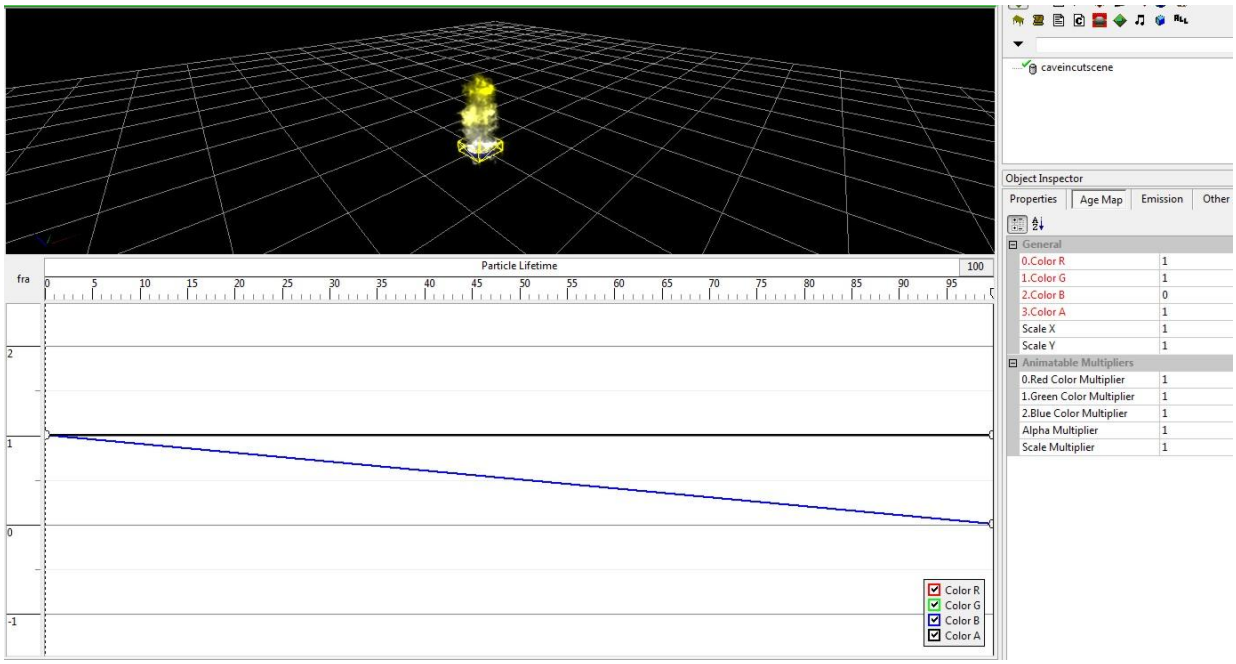
Click inside the time line and you will get a vertical bar. Drag the bar to the far right until the end of the timeline is reached. This bar represents that point in time and I will refer to this bar as the Point bar. Clicking anywhere on the time line will move the point bar to that point in time.



Right click on the time line and select “Add Control Point”. This adds a node at the point in which the point bar and the time line intersects. Also note that the Colors in the age map turn red, this indicates that the values are now controlled by the time line and can vary in value depending on the point in time. Also note that this adds a Control Point to each time line that is visible, so all 4 colors get an added node.

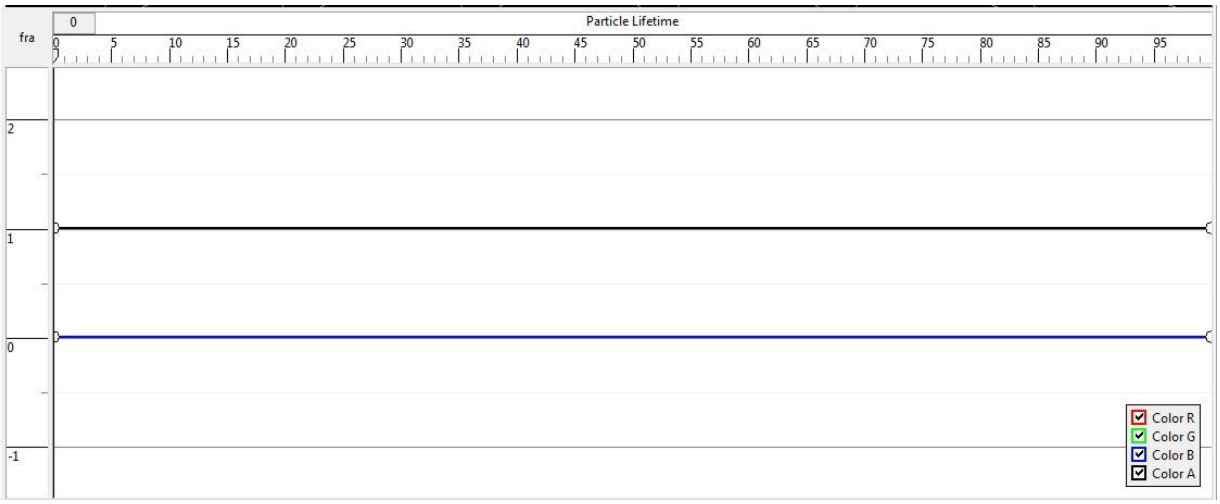
Before we continue, save your work. Next turn the Loop Animation Off by clicking on it at the top right so it is no longer highlighted.

