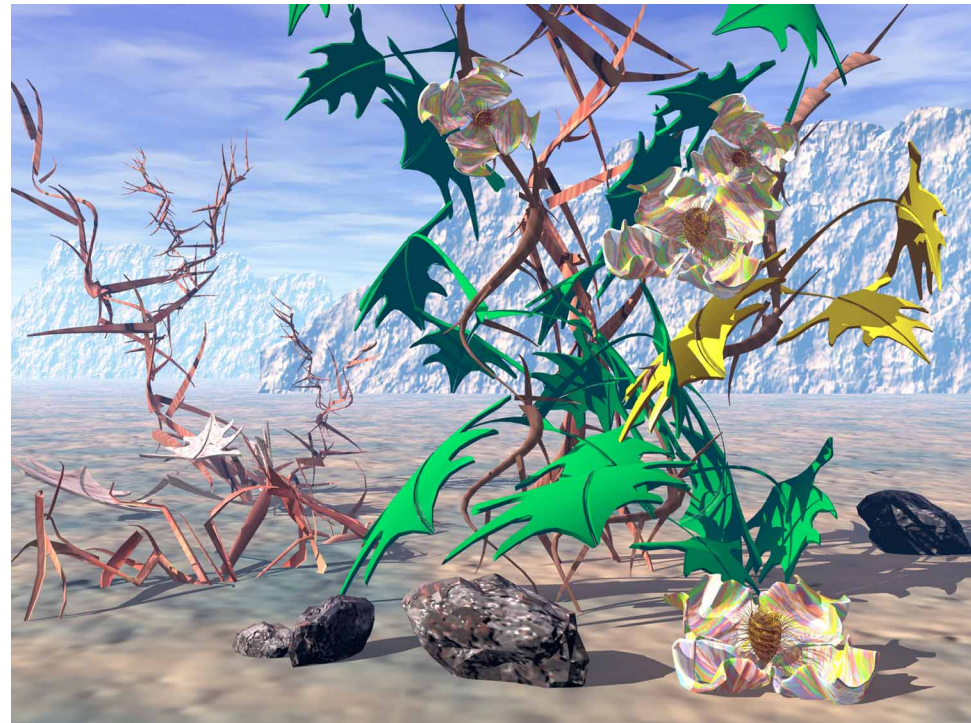


The flowered bramble

Mastering 3D Graphics ~ issue #1

Ray Dream
R. Shamms Mortier

Computer graphics were first identified with the creation of hard-edged geometric objects, with only the sphere as the representative of the world of curved surfaces. As research into fractal geometry intensified, and as it became obvious that the natural world was indeed fractal in itself, computer graphics started to widen its repertoire to include more randomized fractal and curved image content. Now, every professional 3D product advertises its capability to emulate aspects of the natural world, from clouds to mountains, and everything in between.



In this tutorial, we'll explore the tools and techniques made possible by Ray Dream Studio 5, MetaCreation's flagship 3D design application. Perhaps you can recall, as I certainly do, how much Ray Dream Studio has changed over the years, from a basic 3D design environment to a full-featured 3D art and animation engine. As of this writing, the latest edition of Ray Dream Studio is version 5.0.2. If you have version 5 and need to upgrade, download the latest version from MetaCreations Web site: <http://www.metacreations.com>. I developed this tutorial on a 300 MHz PowerMac G3 system with 384 MB of RAM, though I also run Ray Dream under Windows NT on a Pentium system.

Getting Around in Ray Dream 5

In order to follow along in this tutorial, there are a number of terms and procedures you must be familiar with. To gain the needed familiarity, unless you already possess it, you have to read the Ray Dream Studio 5 documentation, and work through the tutorials. For readers who do not yet own Ray Dream

Studio for their own creative endeavors, the article and illustrations may still be valuable. By seeing what this application can do, you may be prompted to purchase it.

The Ray Dream 5 Interface

Figure 1 shows an overview of the Ray Dream 5 interface, highlighting the preview window (top left), Properties Dialog (upper right), Animation Palette (lower left), and the Browser (lower right). The toolbars can be seen on the left and top. In addition to being generally familiar with where various commands and processes can be initiated in Ray Dream, you absolutely **MUST** know about the following actions:

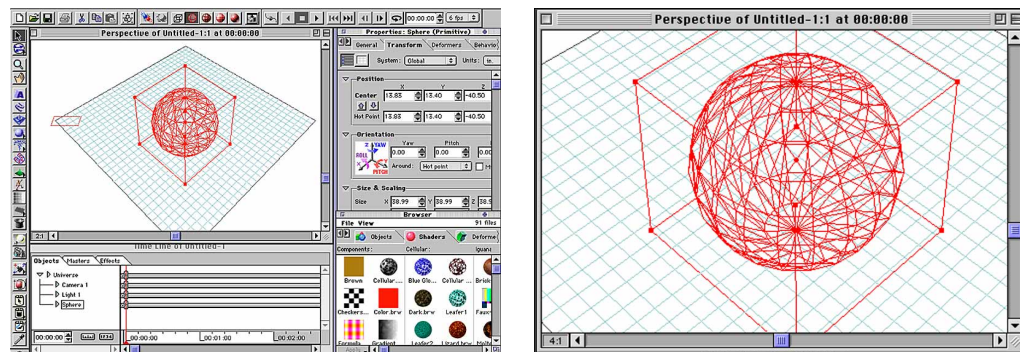


Figure 1 (left). Figure 2 (right): Objects placed in the Preview Window can be interactively moved and rotated, using the proper commands and icons.

Object Placement in the Preview Window

You must know how to move and rotate objects in the Ray Dream Preview Window, and also how to drag and drop various icons there to do this tutorial. You also have to know how to use the zoom command, and how to activate alternate views.

Properties Dialog

The two most important items in the Properties Dialog that you must be familiar with to accomplish this tutorial is how to input parameters in the Transform tab, and how to locate the options in the Deformers tab. The Properties Tab only shows data when an object, light, or camera is highlighted in the Preview Window.

The Browser

For this tutorial, you must have a working knowledge of how textures (Shaders) are saved and loaded using the Shader Tab in the Browser. You must also know how to load and save objects under the Objects Tab.

Double clicking on any Shader under the Shaders Tab in the Browser reveals the Shader Editing dialog. Read

the Ray Dream Studio 5 documentation to get a feel for channel editing in Ray Dream. Ray Dream has a very powerful Shader Editing feature, with near infinite variability. The tabs in the Shader Editing dialog represent the layered channels for that Shader including: color, high-light, shininess, bump, reflection, transparency, refraction, and glow. Depending upon what is used for input under these tabs, you can alter the channel values by inputting data via sliders, or by dropping another Shader or an image in the channel for reference. Keeping an eye on the thumbnail preview in this dialog shows you the visual results of your modifications.

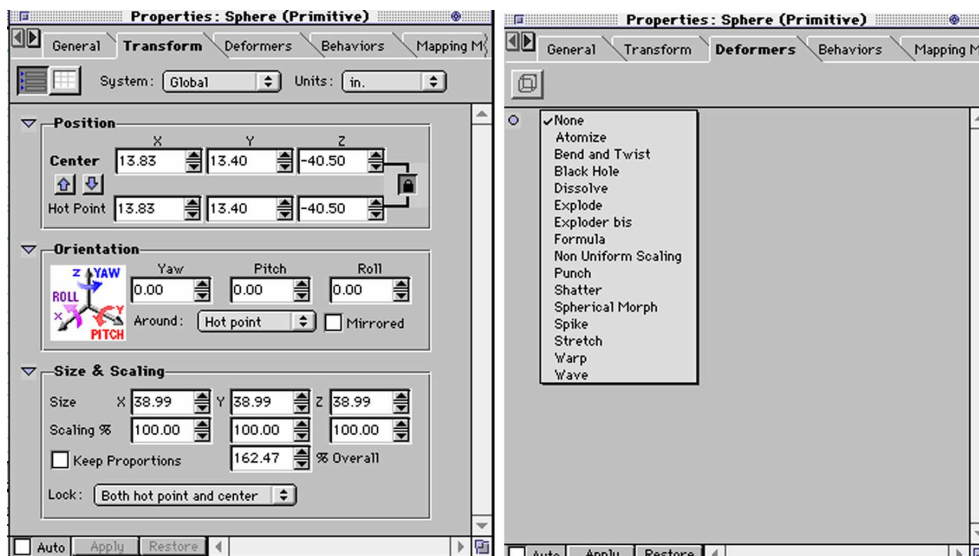


Figure 3: Pictured on the left is the Transform Tab in the Properties Dialog, and on the right, the Deform Tab.

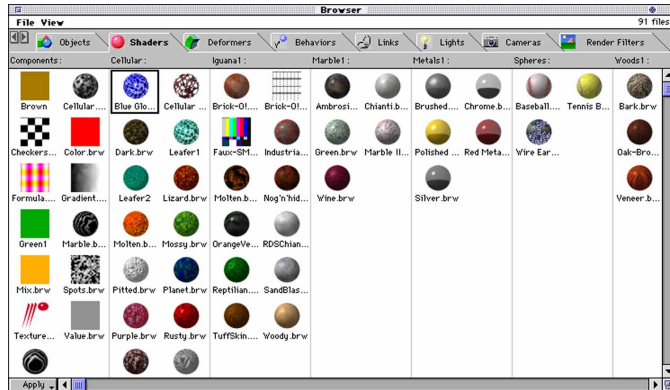


Figure 4: Opening the Shaders Tab reveals the Shaders loaded and accessible for applying to objects.

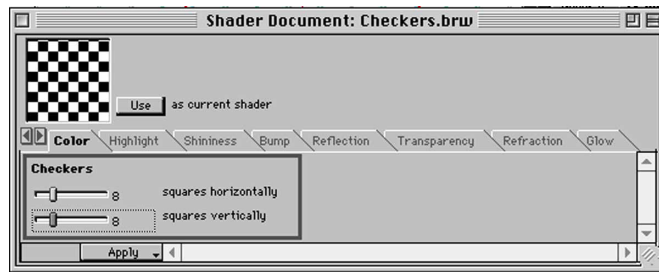


Figure 5: A Shader Editing dialog.

The Animation Palette

Since we are not taking advantage of Ray Dream's animation facilities in this tutorial, you are not required to engage in the same amount of deep learning and exploration of this palette as compared to other parts of Ray Dream. It is suggested, however, that you include a dedi-

cated development time to the Animation Palette for further maximized use of Ray Dream Studio and your own creative pursuits.

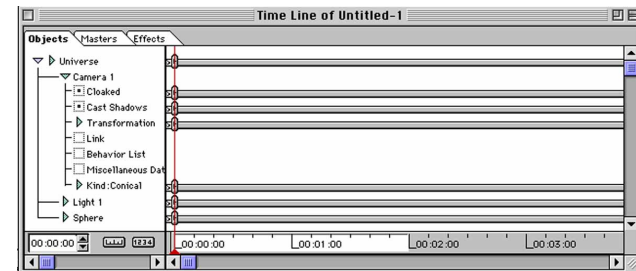


Figure 6: The Ray Dream Studio Animation Palette, showing the hierarchy list on the left and the Timeline on the right.

Toolbars and Icons

You absolutely must know what the icons in the two toolbars represent, and how to activate their use, so that when the tutorial calls attention to them you know what it means.



Figure 7: The two Toolbars are shown here stacked horizontally.

The Modeling Environments

Ray Dream Studio is extremely rich when it comes to possible modeling environments, having a dozen or so (if

meant. The Free Form Modeler is a primary modeler, while the Mesh Form modeler is best used to customize and reshape a pre-existent model.

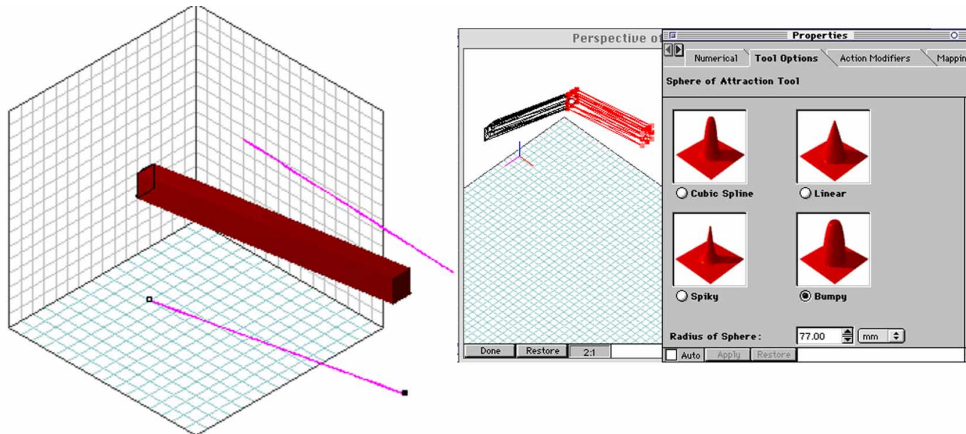


Figure 8: The Free Form Modeler is on the left, and the Mesh Form Modeler on the right.

you count various plug-in modelers). Since we are going to focus upon two, the Free Form and Mesh Form Modelers, you must have a working familiarity with each. You must also know how to “Jump In” and “Jump Out” of a modeler, so that when the tutorials asks you to do either, you don’t have to stop to wonder what is

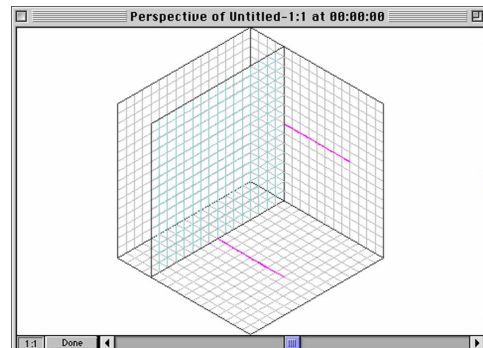


Figure 9: The Free Form Modeler is open and ready to use.

Creating the Leaf and Stem

The project we are going to create has many elements, starting with this one.

The Leaf

The first element we’ll create for our project is a leaf and its stem. To begin, open the Free Form

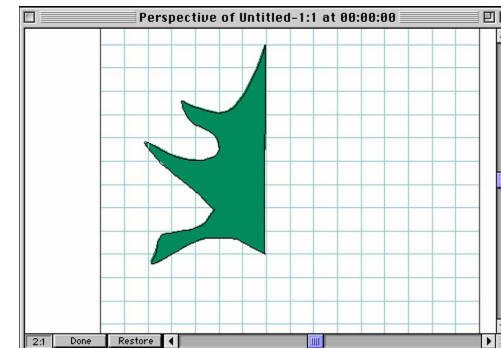


Figure 10: Draw this closed shape using the Pen Tool on the Free Form Modeler Drawing Plane.

Modeler by dropping its icon in the Preview Window. Name this model Leaf 1. When it's open, your Preview Window will change to resemble the image in [Figure 9](#).

Orientation/Pitch. You should now have a leaf that has two halves. The next step is very important. Move the cloned half away from the original by an amount equal to

In the View/Preset Position menu, select Drawing Plane. This results in the Drawing Plane opening to your creative pursuits. Use the Pen Tool to create the closed shape pictured in [Figure 10](#).

Return to the Reference Plane. You will see that the leaf section is too thick. Click and hold on the control point at the end of the left hand projection plane, and move it closer to the Drawing Plane to create a thin leaf, see [Figure 11](#).

