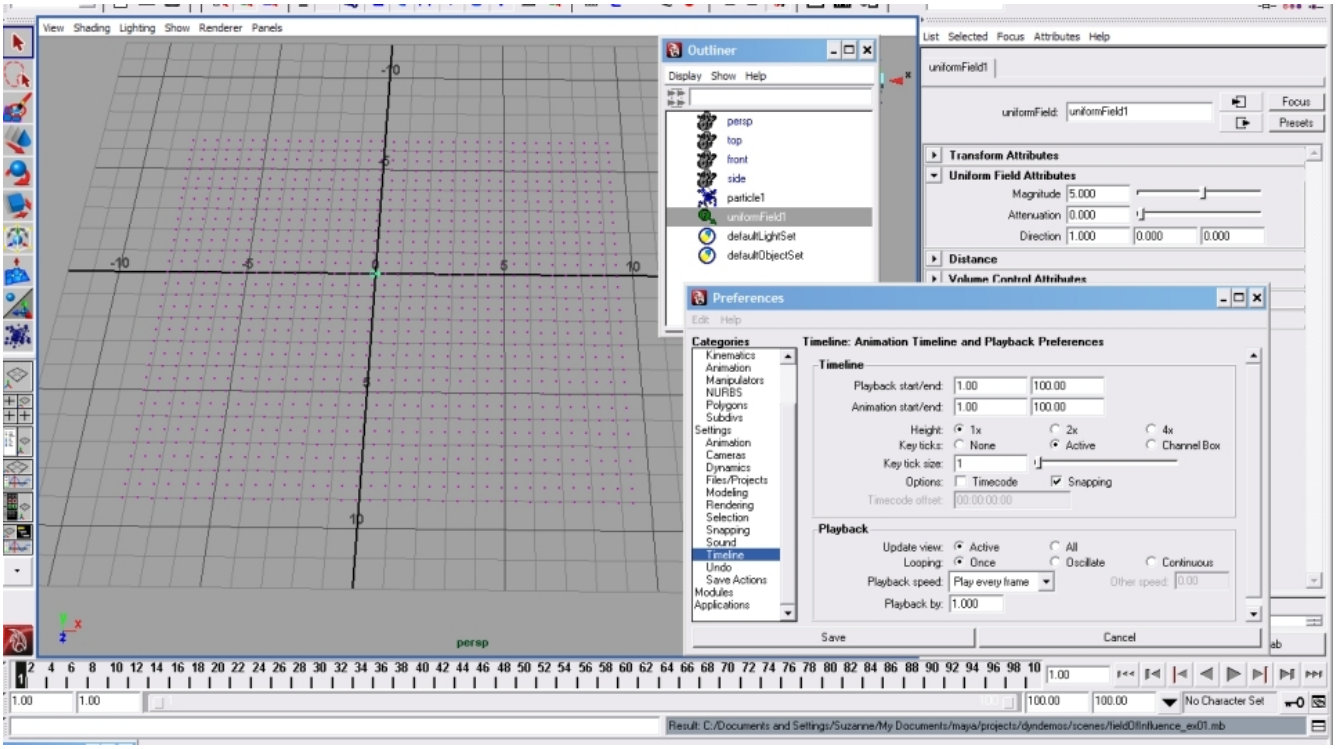
Field of Influence

The next few exercises demonstrate how a field connected to a particle object can be constrained based on the field's volume and attenuation parameters.

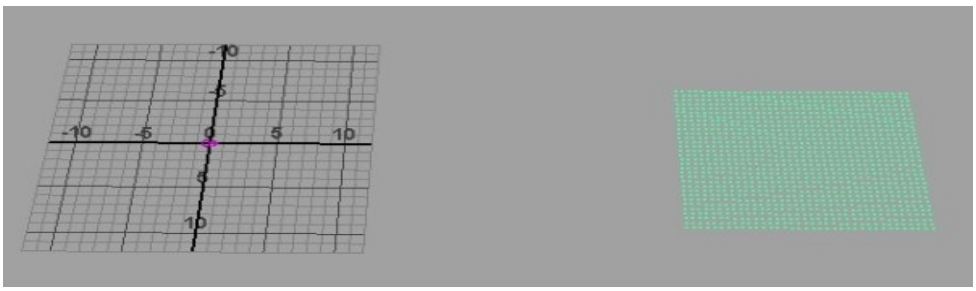
- Create a 2D particle grid between 5 and 10 units on each axis.
- With the particle still selected, create a uniform field with default settings except with Attenuation set to 0.
- Set the Timeline to 100 and Playback Looping to Once. These may be set in the Animation Preferences window accessed by clicking the far-right icon of the Range Slider.