There are 2 ways that we can set the values on the time line, directly in the value box of the Age Map, or by dragging the control points on the time line. To see how it affects the animation, first make sure the point bar is to the far right at 100. Change the value Color B to 0 directly in the Age Map properties, just as we did in Tutorial 1. You should now see a blue line starting at 1 and dropping to 0 at the end of the time line. By changing the value on the Age Map, you affect the control point that intersects with the Point Bar. The Flame should now be white at the bottom and Yellow at the top.



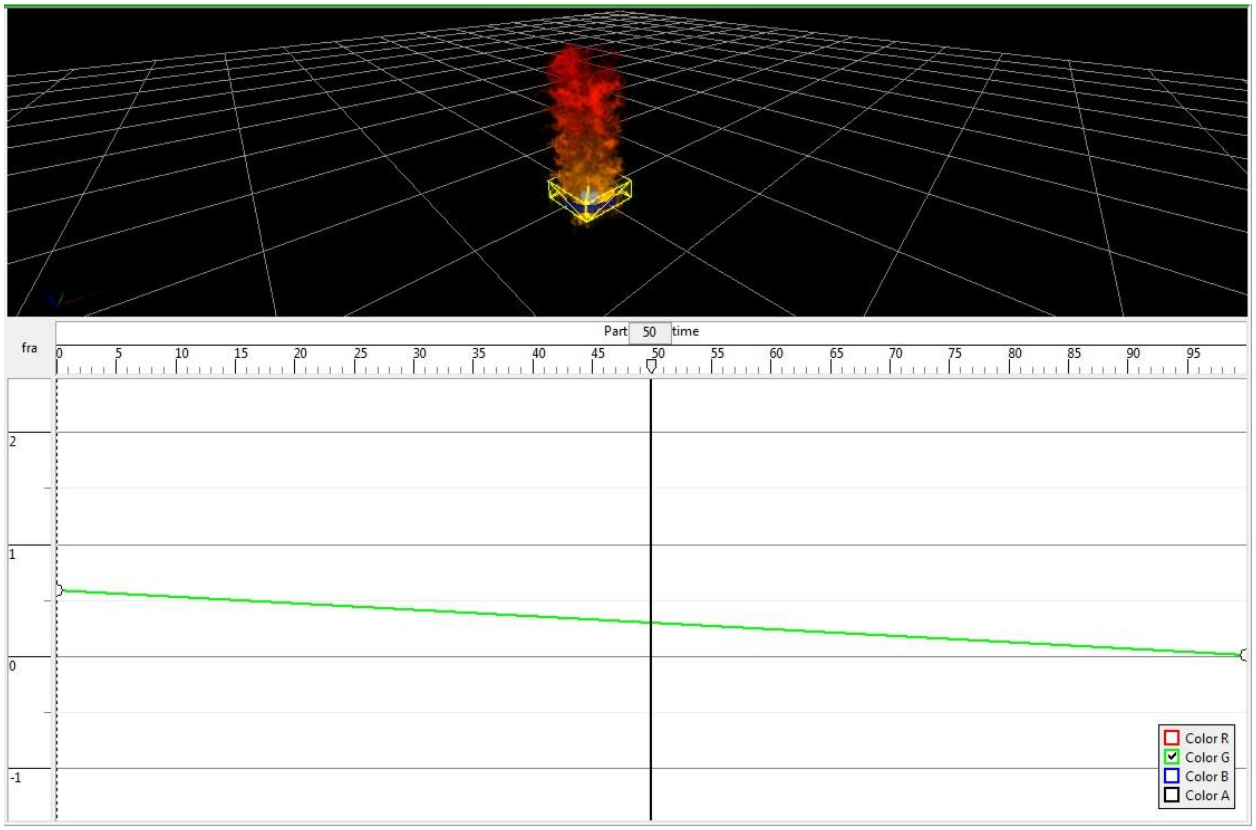
To see what happens to each particle, go to the Emission tab and change the birth rate to 1. You will see the particle start from the emitter as white, then gradually change to yellow. Set the Birth rate back to 10 and return to the Age Map.