Jump Out and go to the top view. Enlarge the scene by zooming in, until the leaf half fills the bottom of the preview. Duplicate the leaf half, and type -180 in the transform tab of the leaf's properties dialog, under

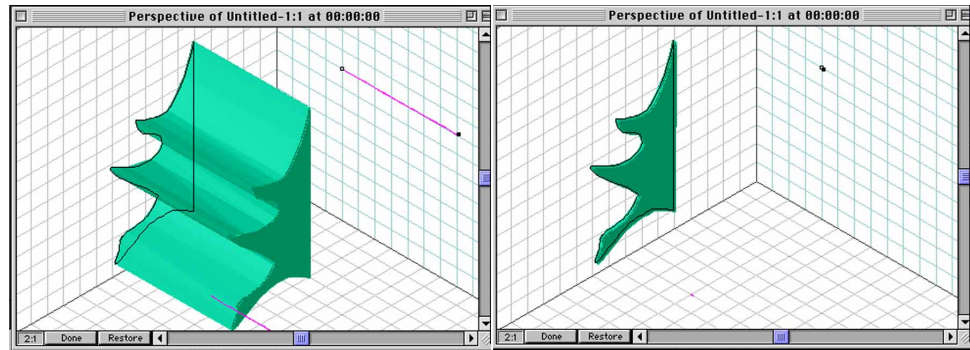


Figure 11: As shown in this example, moving the control point on a Free Form Modeler Projection Plane results in the modification of the object.

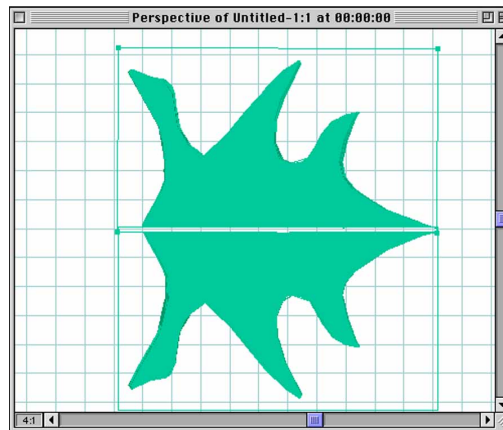


Figure 12: The leaf half has been duplicated and rotated to form a whole leaf.

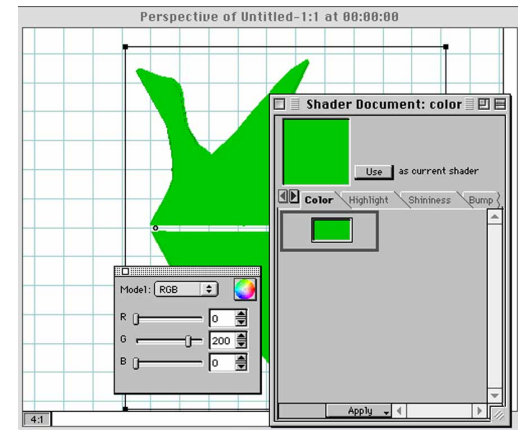


Figure 13: Using the Shader Edit dialog on the Color.brw selection, a new hue is created and applied to the Leaf.

that shown in [Figure 12](#). This makes room for a different colored stem. Select both halves of the leaf, and Group them into one.

The parts are separated slightly, and grouped as one. To make the leaf a desired shade of green, do the following. In the Shaders Tab of the Browser, double click on the Color.brw selection under the Components library. The Edit dialog will pop up. In the Edit dialog, double-click on the default red color, and the color sliders will appear. Adjust the color sliders to RGB= 0, 200, 0. Drag and drop this color swatch onto both halves of the leaf, and also drag it into the library. In response to the dialog that appears, name this new swatch Leaf Green 1, see [Figure 13](#).

The Stem

Open the Free Form Modeler, and select the drawing plane. Go to the geometry menu, and make sure the symmetrical extrusion envelope is selected. This allows us to create a perfectly symmetrical form. Draw a perfect circle on the back drawing plane, and center it.

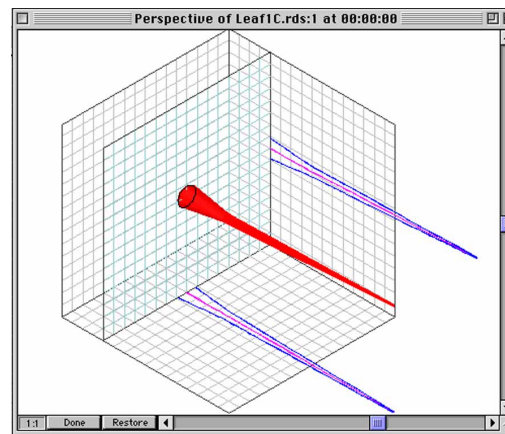


Figure 14: The Stem is created in the Free Form Modeler.

Use the left projection plane to make it resemble an elongated golf tee, as shown in [Figure 14](#). When you are finished, jump out. Color the Stem brown, using the same method used to color the leaf green, see [Figure 14](#).

Carefully place the stem between the two leaf halves, checking placement and rotation in the top, left, and front views. When this has been accomplished, Select the stem and both leaf halves, and group them. Move the hot point (the small circle that appears inside of the grouped object) to the base of the stem. This is the space the grouped object will rotate from. When all is done, save the object to your objects browser file (either under the Nature folder, or in a new folder altogether) see [Figure 15](#).

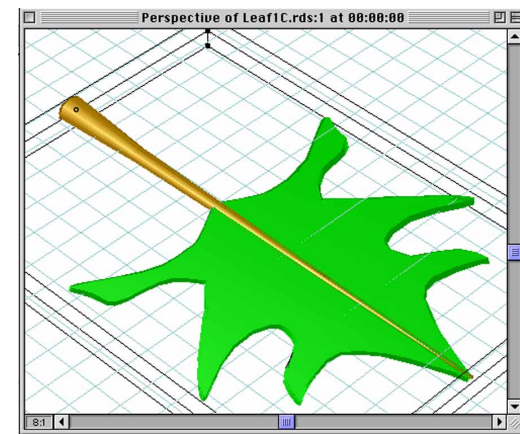


Figure 15: The leaf is now complete and grouped with a Stem.

Now we want to create a triple leaf group. Duplicate the leaf twice, and rotate each clone so the leaves look like they are joined at the base of their stems, as shown in

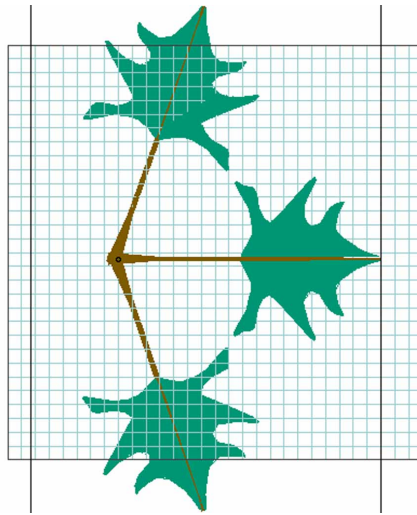


Figure 16. From one leaf, we have created a triple leaf group.

Figure 16. Group them, and save this leaf group.

If we were to use the leaves in this configuration, they would look very artificial. There are no curves, and the natural world is based upon curves. So let's add some. With the

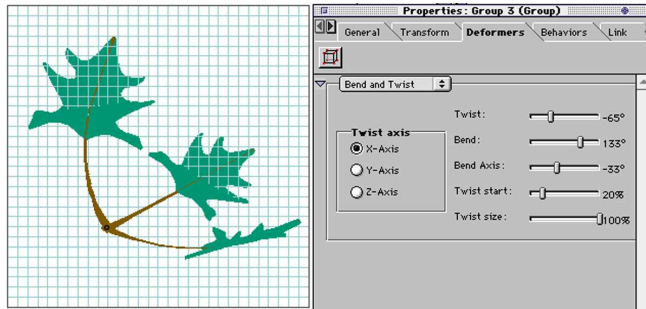


Figure 17: The Deformers Tab in the object's Properties dialog allows us to select Bend and Twist parameters, creating a more organic looking leaf set.

triple leaf group selected, go to the Deformers Tab of the Properties dialog. From the list, select Bend and Twist. Set the sliders to the following values: Twist -65, Bend 133, Bend Axis -33, Twist Start 20, and Twist Size 100, all on the X Axis. You have just added curved surfaces to the triple leaf object. You may explore other settings on your own. All we really need for this project is one curved triple set of leaves, since they can be cloned and rotated to emulate different looking triple sets. Save this new curved set in your Browser Objects folder, see Figure 17.

The Central Stem

Now we'll create the central stem that holds the leaves, and later, flowers. You already have the core element, which is the leaf stem. Load it in, and duplicate and stack them so that there are five stems, increasing in size from left to right. Make sure they are all centered correctly, and group them. Refer to Figure 18.

Time again for deformation. With the main stem selected, open its deformers properties. Select wave from the list. Apply the following values: phase 0, number of wave cycles 1, Height of waves 20%. Shape is radial, and orientation is on the X Axis. Save the resulting object as Main Stem 1. Refer to Figure 19.

Ray Dream Studio has a strange quirk. You can only apply one deformation to a selected object. There is, thank goodness, a way around this. What you have to do is to select Group, no matter that the object is already grouped.

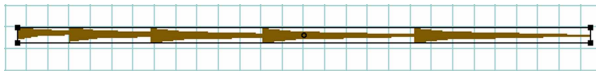


Figure 18: To create the main stem, five separate leaf stems are resized, moved into position, and grouped.

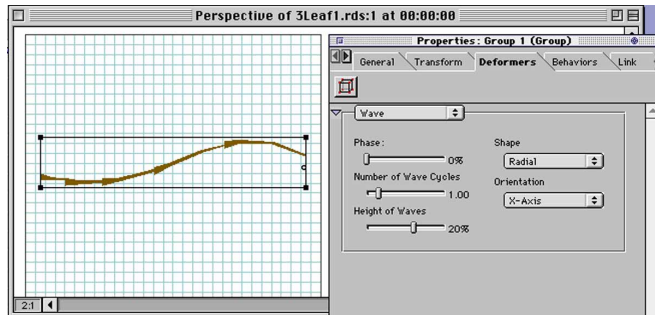


Figure 19: A Wave deformation is applied to the Main Stem.

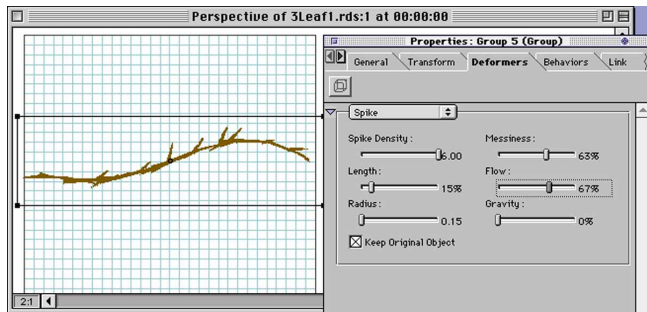


Figure 20: Using the Spike Deformer, thory projections are added to the Main Stem.

After this, it is as if the object were brand new and you can apply another deformation. You can repeat this process as many times as necessary.

Group the Main Stem again. Return to the deformers tab in the object's properties dialog, and go to the spikes listing. In this dialog, input the following values: spike density 6, length 15%, radius 0.15, messiness 63%, flow 67%, and gravity 0. Apply to add thorny projections to the Main Stem. Save the object to the Browser folder, see [Figure 20](#).

Flower

We can model any of a million flowers, but this one will be a simple generic four-petaled type.

The Flower Core

We'll do this in two sections. First, place a sphere in the preview window. Jump it into the Mesh Form Modeler. Select the sphere, and do a selection/subdivide. This doubles the polys in the sphere. Use the marquee tool in the front view to select a section from the center of the top half of the sphere, see [Figure 21](#).

Click on the sphere of influence tool (the Magnet icon), and under the tools tab in the properties dialog, set the value to a bumpy 100 mm. This creates a circle of influence that you can move with the mouse over the selected polygons, see [Figure 22](#).

Holding the mouse over the selected polygons, click and drag downward, deforming the sphere, see [Figure 23](#).

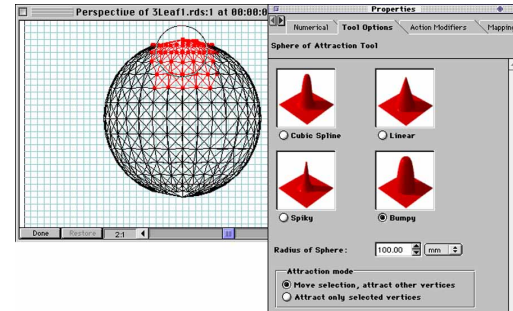


Figure 22: The Sphere of Influence is activated.

Jump the Sphere out, and apply a black hole deformer to it with the following settings: completion of hole entrance 60%, winding 100%, spin speed 100%, and suck down below object 27%, see [Figure 24](#).

Group the object, and go to the Spike Deformer. Input the following settings and apply them: spike density 6, length 100%, radius 0.10, messiness 100%, flow 100%, and gravity 100. This creates drooping projections on the object. Color it dark yellow with a color shader, and save it, see [Figure 25](#).

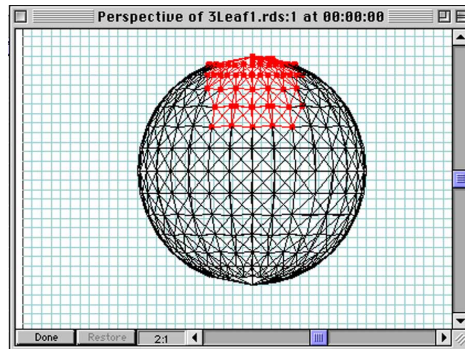


Figure 21: The top half of the polys in the sphere are selected in the Mesh Form Modeler.

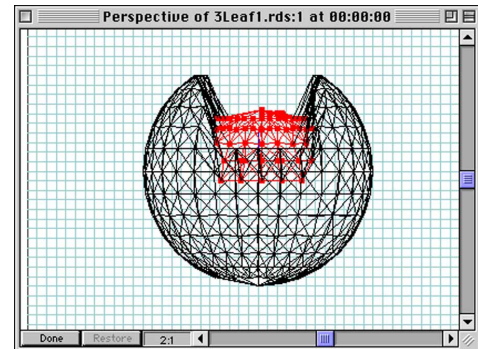


Figure 23: The Sphere is deformed by the Sphere of Influence tool.

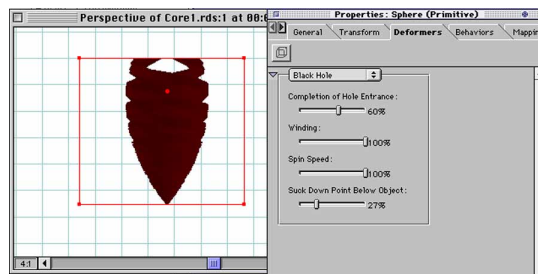


Figure 24: Using the Black Hole Deformer creates this shape

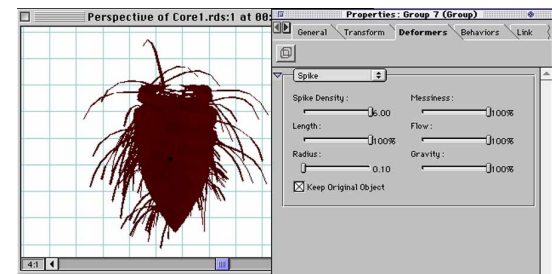


Figure 25: The core of the flower is created by adding the droopy spikes.

Flower Petal

Do the following to create the flower:

1. Jump in Free Form Modeler.

2. Draw shape on drawing plane. Do not create “perfect” symmetry, since nature follows curves more than mechanical regularity, [Figure 26](#).