Figure 1.



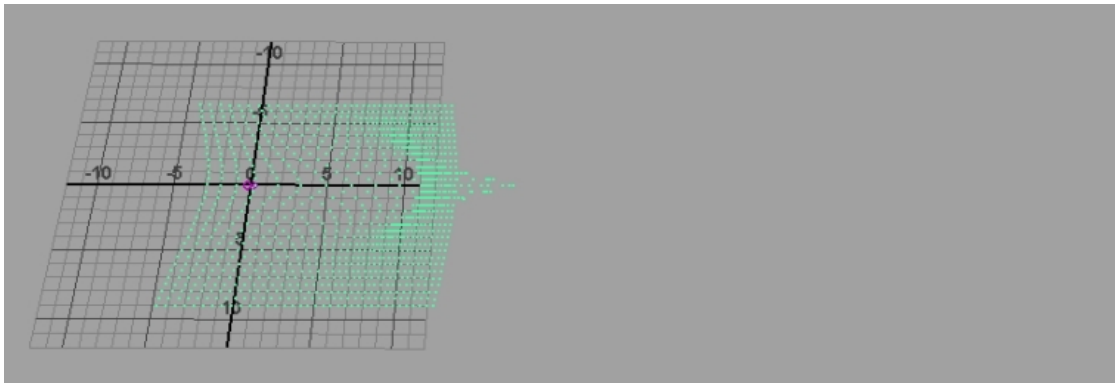
When the simulation plays, the particle grid moves uniformly in the positive X-direction.

Figure 2.



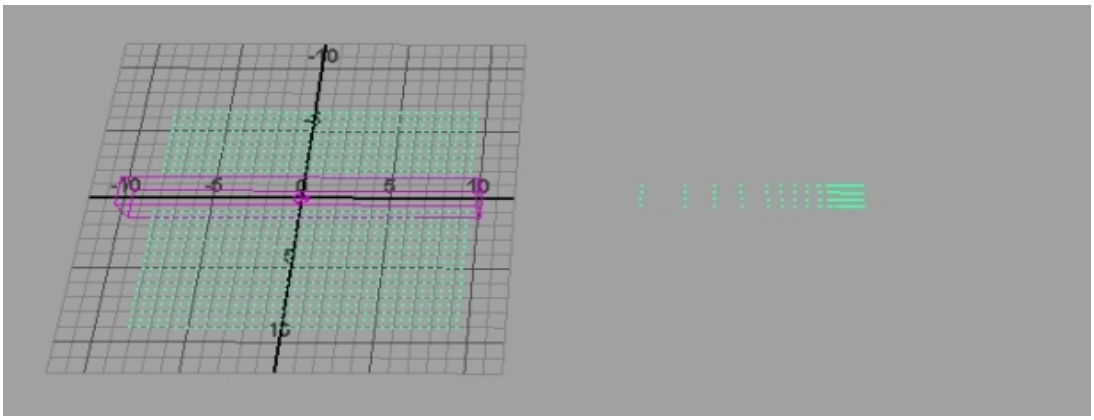
Set the uniformField1's Attenuation to 1 and move the frame back to Playback start. When the simulation plays this time, the particles do not move as much and the amount of their movement depends on how close the individual particle is to the field's position.

Figure 3.