Now move the point bar to the far left on 0. Notice that the value in Color B on the Age Map is again 1. Change this to 0 also and the left most control point will drop to 0 and you time line should now look like this.

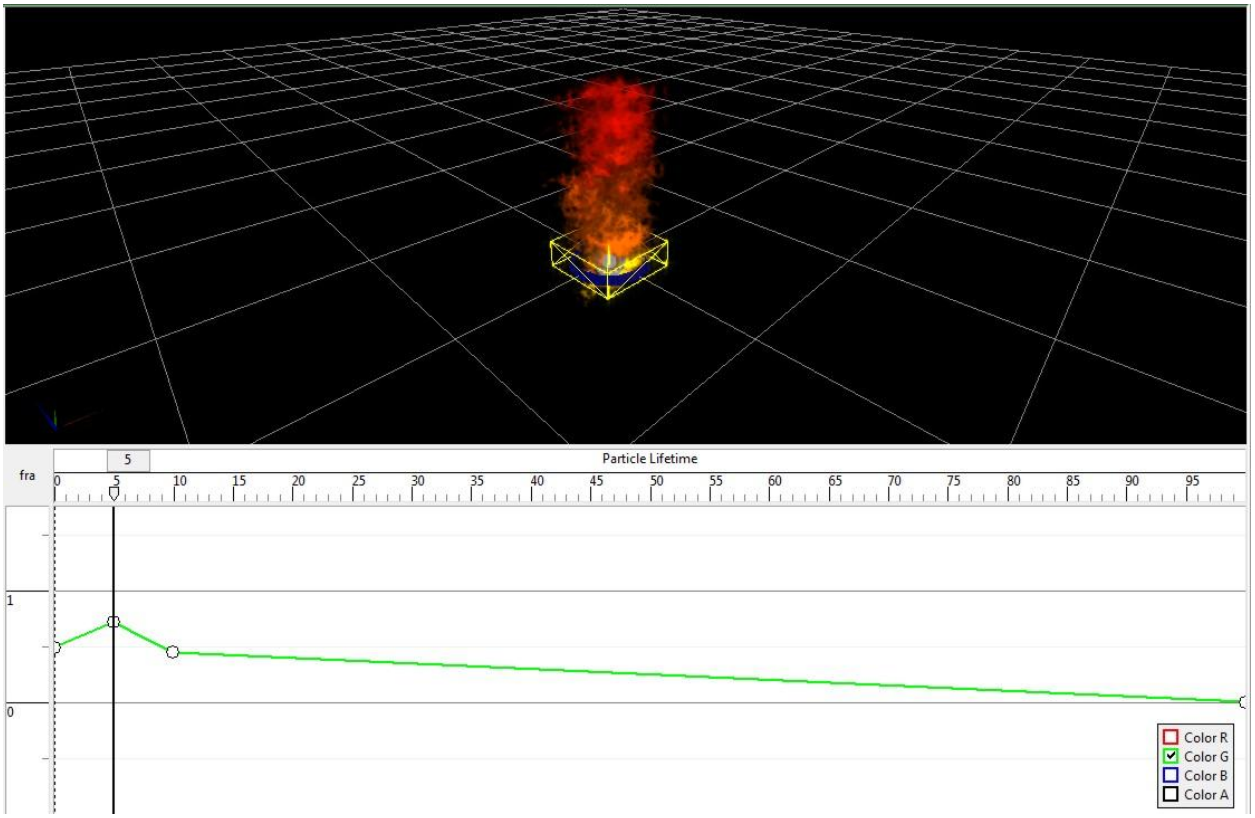


The small box in the lower right corner in the above image indicates which time lines are visible. Right now all 4 colors are visible on the time line. Next we will affect the green color by dragging the control points instead of changing the value directly in the Age Map. However the green time line in underneath the Alpha time line. So to make it visible, click the check mark to unselect the Alpha Color. The Alpha line goes away and we can now see the Green time line. Also uncheck the Red and Blue color time lines so only the Green is visible.