3. Go to reference plane. Create a free extrusion envelope, and create 8 sections.

4. Go to the left view, and shape the projections similar to that in [Figure 28](#). Not to worry if your creation takes on a life different from this one.

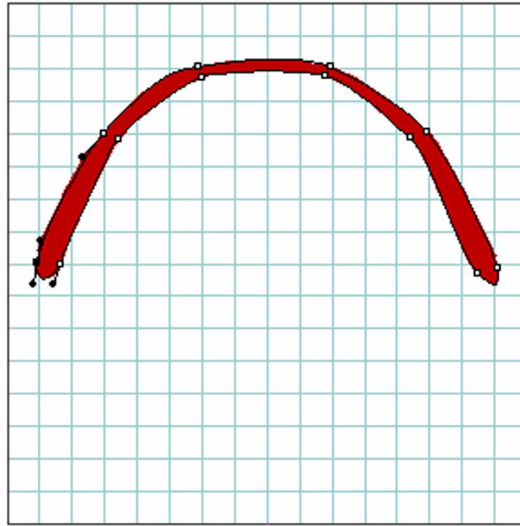


Figure 26: The initial shape is drawn.

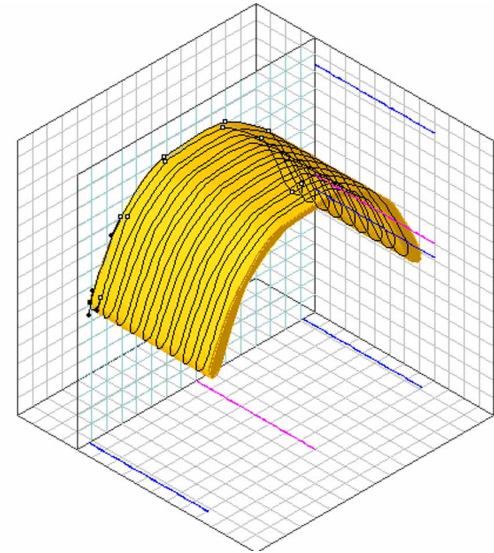


Figure 27: The Envelope and sections are created for the flower petal.

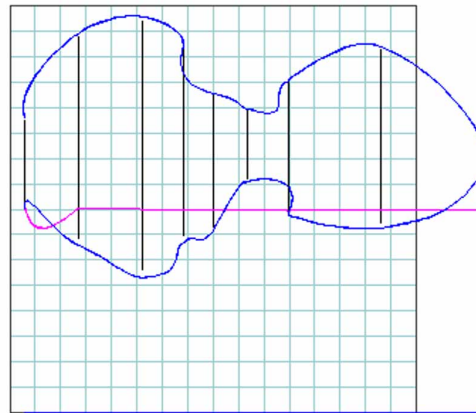


Figure 28: The Extrusion Envelopes are shaped on the Left projection plane.

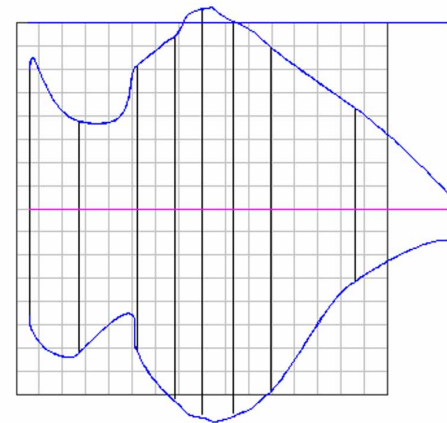


Figure 29: The Extrusion Envelopes are shaped on the bottom projection plane.

5. Go to the top view, and shape the projections similar to that in [Figure 29](#).

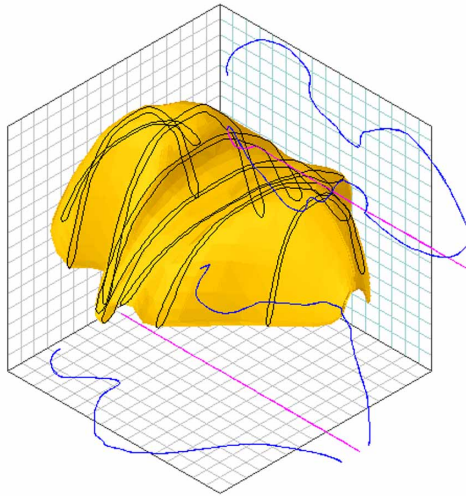


Figure 30: The result of the extrusion curves.

6. Don't worry about copying these illustrations exactly. nature is chaotic. Your reference view should look something like [Figure 30](#).

7. Duplicate the petal three times, and arrange the petals in a circle, so you have a four petaled flower. Place the core at the center. Group everything and do a test render. Save the completed flower, see [Figure 31](#).

In [Figure 32](#), I rendered a test in Bryce 3D of the same flower. Bryce has better Shaders for natural objects. The texture I used was the psychedelic Dreamy Shader, with a Diffusion of 100 and a Ambience of 50, with parametric mapping. In fact, I selected Bryce 3D as the environment for compositing all of the elements together in a scene.

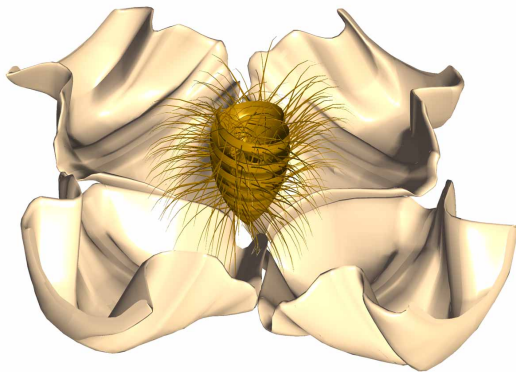


Figure 31: The final flower is test rendered in Ray Dream.



Figure 32: The finished flower is rendered in Bryce 3D.

Putting It All Together

I prefer to use Ray Dream as a modeling environment, and then to port everything over to Bryce 3D as the rendering environment. To do this, it's necessary to save the objects out in a format that Bryce 3D can

read. MetaCreations Poser 3 has plugins for Ray Dream that allow it to save our Wavefront (OBJ) files, which are perfect for Bryce 3D, so I saved out all of the elements in this tutorial in OBJ format.

The series of images in [Figure 33](#), from upper left to lower right, show how I composed the final scene. First, two vertical bramble stems were added, and one was rotated to make it appear different from the first. Then, I placed several of the triple leaf clusters on the stems. All of these leaves are the same, just rotated and resized differently. Most are colored green, but I gave one a yellowish cast to make it appear to be dying in the second image. In the third image, you can see that I constructed a dead plant in the background by using a series of the spiked stems connected together. This contrasts nicely with the live plant in the foreground. In the fourth image, a dead leaf group is added to the ground, and some rocks are added for visual interest. background mountains are added in the



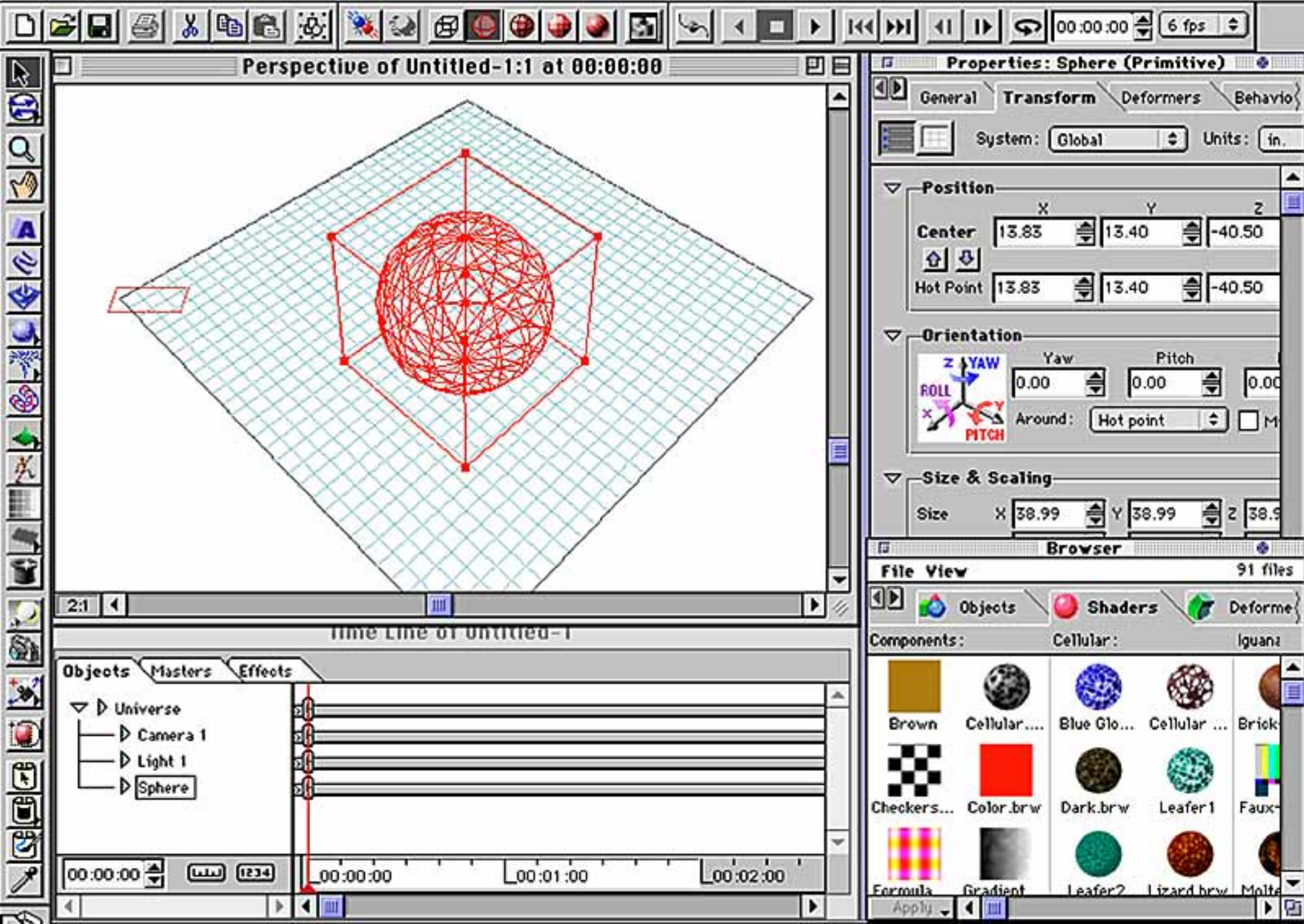
Figure 33: The progression of the composition.

fifth image, misted out in order to accentuate the clarity of the foreground more. The sixth image shows the addition of another bramble, this time placed partly under the ground plane. This could be a dead plant, or perhaps a root breaking through the ground.

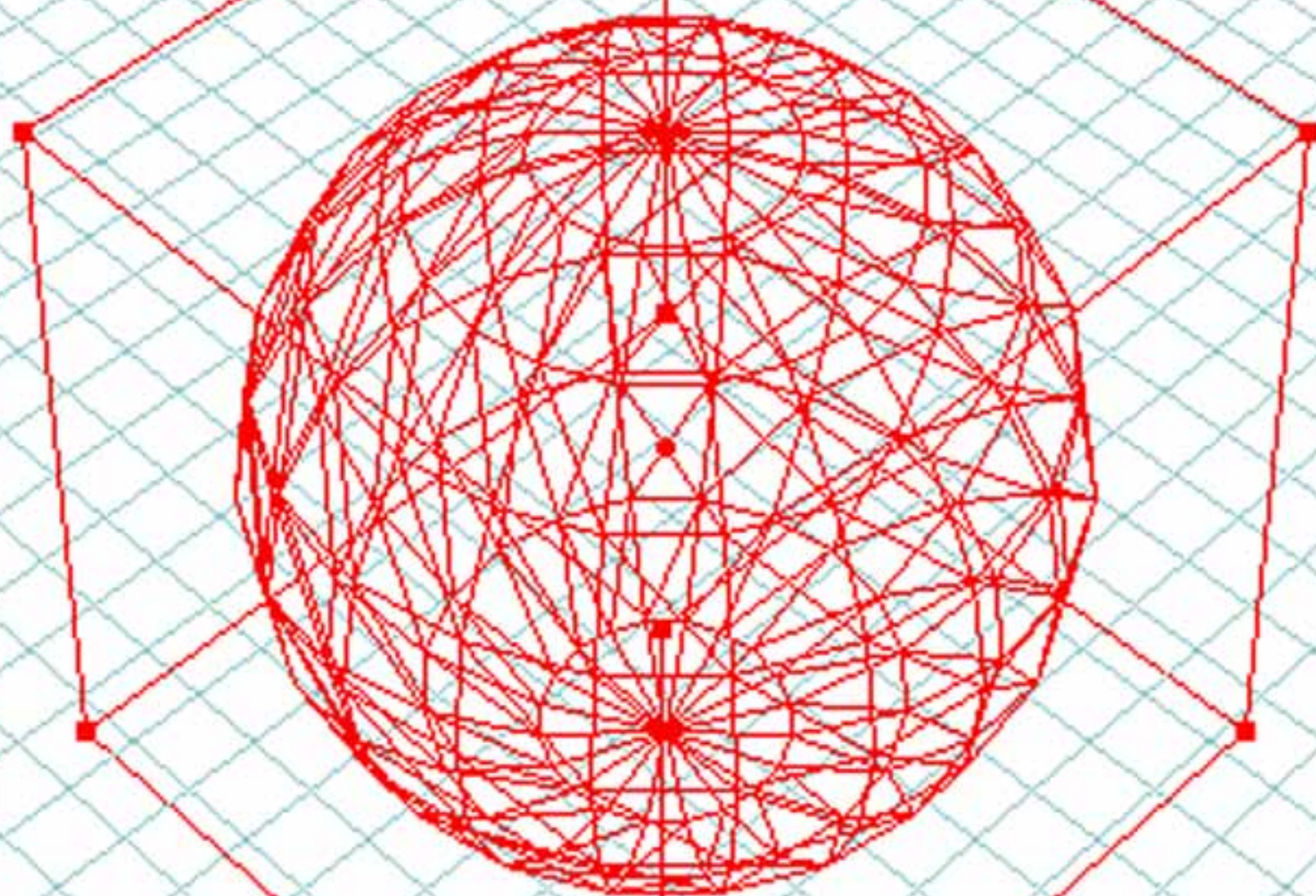
The last items to be added are the flowers. The flower object developed in Ray Dream was duplicated several times, rotated and resized, and placed along the foreground plant. One special flower, having dropped off of the plant, was placed on the ground. In this composition, the only imported item that has a Shader applied is the flower (as outlined in [Figure 32](#)). This makes it the central object of interest as far as level of detail, see [Figure 34](#).