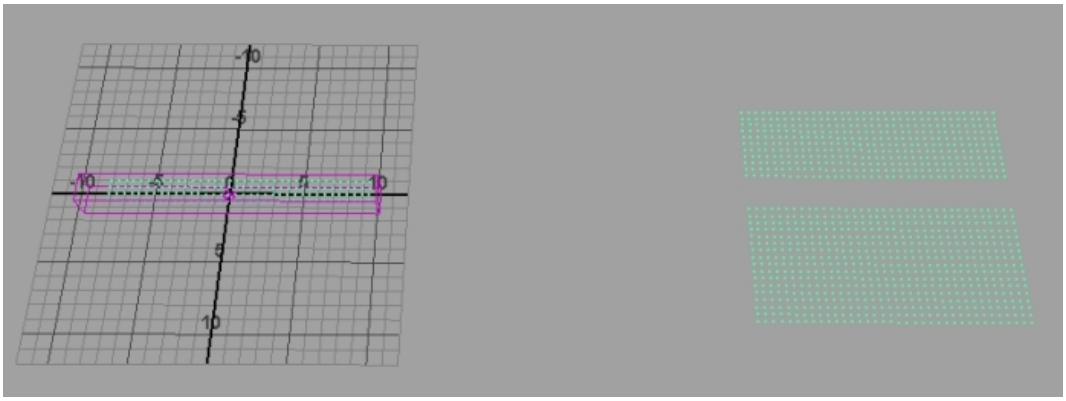
Now reset the uniformField1's Attenuation back to 0. Under the Volume Control Attributes set the Volume Shape to Cube and under the field's Transform Attributes make the X Scale 10. When the simulation plays, only the particles inside the cube volume move across the grid.

Figure 4.



Finally, check Volume Exclusion under Volume Control Attributes and replay the simulation. Now the particles outside the cube move but those inside do not.

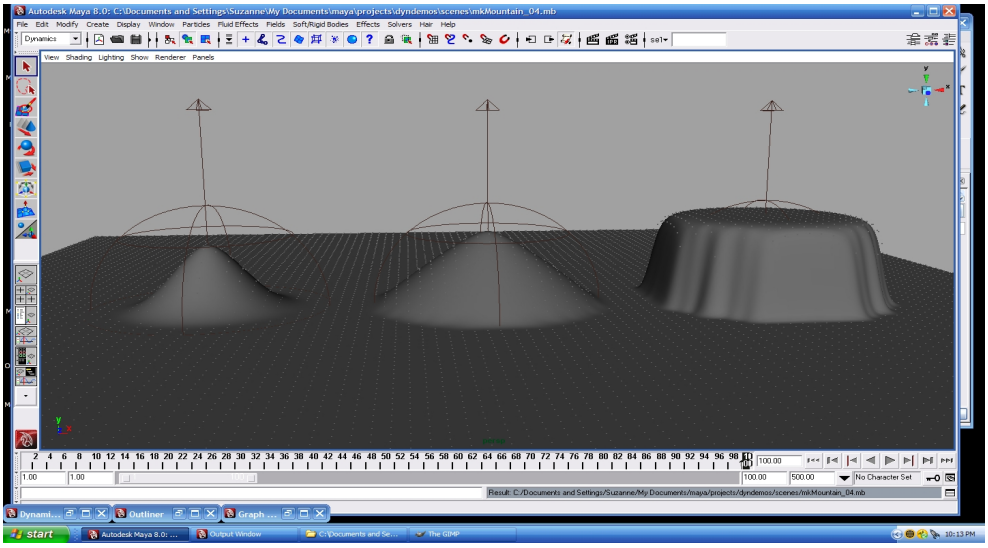
Figure 5.



This exercise uses a soft body connected to three Volume Axis fields to visualize the Attenuation, Distance, and Falloff Curve parameters of the respective field. It also leads to a fun technique to do terrain modeling.