Next Click and hold on the far left (0) control point of the Green time line and drag it down a bit, about half way between 1 and 0, you should see the flame change colors as you drag it down. Grab the right most control point and drag it down to 0. You should now have a flame that is brighter red at the bottom and darker at the top.



Now we are going to add 2 more control points to the Green time line. Move the Point Bar to 5 on the Particle Lifetime line, right click and select “Add Control Point”. Now move the Point Bar to 10 on the timeline and add a second control point. Grab the first control point we just added, the one at 5, and drag it up to about 0.7. This will create a bright flicker at the base of the fire.

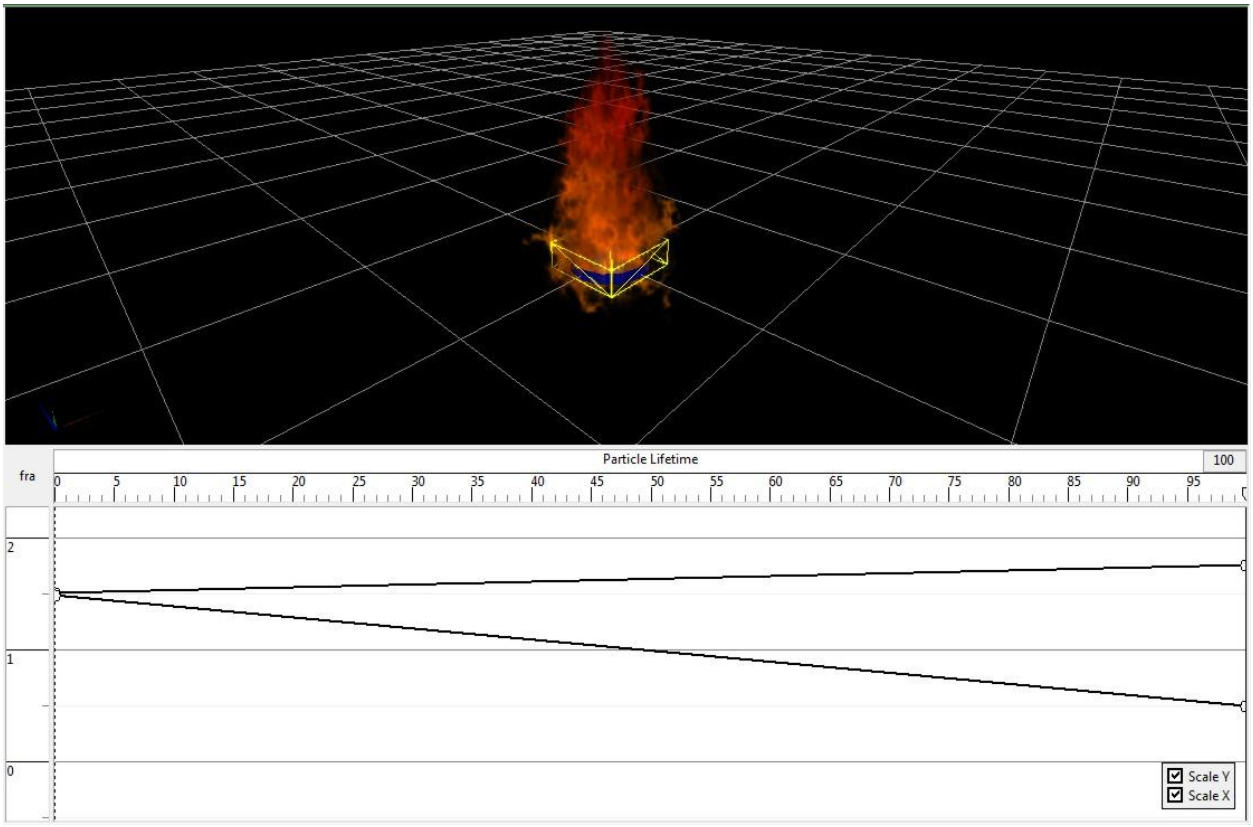


Now we just need to fade out the top of the flame a bit so the bottom is more intense than the top. Uncheck the green timeline and check the Color A (Alpha). Color A is a transparency color and can be use to alter the intensity of the particle. Grab the Right most control point and drag it down to about 40% (0.4). You will see that the top is less visible than the bottom of the flame. Save your work.