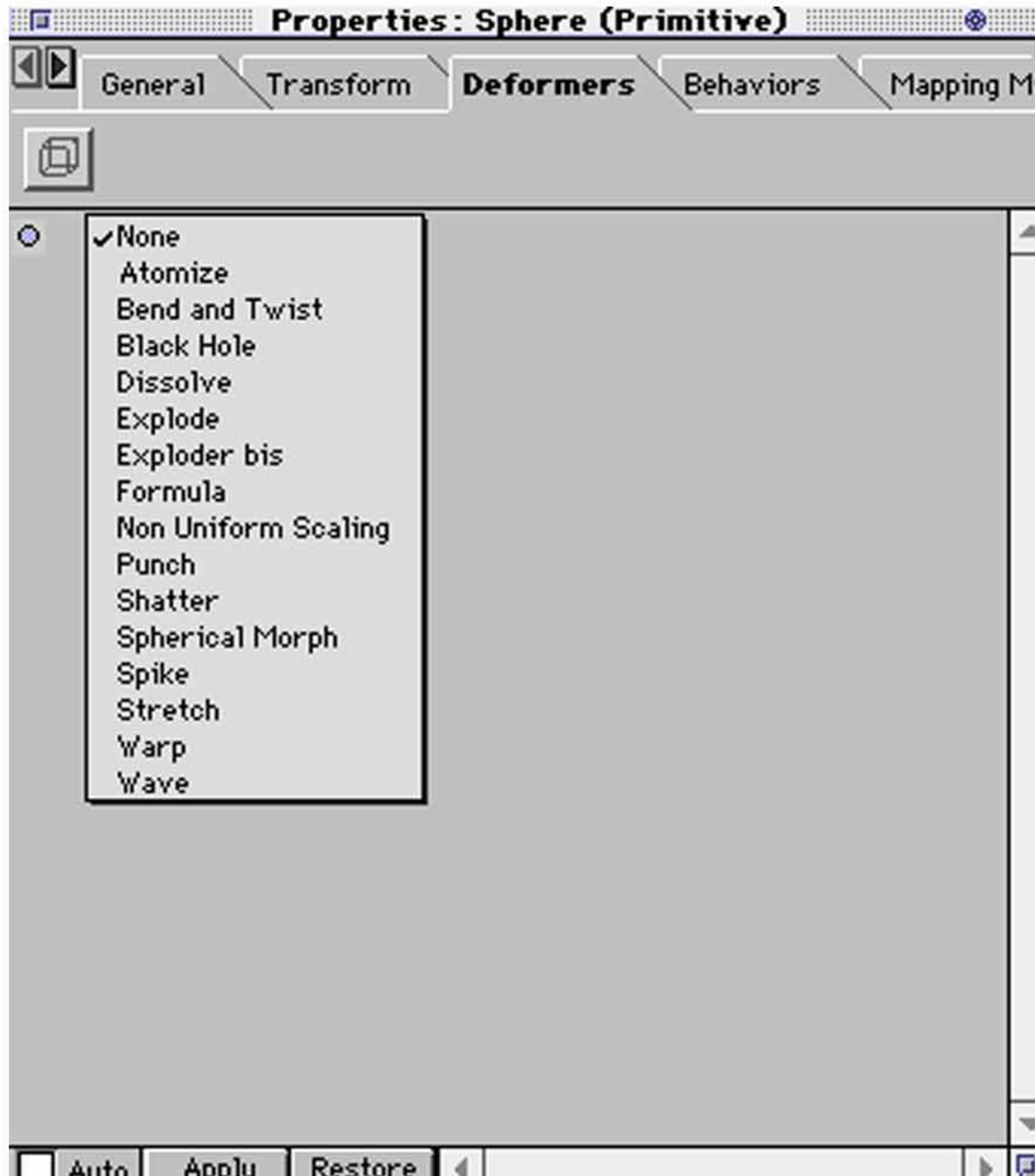
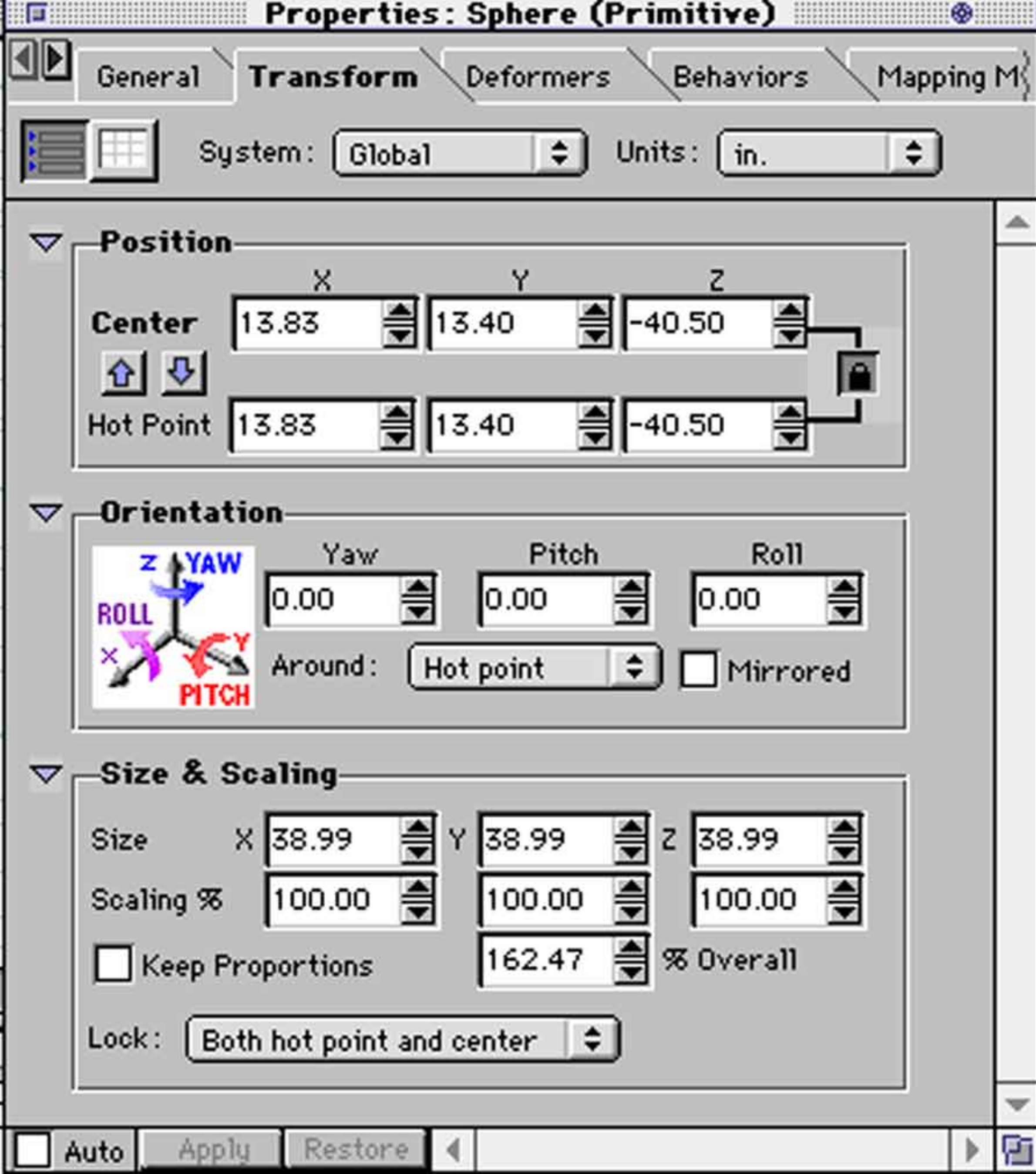
Figure 34: The completed composition with the flowering plant.



Perspective of Untitled-1:1 at 00:00:00



4:1



File View

91 files



Objects



Shaders



Deformers



Behaviors



Links



Lights



Cameras



Render Filters

Components:

Cellular:

Iguana1:

Marble1:

Metals1:

Spheres:

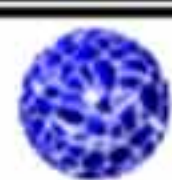
Woods1:



Brown



Cellular....



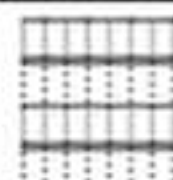
Blue Glo...



Cellular ...



Brick-O!...



Brick-O!...



Ambrosi...



Chianti.b...



Brushed....



Chrome.b...



Baseball....



Tennis B...



Bark.brw



Checkers...



Color.brw



Dark.brw



Leafer1



Faux-SM...



Industria...



Green.brw



Marble II...



Polished ...



Red Meta...



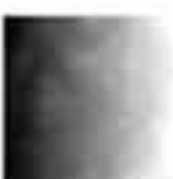
Wire Ear...



Oak-Bro...



Formula....



Gradient....



Leafer2



Lizard.brw



Molten.b...



Nog'n'hid...



Wine.brw



Silver.brw



Veneer.b...



Green1



Marble.b...



Molten.b...



Mossy.brw



OrangeVe...



RDSChian...



Mix.brw



Spots.brw



Pitted.brw



Planet.brw



Reptilian....



SandBlas...



Texture...



Value.brw



Purple.brw



Rusty.brw



TuffSkin....



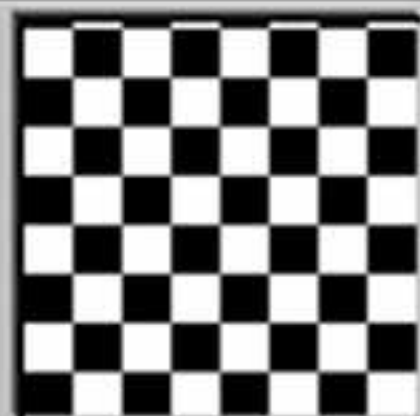
Woody.brw



Apply



Shader Document: Checkers.brw



Use

as current shader



Color

Highlight

Shininess

Bump

Reflection

Transparency

Refraction

Glow

Checkers



8

squares horizontally



8

squares vertically

Apply

Time Line of Untitled-1

Objects

Masters

Effects

▼ ▸ Universe

▼ Camera 1

▪ Cloaked

▪ Cast Shadows

▸ Transformation

▪ Link

▪ Behavior List

▪ Miscellaneous Data

▸ Kind:Conical

▸ Light 1

▸ Sphere

00:00:00



1234

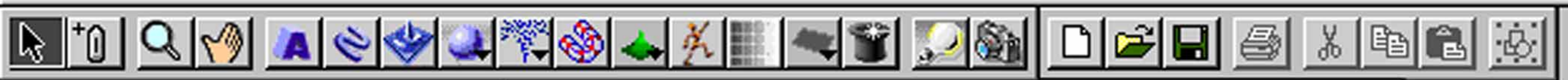
00:00:00

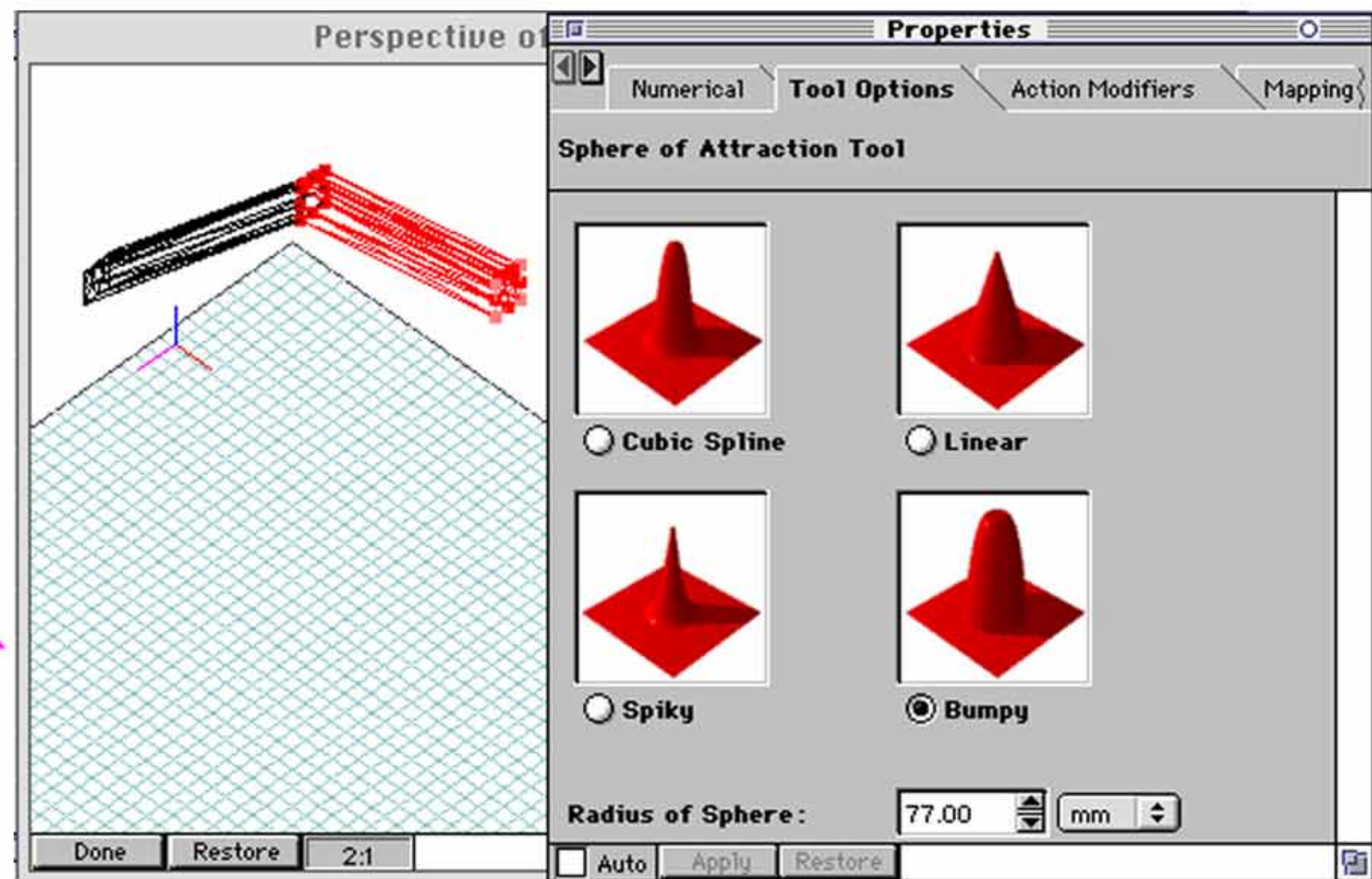
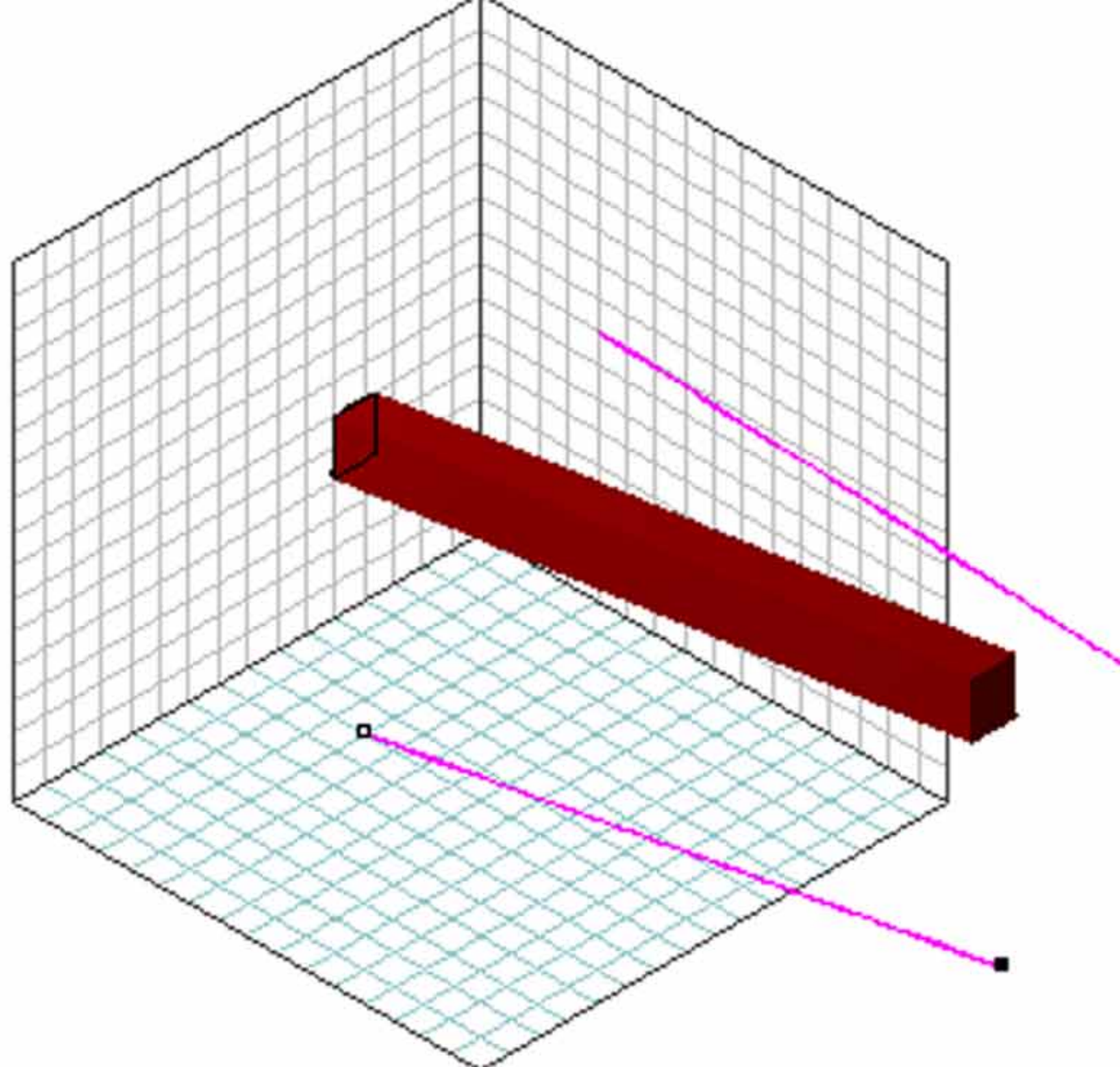
00:01:00