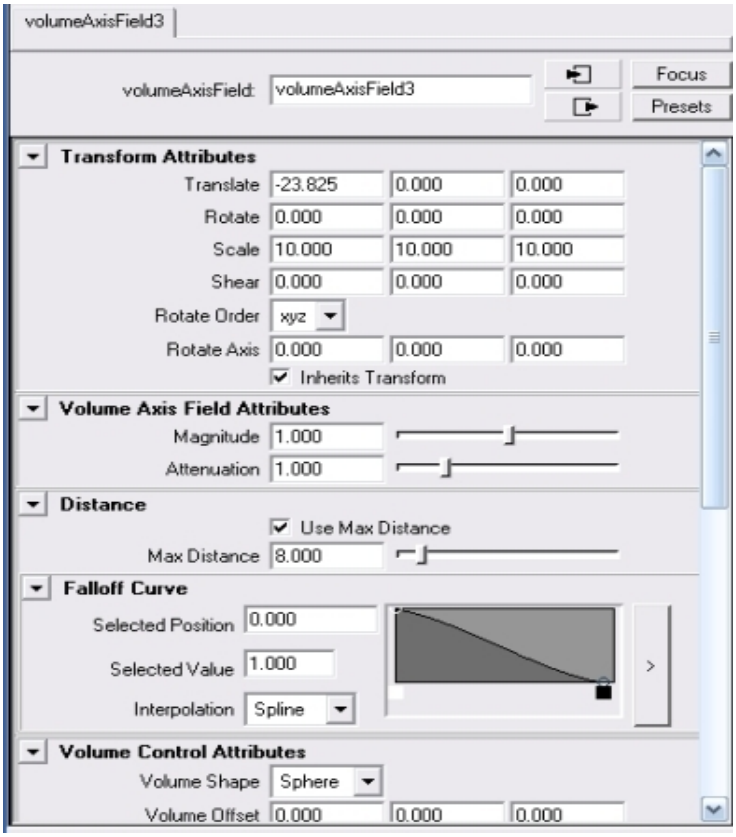
- Create a nurbs plane that is 100 units on both the X and Z axis.
- With the plane still selected, create a soft body with default settings.
- Select the particle object that is now parented under the soft body nurbs plane and create three Volume Axis fields spaced about 25 units apart along the X axis.
- Be sure that each of the fields is connected to the soft body particle object using the Dynamics Relationships.

Figure 6.



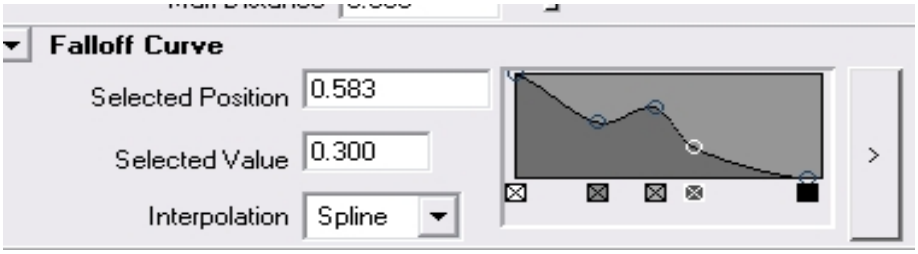
- Each of the Volume Axis fields should have these settings: Volume Shape Sphere, Scale 10, Magnitude 1, and Along Axis 1.
- The rightmost Volume Axis field should have 0 Attenuation while the other two should have Attenuation of 1.
- The Falloff Curve should also be set as illustrated in Figure 7.
- The leftmost Volume Axis field should have Use Max Distance checked with Max Distance 8.

Figure 7.