Changing its size:

Right now the flame is a single column that is the same size at the top as it is at the base, this is not very realistic so we will remedy that by changing the scale of the particle.

In the drop down menu at the top right, select “Scale”. Again you will see a time line labeled “Particle Lifetime” a Control point, and a box showing the “Scale Y” and “Scale X” time lines. As we did before, move the Point Bar to the far right at 100 and right click and select “Add Control Point”. Now uncheck the Scale X time line so only the Scale Y line is visible. Move the Left control point to about 1.5 and the right control point to about 1.75. Check the Scale X timeline to make it visible and move the left control point to about 1.5 and the right control point to 0.5. This will widen the base and stretch the top to a point much like a real fire.



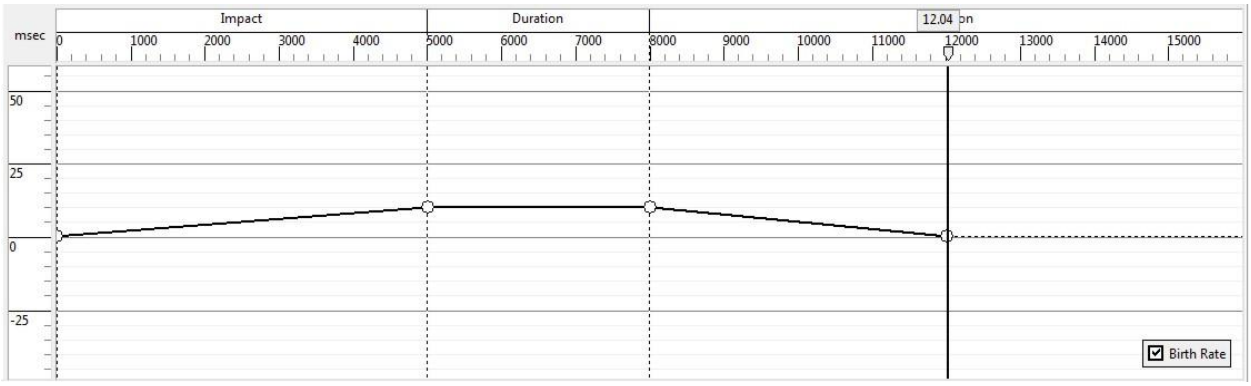
Now the fun begins. Up until now we have been changing values over the lifetime of the particles. Now we will start changing values over the Impact, Duration, and Cessation time of the effect, but first save your work.

Select the “Emissions” Tab in the Object Properties. In the drop down menu, select “Birth Rate”. This time you will see a bit different looking time line. At the top you will see 3 sections, Impact which starts at 0 and ends at 5000, Duration starting at 5001 and ending at 8000, and the Cessation which starts at 8001 and ends at 1600. These times correlate to the 5 sec Impact, 3 second Duration, and the 8 second Cessation times specified in the VFX root.

TIP: You can Zoom Extents by double clicking inside the time graph, or zoom in/out by using the mouse scroll wheel.

When an effect is used in game, the Impact time plays, then the Duration time is looped for the length of the applied effect, then the Cessation time plays. For example, if the fire effect is applied to a wood pile for 3 min, the Impact time plays then the 2 second duration is looped for 3 min then the cessation time plays. With this in mind, we want the fire to build up to the a full blown fire, then taper off and go out.