00:02:00

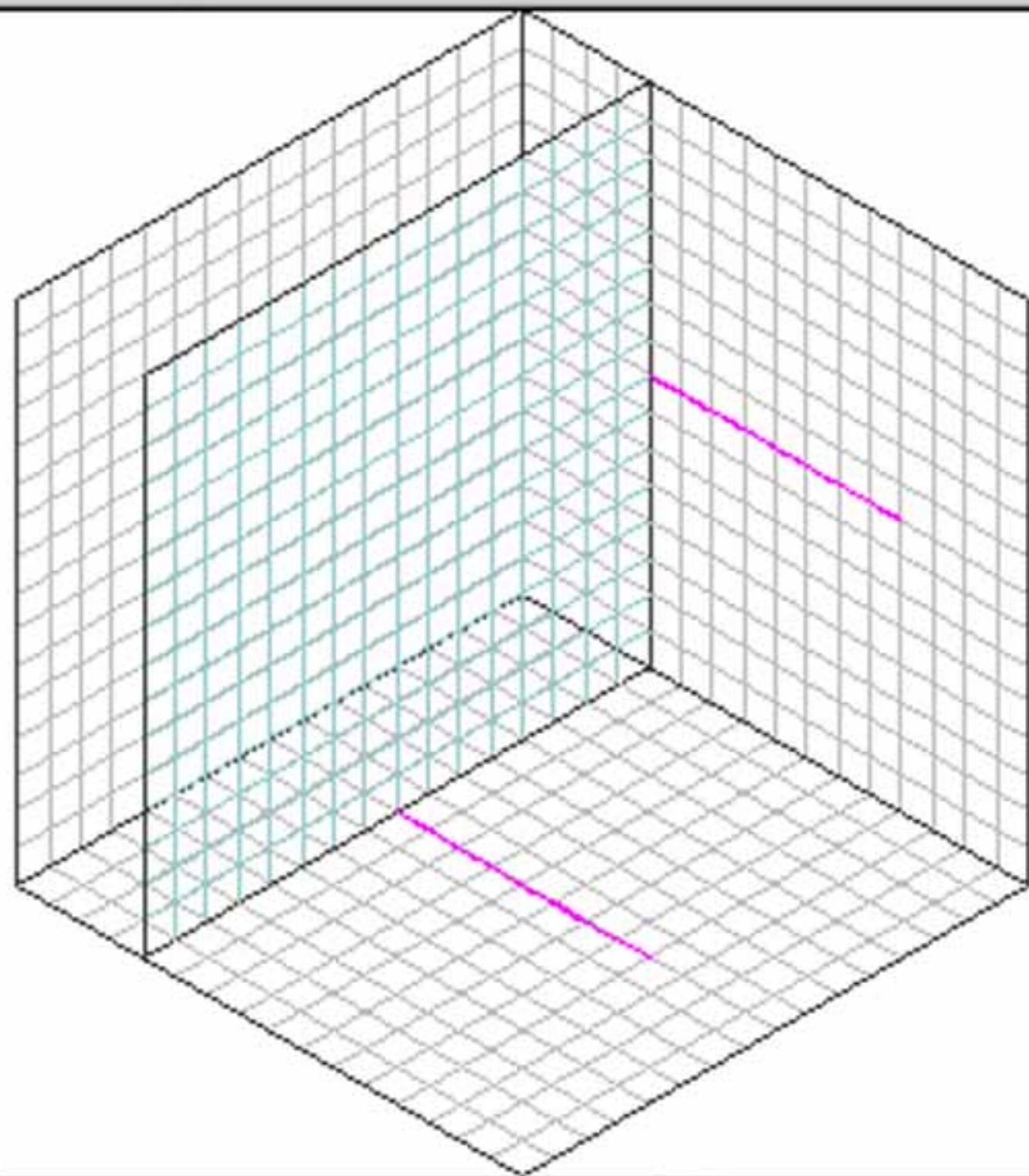
00:03:00







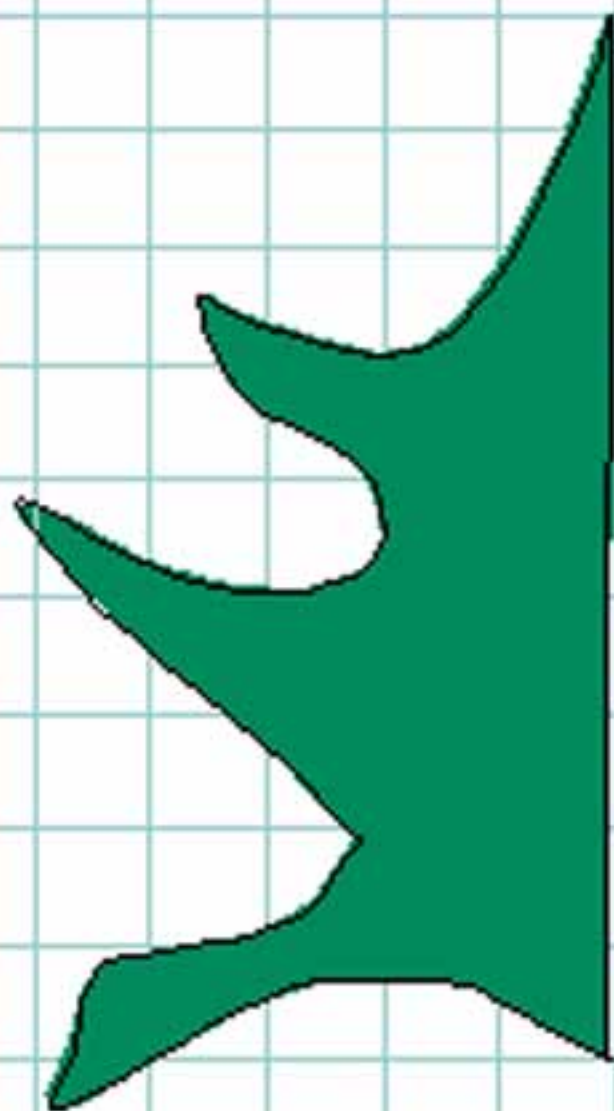
Perspective of Untitled-1:1 at 00:00:00

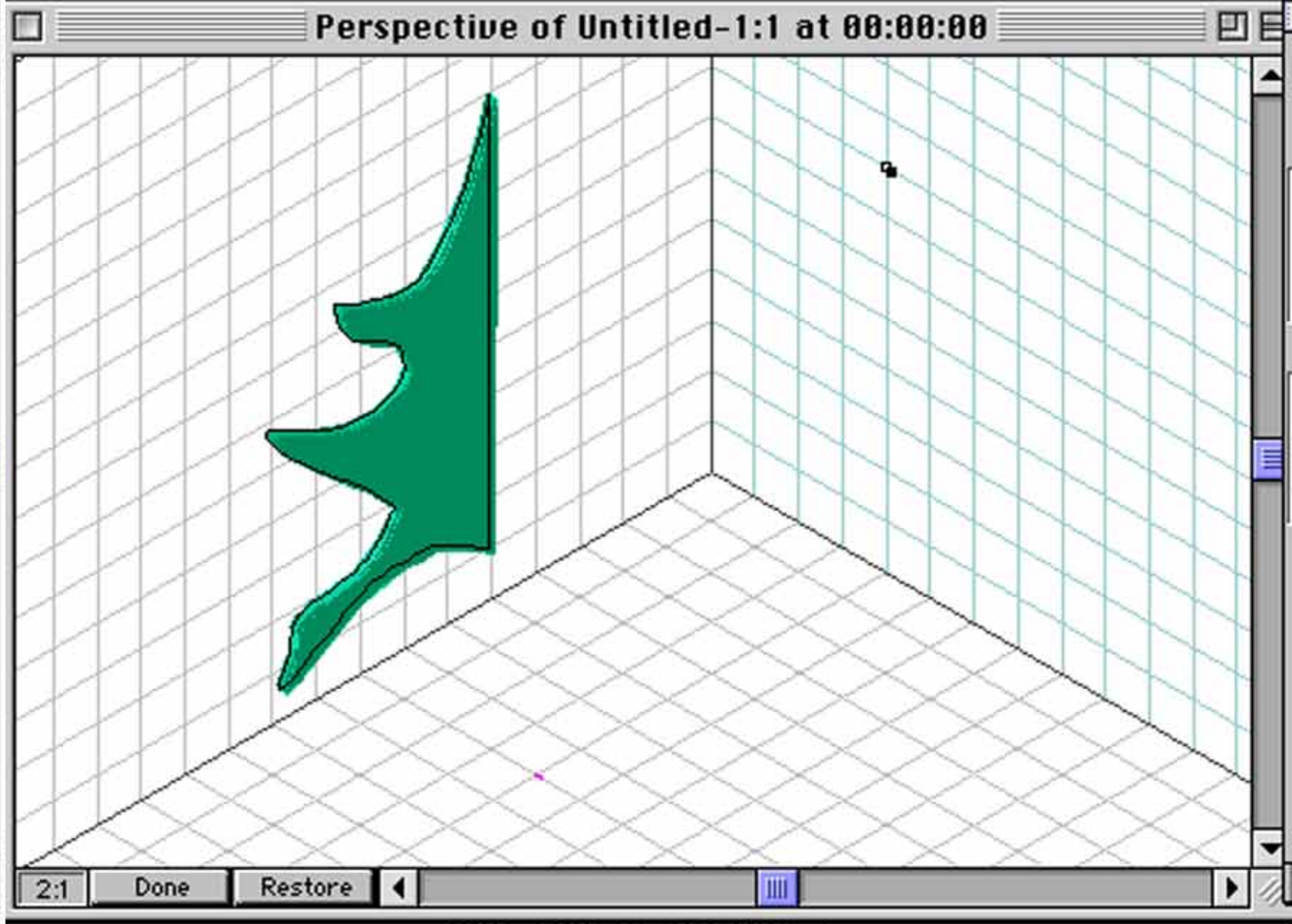
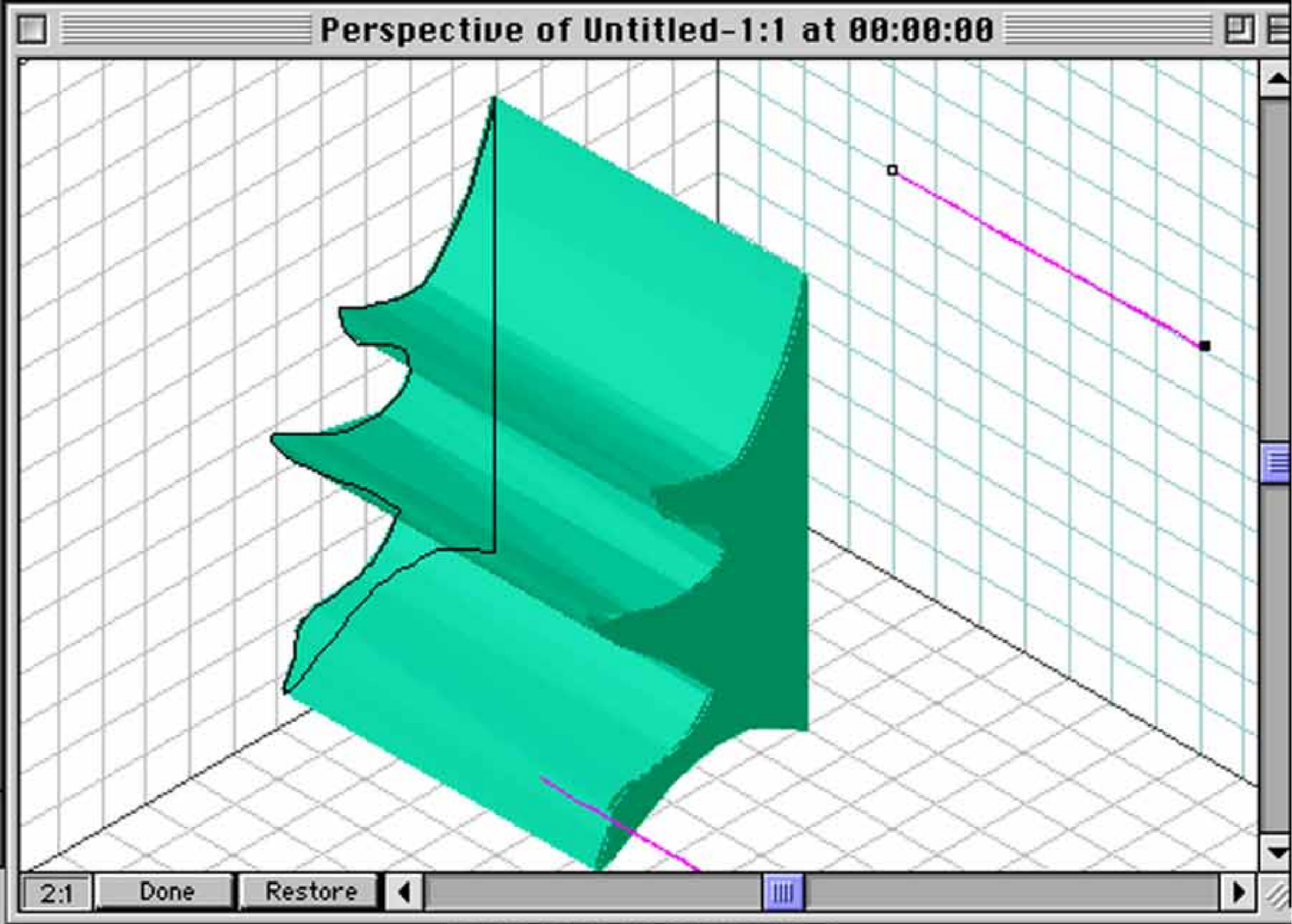