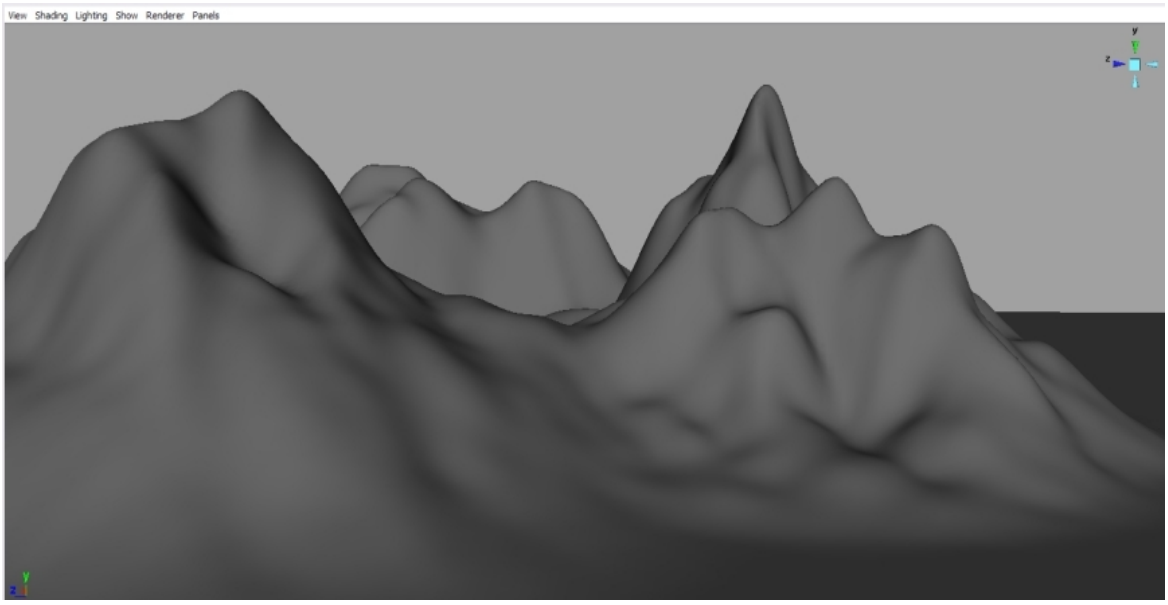
As the simulation plays, the soft body nurbs plane will deform under each of the Volume Axis fields and should look like Figure 6. at frame 100. What is presented here is a technique to visualize the effect of the parameters discussed. Just for fun, see what happens when a bump is added to the Falloff Curve and the simulation replayed.

Figure 8.



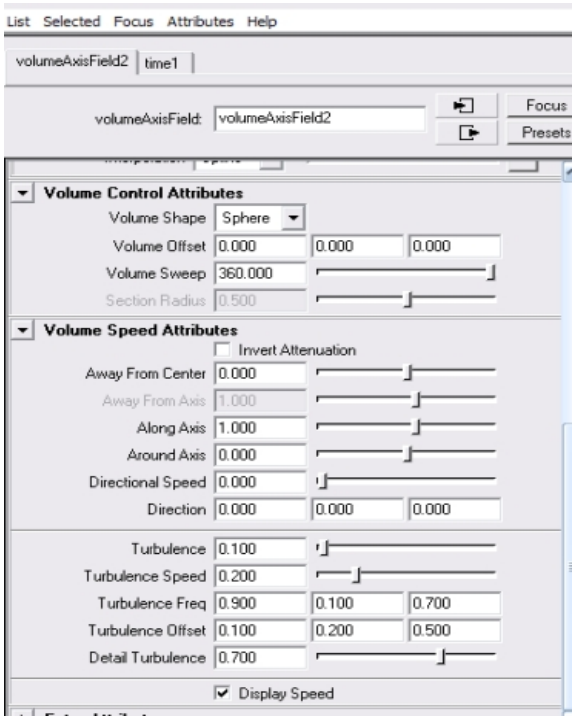
The last exercise also uses a nurbs plane soft body connected to Volume Axis fields. The settings for Magnitude, Attenuation, Max Distance, and Falloff Curve are similar to the previous example. In addition to Along Axis set to 1, Turbulence is applied. The simulation deforms the nurbs plane into a believable mountain range.

Figure 9.



The next figure shows the turbulence values for the leftmost mountain.

Figure 10.



Assignment: Using the technique presented here, create a fantasy terrain of your own design. You may wish to incorporate several different surfaces deformed using the soft body/volume axis field approach to make a more complex world with plant life as well.

The suggested work flow would be to create the soft body surfaces and experiment by replaying the simulation with different Volume Axis field settings. Be sure to call the seed function once before running any simulations. (Why ?)

When the desired terrain shape is obtained, it will be necessary to convert the geometry into a static non-deforming surface that retains the shape produced by the simulation. To do this follow these steps:

- Select the soft-body object that is the parent of the particle object connected to the fields.
- Under the Edit menu, select Delete By Type → History to make the deformed surface static.
- Delete the soft-body particle object because it is no longer needed and is using up memory and disk space.

Discussion: Describe other methods to model terrain and compare their merits with respect to work flow efficiency and flexibility.