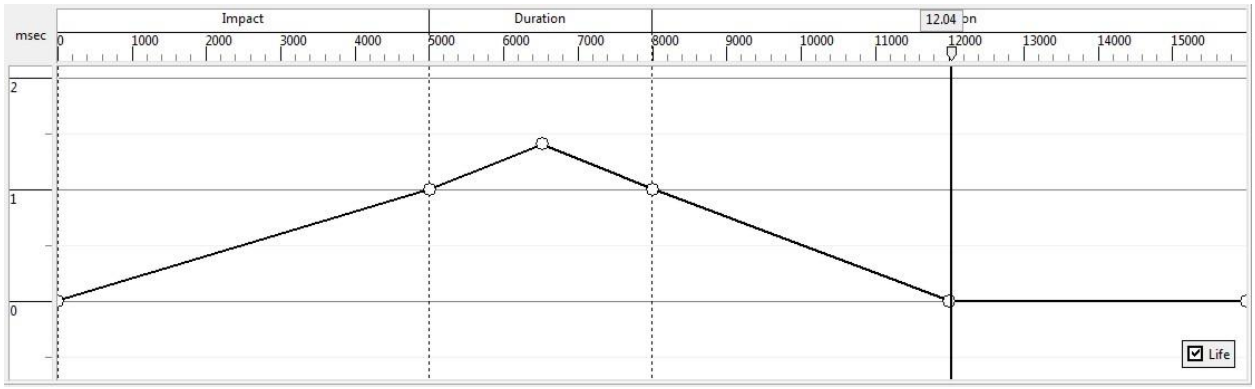
In the Birth Rate time line, add 3 more control points, one at the Duration start, one at the duration end, and one at about 12000. Starting from the left move the left most control point to 0, move the second Control Point to 10, the third Control Point to 10 and the forth to 0.



Notice that the flame stops burning like it was before. This is because now the total effect length is a factor. Slide the Point Bar back and forth on the time line, you can see what happens to the fire at any point in time. Now to view the animation of the effect, you must click the Play button in the upper right corner. The Point Bar will scroll across the time line and the results can be viewed in the effect window.

The fire should now start out slow and build up then taper off and go out at around 12 seconds. You can click on the Loop Animation if you want and the effect will continue to loop until paused by the Pause Animation button or by clicking in the time line.

Now select Life in the drop down menu. Right now each point in time the flame last 1 second. We want to change this so the flame when first starting out or ending doesn't last that long. Keep the tip I gave above in mind, and make the Life time line look like the one in the picture. The Control Point times from left to right are 0, 1, 1.4, 1, 0 then save your work.

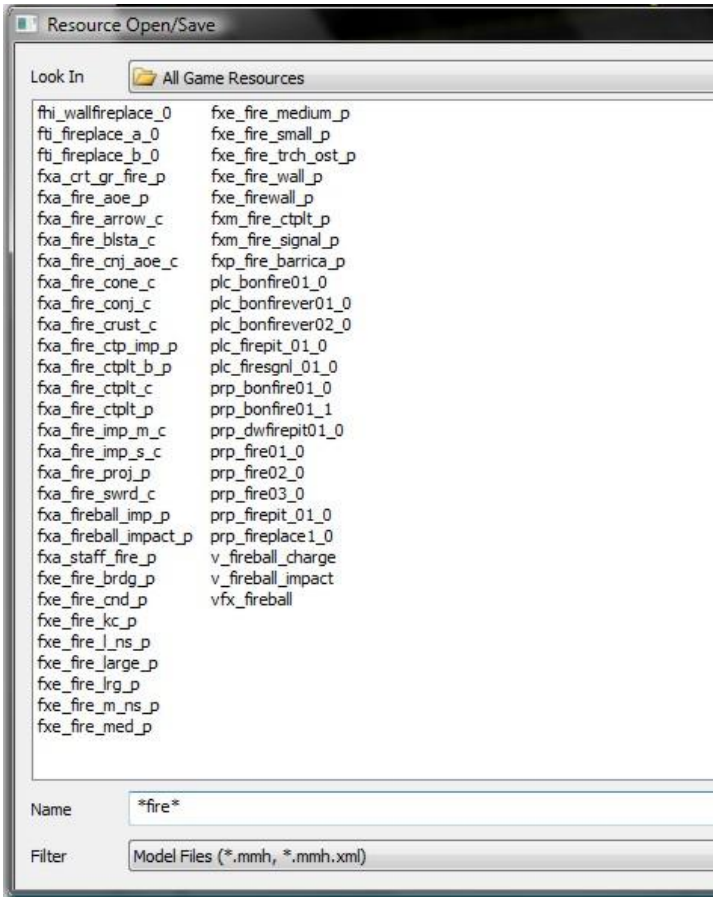


Let's Dance:

Right now we have our fire looking pretty good, but there is one element still missing, the wavering and dancing of a real fire. On the Emission table item 12 and 13 are "Spawn Spread X (Deg)" and "Spawn Spread Y (Deg)". These settings affect the spread of the particles in the X and Y directions, that is the particles can emit in varying directions in degrees from the emitter. Set both of these to 20 degrees.

Now our fire dances. Note that these settings could be set using the time line "Spawn Spread" as well, feel free to play with that if you wish.