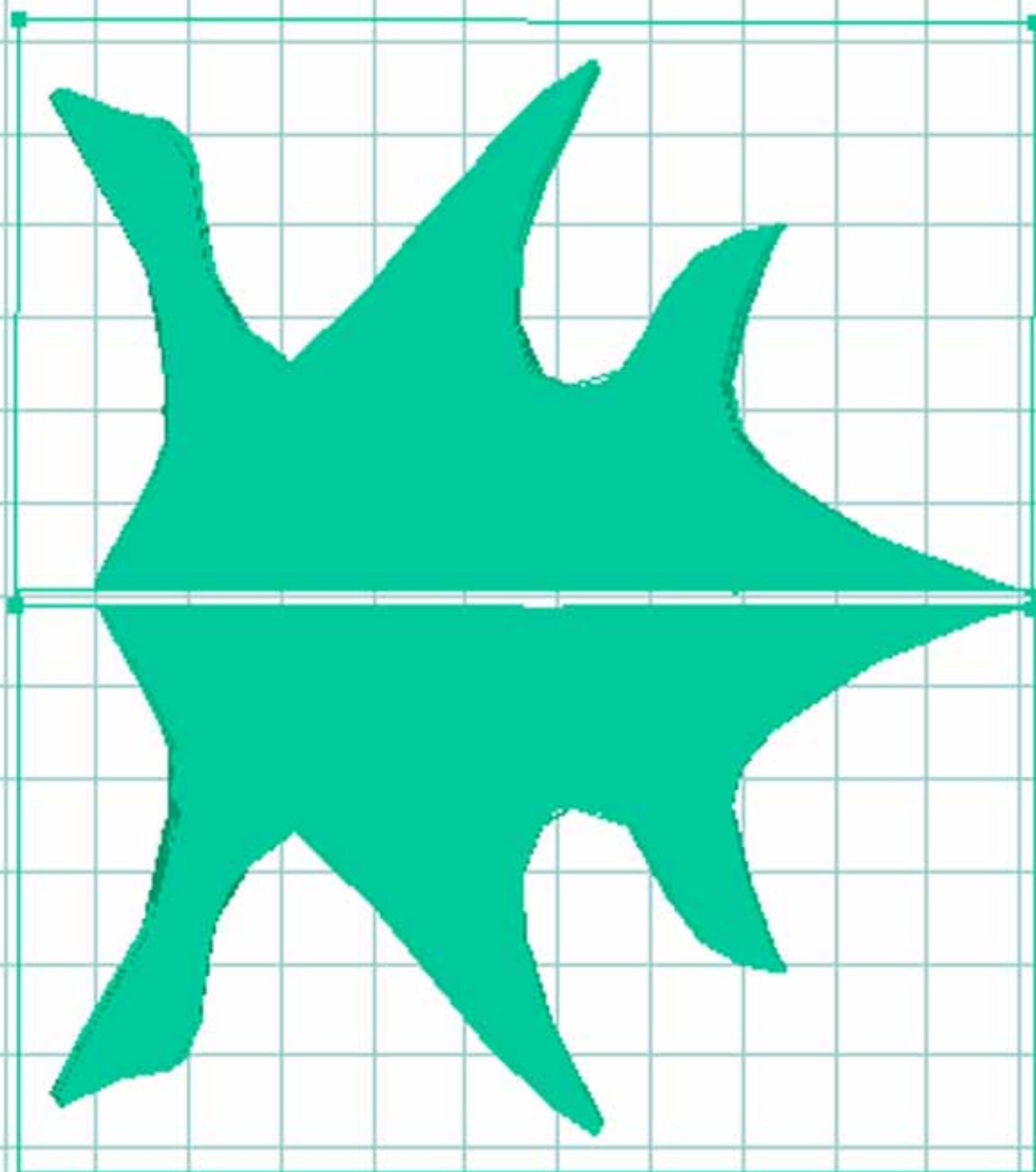
1:1

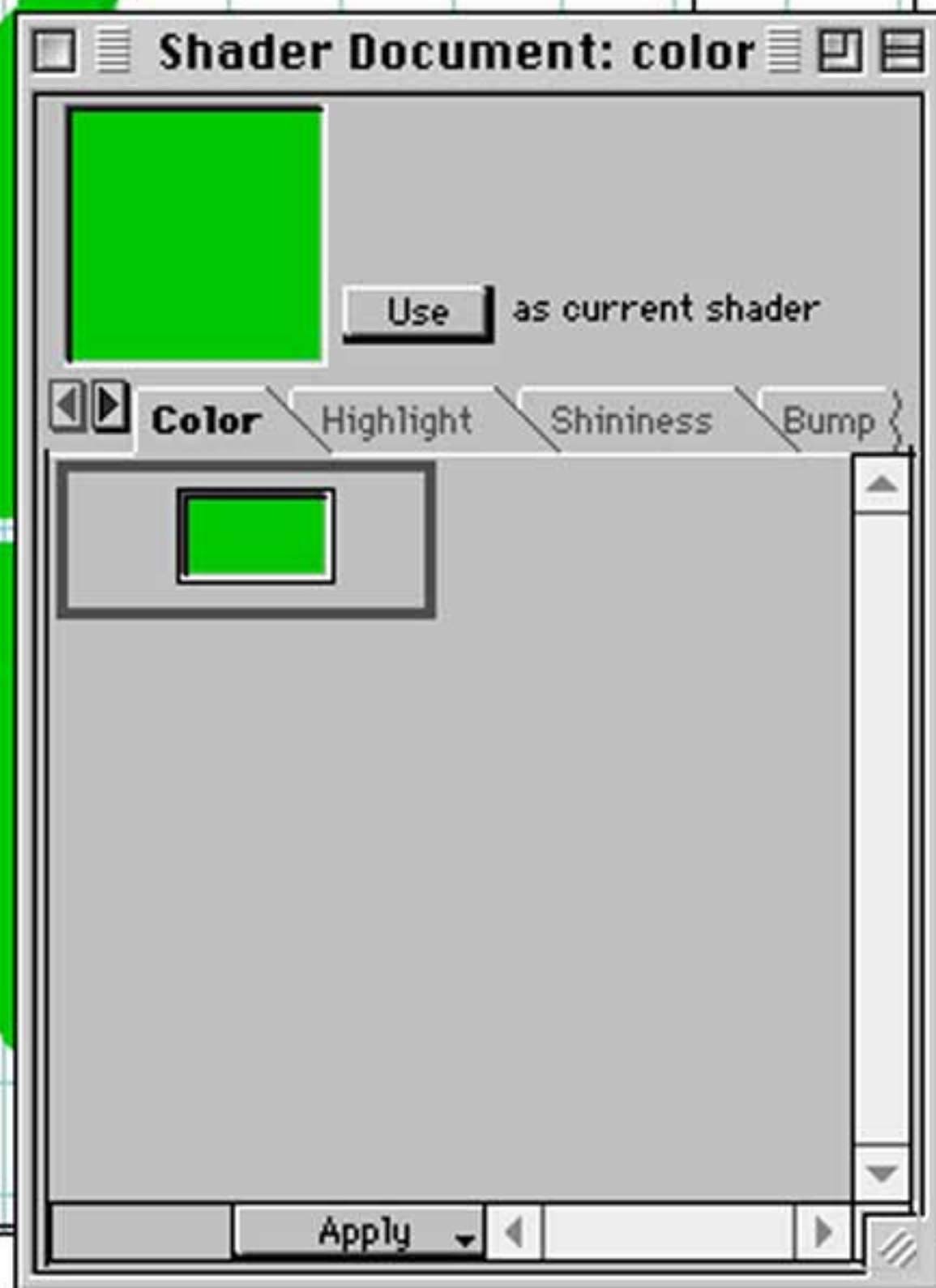
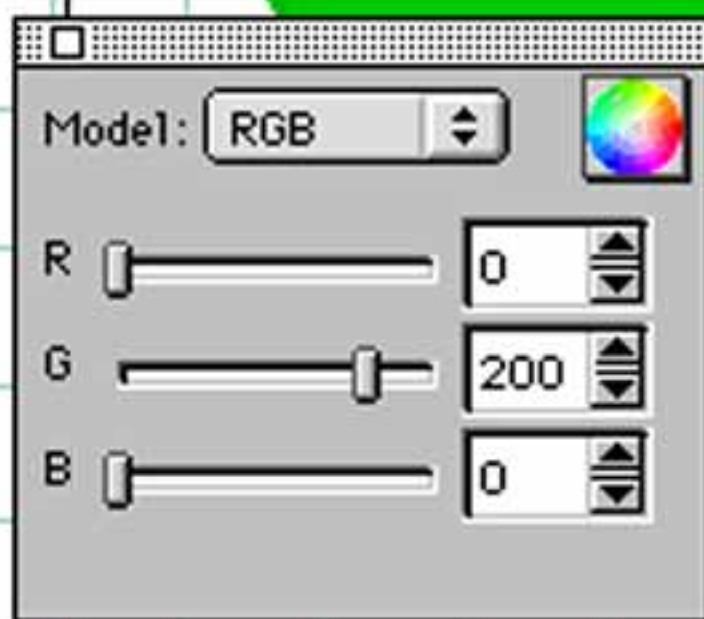
Done