We can get a better Idea of what our effect will look like in game by adding a reference model. Right click on the Root and select "Insert > Insert Reference Model". In the Resource window Name field we can filter the list to make it easier to find what we are looking for, so enter *fire* and press enter. Now your resource list will only show those items with the word fire in it.

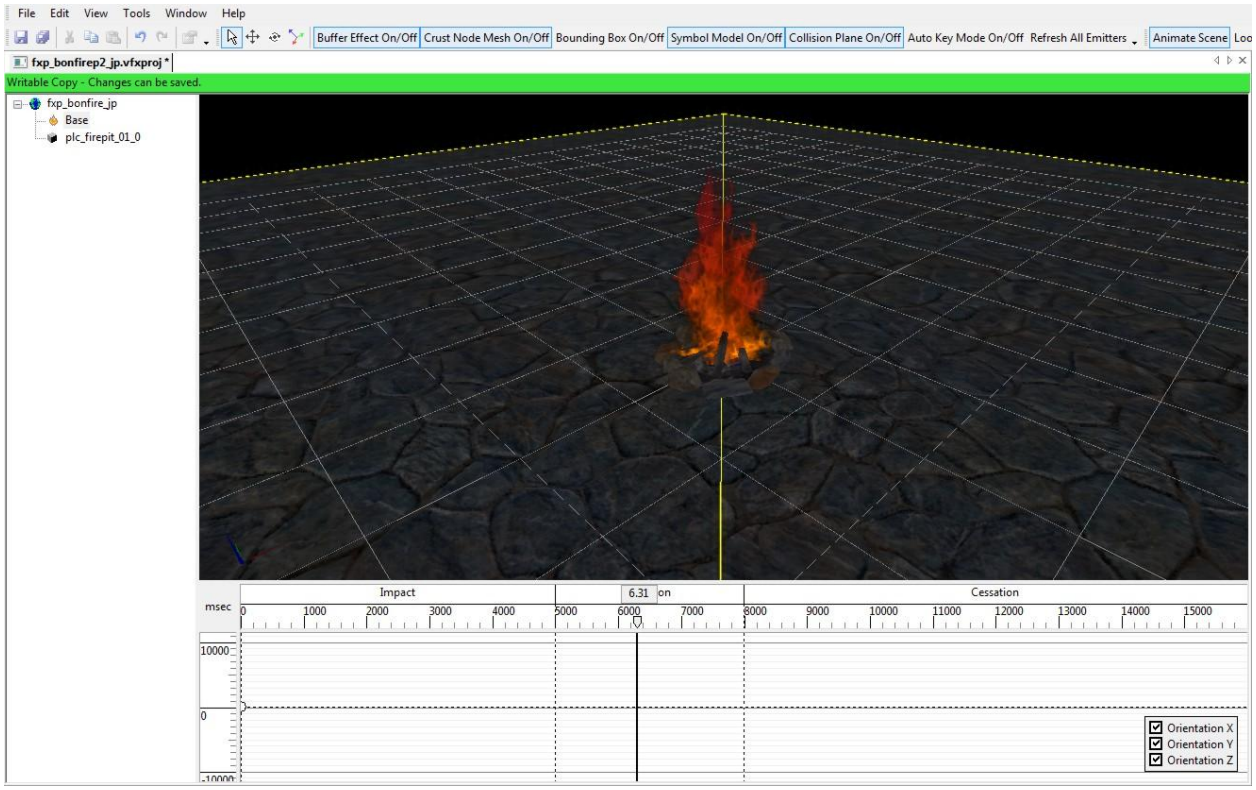


Choose the resource "plc_firepit_01_1". Turn Bounding box Off by clicking it at the top to un-highlight it. This gets rid of the yellow square around the objects. Turn the Collision Plane on by clicking on it to highlight it. This will simulate a stone floor at the walk mesh level.

Now play you animation. You can also select the Base object and click anywhere in the time line, for example if you place the Point Bar anyplace in the Duration time you can watch your fire burn at it's full potential.

Challenge: Replace the plc_firepit_01_1 with the plc_bonfire01_1 reference model. Scale your fire up, and increase it's life time to engulf the wood pile in flames.

Don't forget to save your work.



This concludes Part 2 of the tutorial. In Part 3 we will be adding smoke and lighting to the flame and make the flickering flame reflect off of surrounding objects.