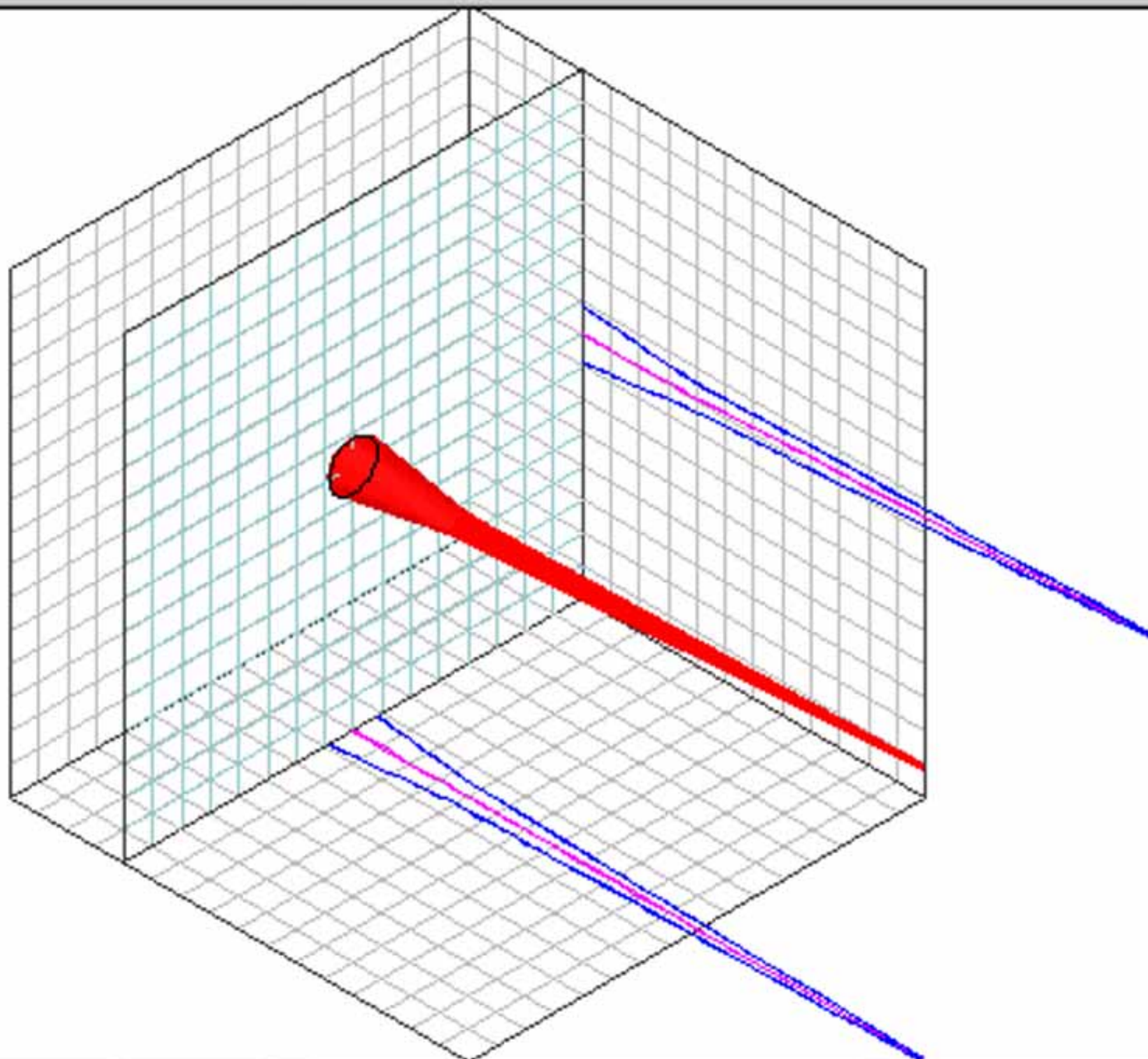








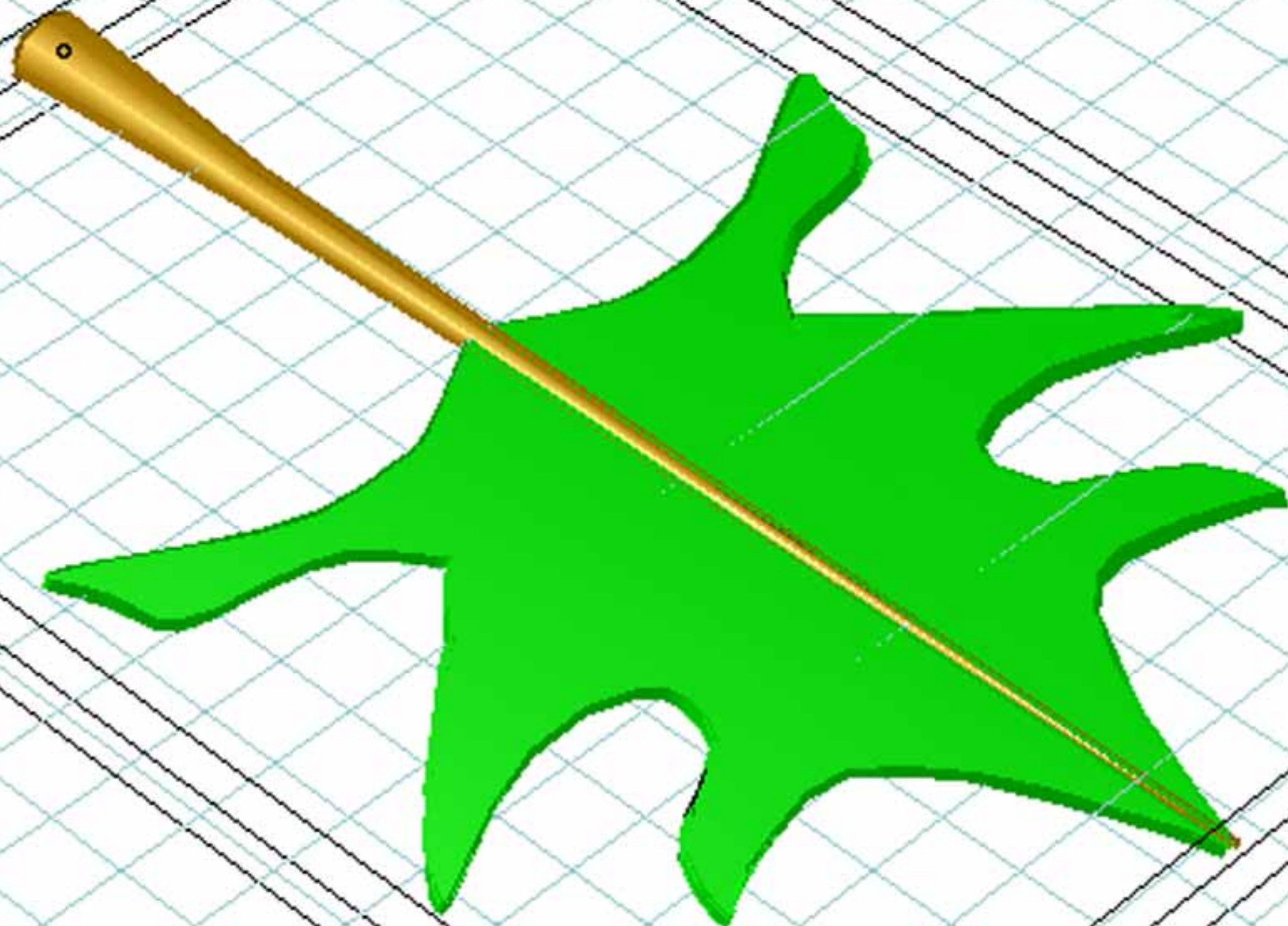
Perspective of Leaf1C.rds:1 at 00:00:00

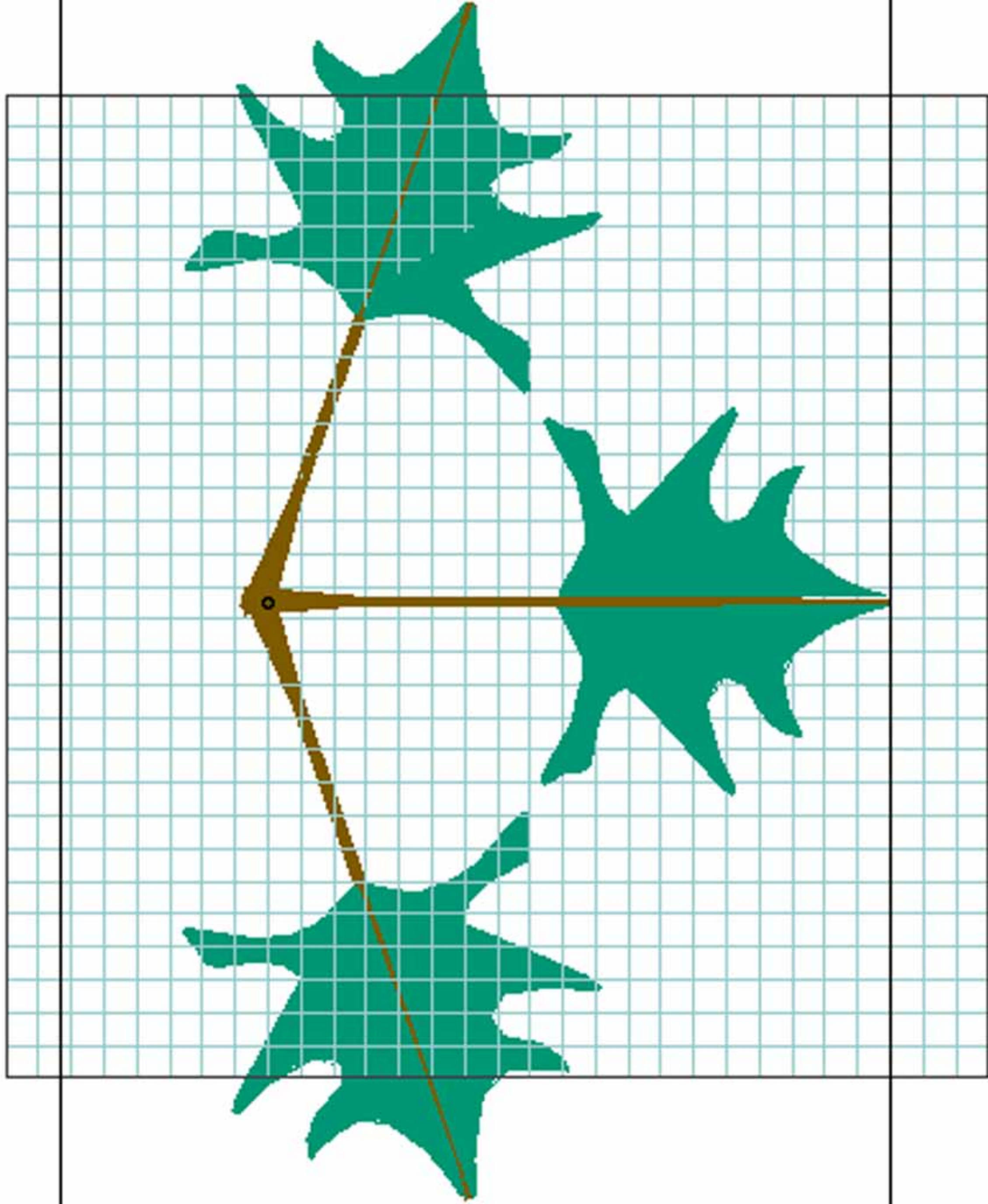


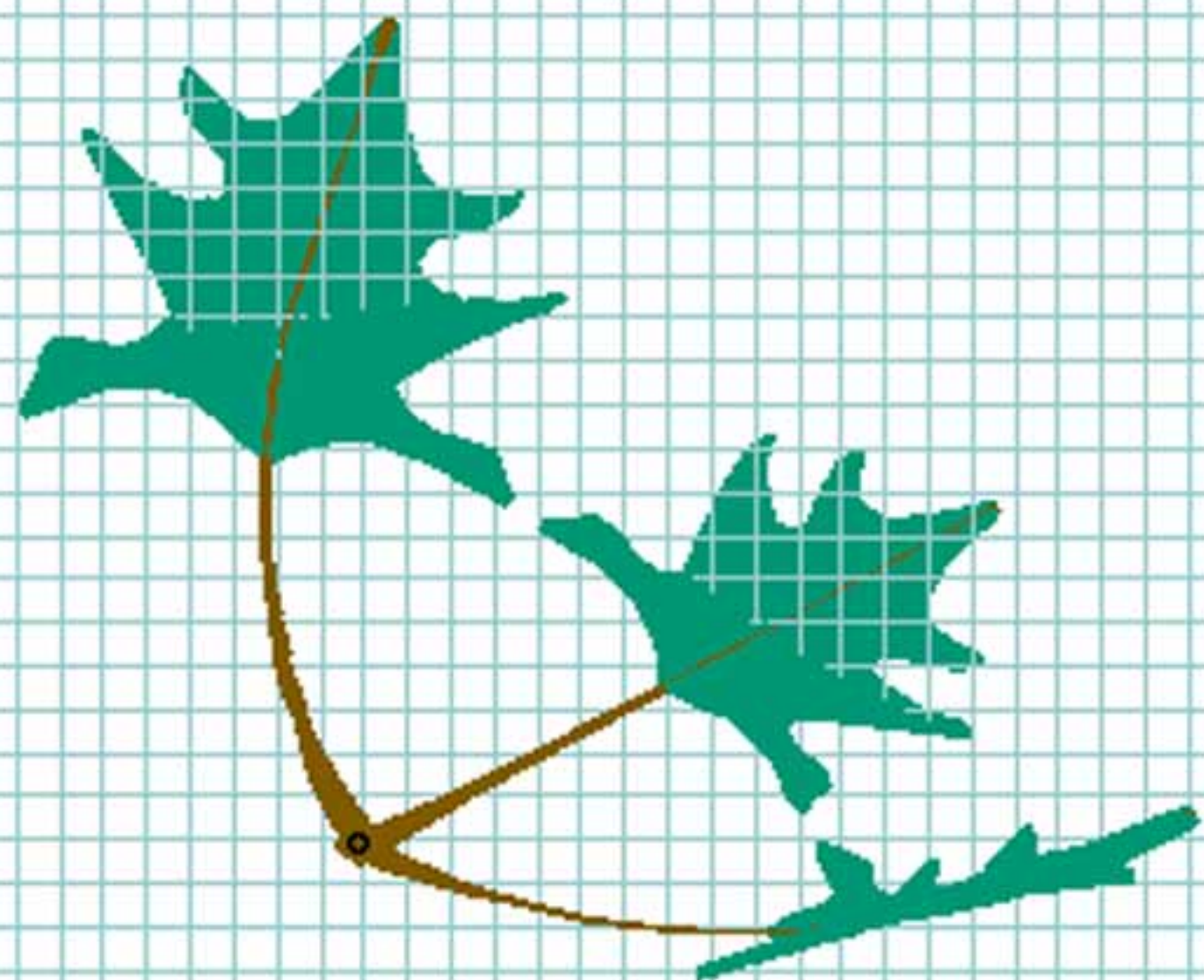
1:1

Done

Restore







Properties: Group 3 (Group)

General Transform **Deformers** Behaviors Link

Bend and Twist

Twist axis

- ☒ X-Axis
- ☐ Y-Axis
- ☐ Z-Axis

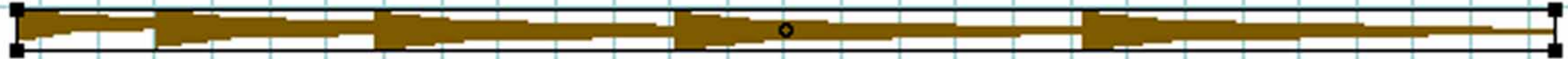
Twist: -65°

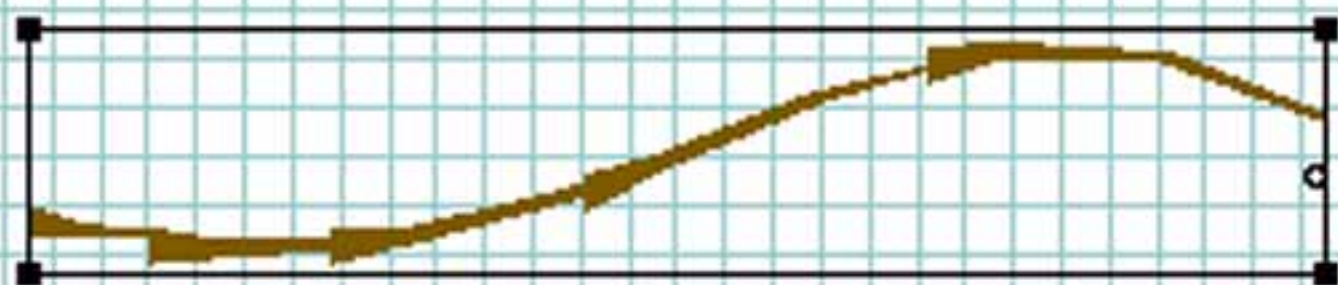
Bend: 133°

Bend Axis: -33°

Twist start: 20%

Twist size: 100%





Properties: Group 1 (Group)

General

Transform

Deformers

Behaviors

Link

Wave

Phase:

 0%

Number of Wave Cycles

 1.00

Height of Waves

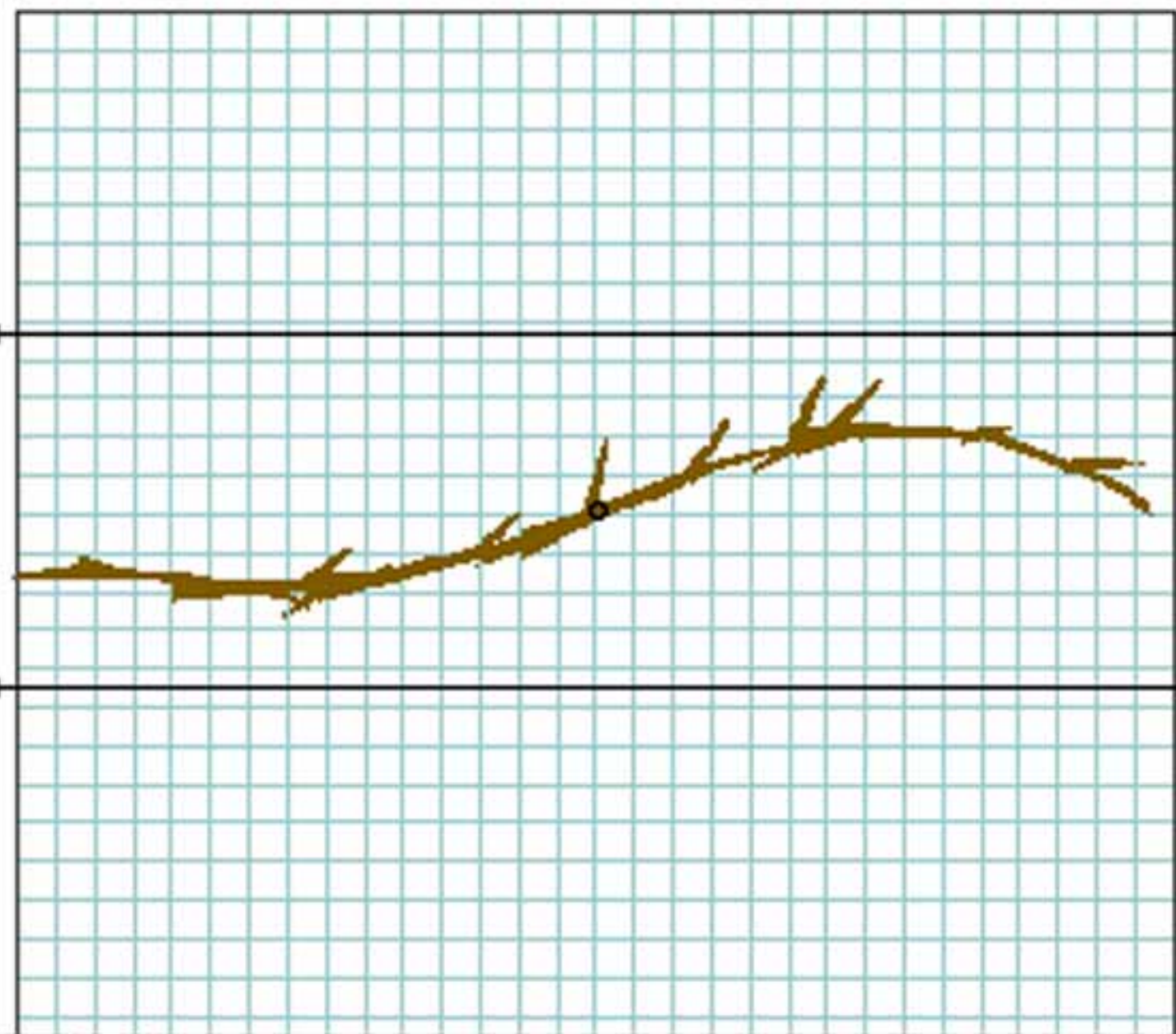
 20%

Shape

Radial

Orientation

X-Axis



Properties: Group 5 (Group)

General

Transform

Deformers

Behaviors

Link

Spike

Spike Density :

6.00

Length :

15%

Radius :

0.15

☒ Keep Original Object

Messiness :

63%

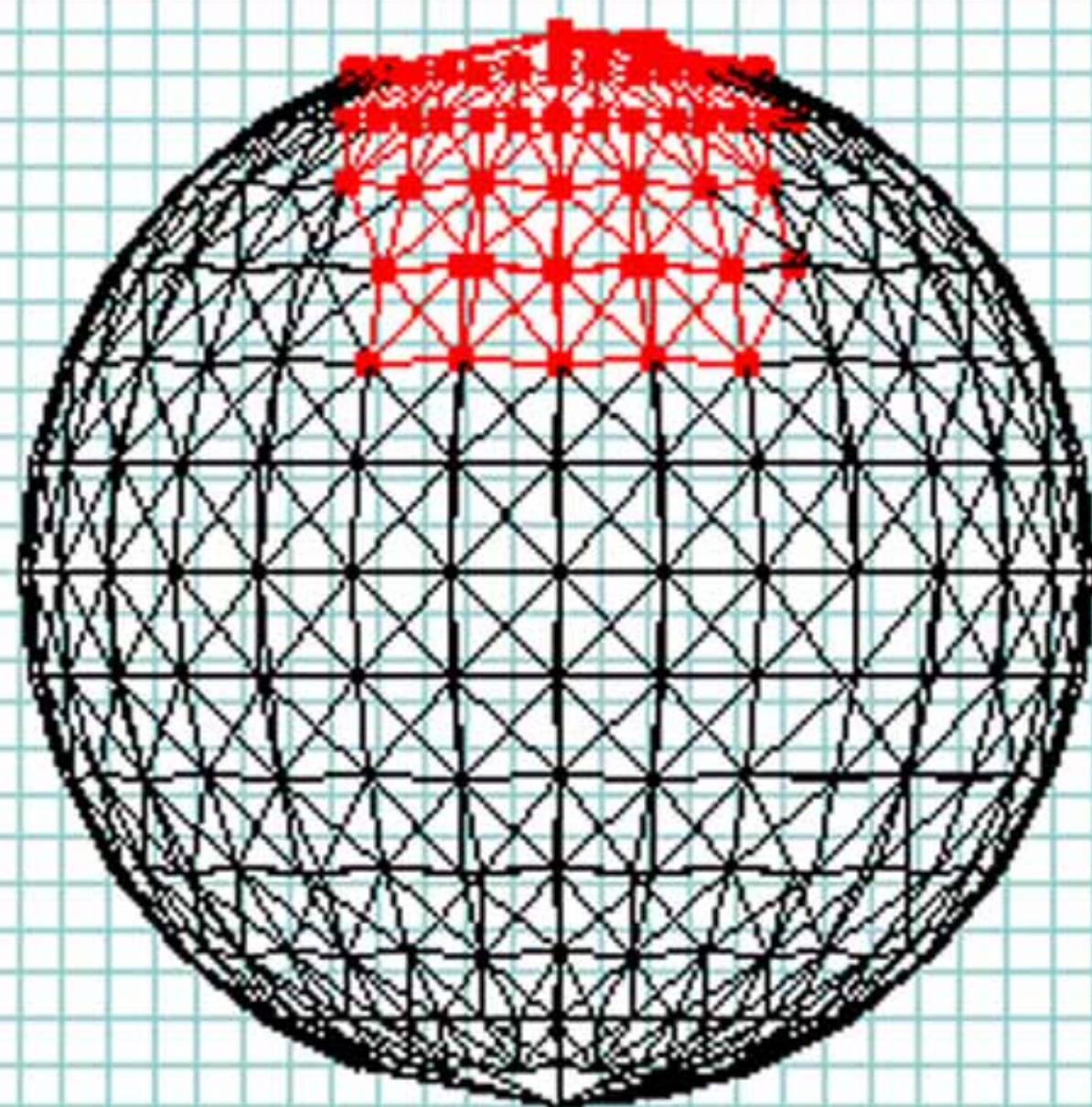
Flow :

67%

Gravity :

0%

Perspective of 3Leaf1.rds:1 at 00:00:00

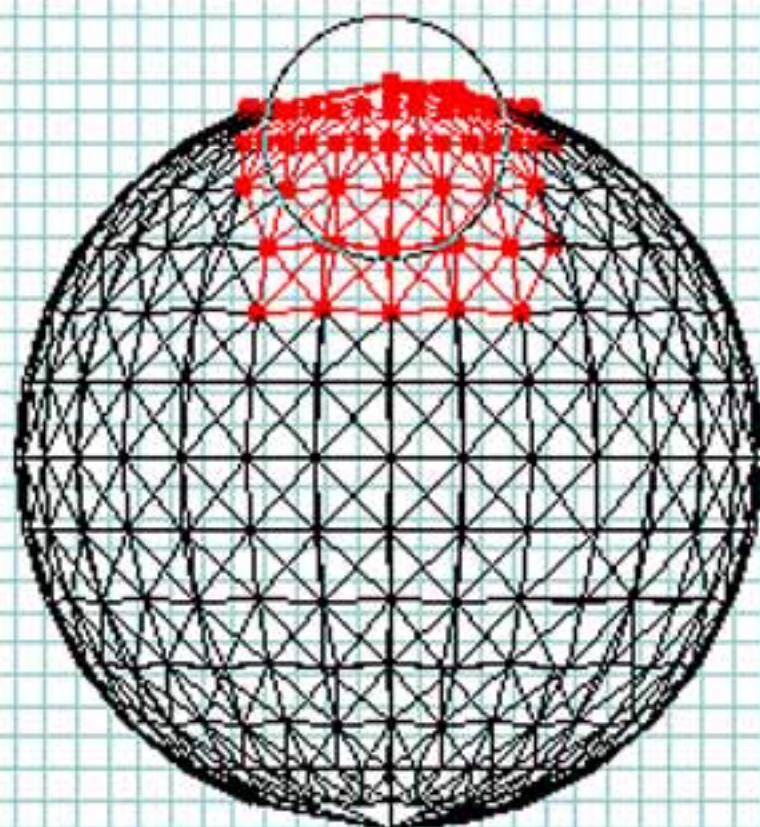


Done

Restore

2:1





Done

Restore

2:1



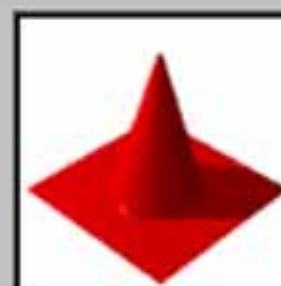
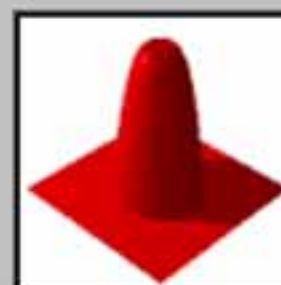
Numerical

Tool Options

Action Modifiers

Mapping

Sphere of Attraction Tool

☐ Cubic Spline☐ Linear☐ Spiky☒ Bumpy

Radius of Sphere :

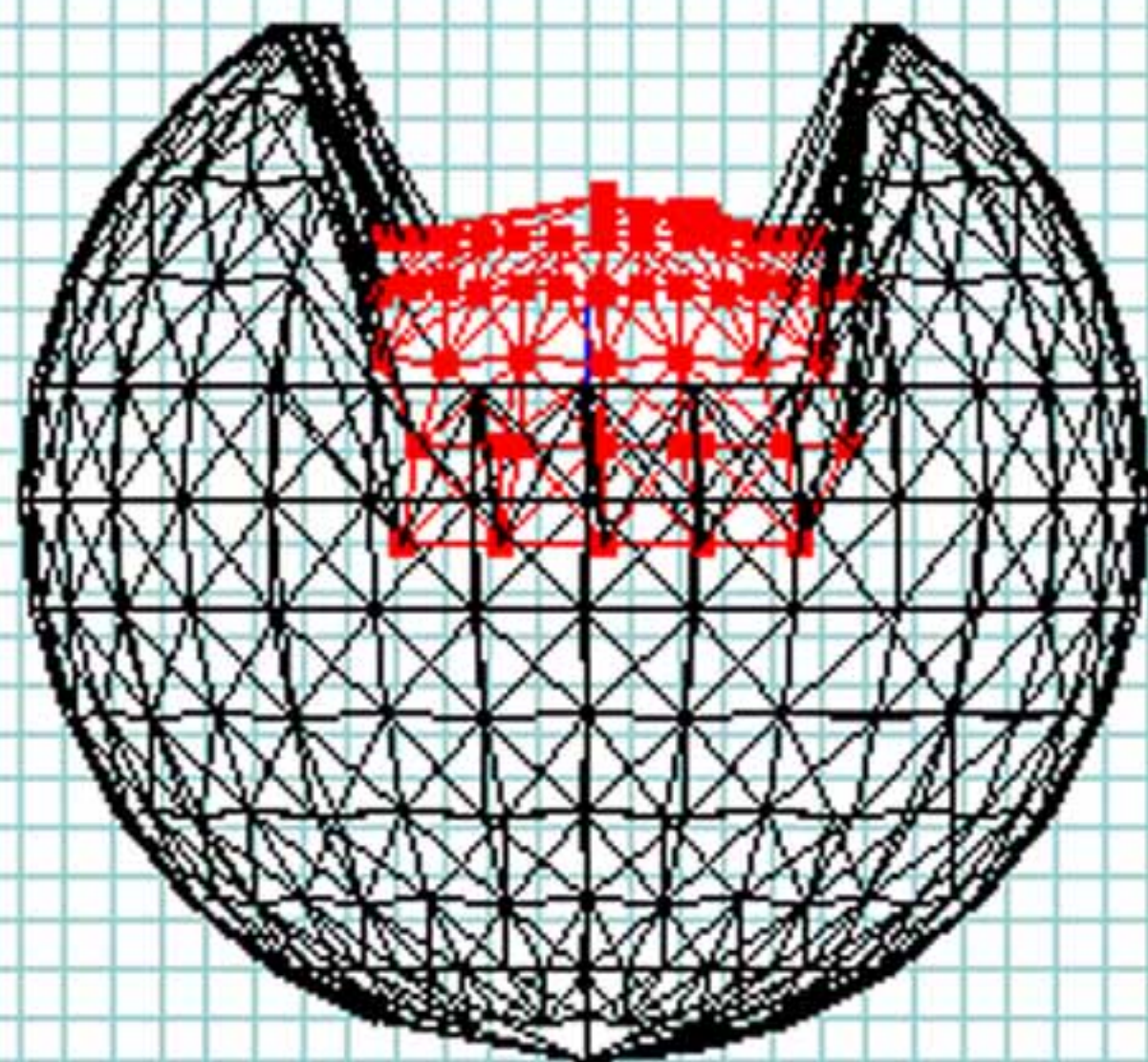
100.00

mm

Attraction mode

- ☒ Move selection, attract other vertices
- ☐ Attract only selected vertices

Perspective of 3Leaf1.rds:1 at 00:00:00

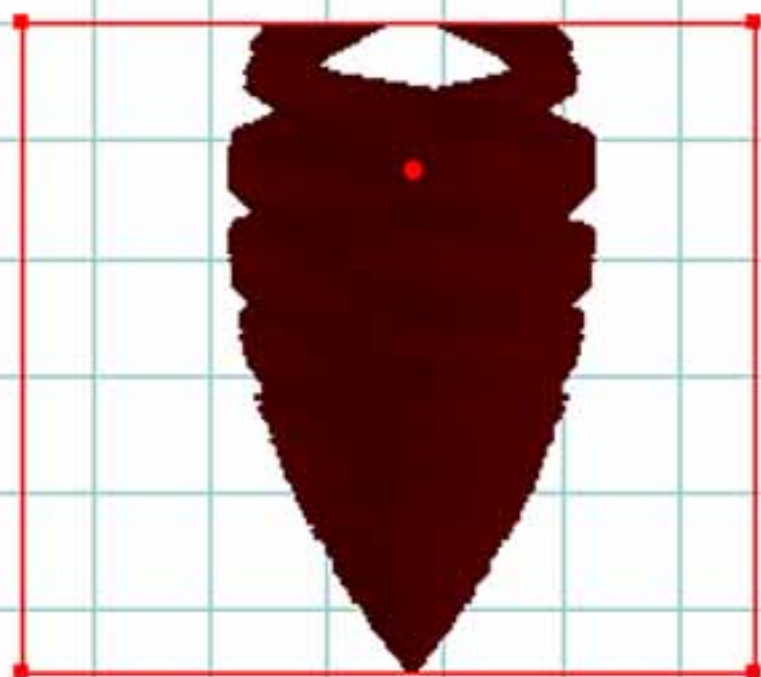


Done

Restore

2:1

Perspective of Core1.rds:1 at 00:00



4:1

Properties: Sphere (Primitive)

General

Transform

Deformers

Behaviors

Mapping

Black Hole

Completion of Hole Entrance:

60%

Winding:

100%

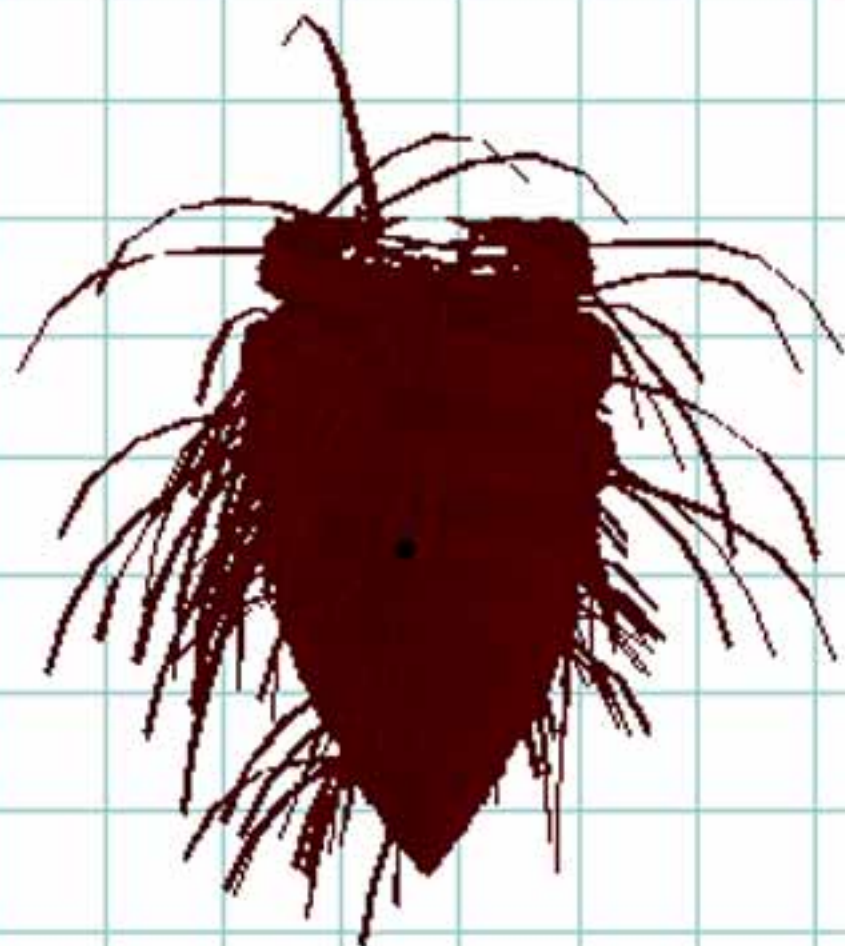
Spin Speed:

100%

Suck Down Point Below Object:

27%

Perspective of Core1.rds:1 at 00



4:1



Properties: Group 7 (Group)

General

Transform

Deformers

Behaviors

Link



Spike

Spike Density :

5.00

Length :

100%

Radius :

0.10

Messiness :

100%

Flow :

100%

Gravity :

100%

☒ Keep Original Object

