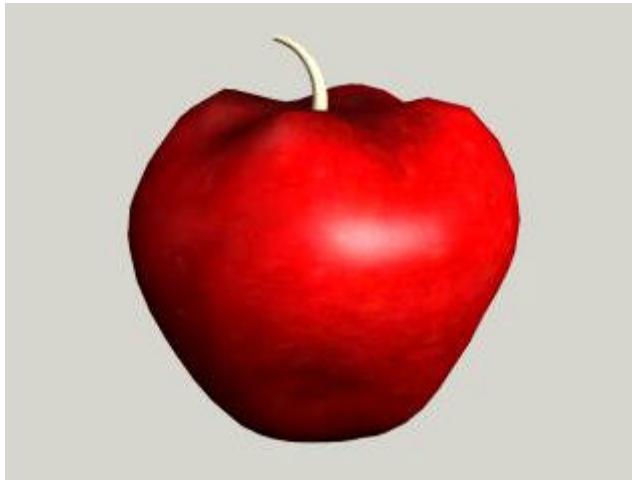# Modeling an Apple

In this tutorial, you create an apple. You will add *Taper* and *Displace* modifiers to reshape a sphere to look like an apple, then use additional tools to improve its shape and add a stem.

Before you start:
Enter **Customize > Preferences** and in the **General** tab check these settings:
Scene Undo: 200 Levels

Scene Selection > tickmark in **Auto Window/ Crossing by direction**: also tickmark in **Right- >Left=>Crossing**

Texture Coordinates > **No** tickmark in **Use Real - World Texture Coordinates**

Skill Level: Beginner

Time to complete: 25 minutes

Features Covered in This Tutorial

- *Taper* modifier
- Creating sub-object selection sets
- Using *soft selections* to blend changes to a mesh
- Using a *Displacement* modifier to shape your

mesh • Using a *Bend* modifier to shape a stem

Tutorial Files

All the necessary files for this tutorial can be found in the *P:\Courses\41618-3ds Max Design \Day-1* directory. Before starting the tutorials, copy the *Day-1* folder to your local *\3dsmax7*installation.

In This Tutorial

Creating the Basic Apple Shape
Improving the Shape of the Apple
Completing the Apple
Adding a Stem to the Apple

Comments

Creating the Basic Apple Shape

First you will create the basic apple shape from a sphere and modifiers.

Create the apple:

1. Choose **File > Open** and open the file **tut_apple_start.max** from the
   Day–1 folder. Highlight the file and click **Open**.
   There is no geometry in this file; however, it does contain a material you will need.

2. On the **Create** panel, under **Standard Primitives > Object** Type, click **Sphere**.

   The button turns *blue*, indicated the **Sphere** command is ready for you to make a sphere.

3. In the **Top** viewport, drag to create a sphere that has a Radius of **10**.

4. In the **Name** and **Color** rollout, name the sphere **apple**.

5. Click **Zoom Extents All** to zoom all the viewports.

Change the rendering background color:

You'll be able to see the apple better if you render it against a white background.

1. From the **Main** menu, choose **Rendering > Environment** to display the **Environment and Effects** dialog.

2. In the **Common Parameters** rollout > **Background** group, click the black **Color** box to display the **Color Selector** dialog. Set Value to **255** and click **Close** to accept the value and close the dialog.

3. Close the **Environment and Effects** dialog.

Apply an apple material:

1. Press **M** on the keyboard to open the **Material Editor**.

2. From the **Material Editor**, drag the material **shiny apple** to the apple sphere in any viewport.

3. Close the **Material Editor**.

4. Right-click in the **Perspective** viewport to activate it. On the **Render** toolbar, click **Render**.
   Or press **F9** on the keyboard to render the viewport without clicking a button.

Rendered apple against White background

Taper the apple:

Selecting what you want to work on is the first step in modeling. Until you make a selection, all modifier choices are unavailable. In this case, the apple should be selected; when selected, its **wireframe** mesh is displayed in white.

Modifiers can be selected from the **Modifier** List on the **Modify Panel**, or from the **Modifiers Menu**. Here you'll use the menu option at the top of the interface.

1. On the **3ds max** menu bar, on the **Modifiers menu**, choose **Parametric Deformers > Taper** to apply this modifier to the sphere of the apple.

2. In the **Parameters rollout > Taper** group, adjust the **Amount** parameter and watch the effect in the viewports. You only need a small amount of taper. Adjust the parameter to about **0.85**.

3. On the **Parameters rollout > Taper Axis** group, set Primary to **Z** and Effect to **XY**.
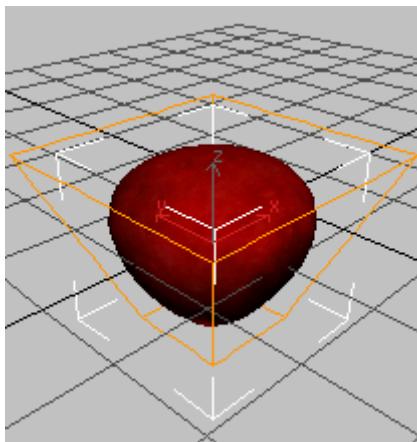
Next

[Improving the Shape of the Apple](#)

Improving the Shape of the Apple

The **Taper** modifier produced a rough reshaping of the apple's original sphere. To achieve more realism, you will **collapse** the sphere into an **editable mesh** and use **Soft Selection** to adjust the transition between selected and unselected areas.

Shape the lower half of the apple:

What you see in the viewports is a tapered wireframe of the whole apple. For more detailed modeling, you need to select only part of the apple, such as the lower half. By collapsing the sphere to an **Editable Poly**, you can make a soft **sub-object** selection.

1. With the apple selected, go to the **Modify panel > modifier** stack display (below the **Modifier** List), right-click the object name, and then choose **Collapse All**. Click Yes in the Warning dialog.
   Tip: If you are unsure about collapsing the stack, click **Hold/Yes** instead. You can revert the scene to the current state by selecting **Edit > Fetch** from the menu bar.
   The tapered sphere becomes an **Editable Poly**.
   Tip: You can also convert a selected object to an **editable poly** in the active viewport by right-clicking the object and in the **quad menu > Transform quadrant > Convert To > Convert To Editable Poly**.

2. In the **stack** display, click the dark area to the left of **Editable poly** to expand its sub-object levels.
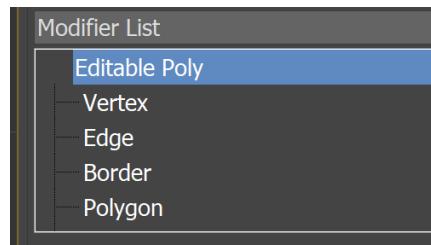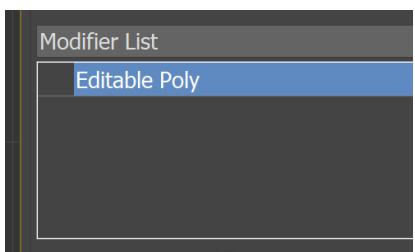
3. Choose **Vertex** from the level list.
   In the viewports, the vertices appear, highlighted in blue.

4. Activate the Left viewport.

5. Click **Zoom Extents All** in the viewport navigation controls.
   The apple is enlarged in three viewports.

6. In the Front or Left viewport, drag from outside the sphere to make a dotted box around the bottom two or three rows of vertices of the apple. As you release to complete the box, the selection is made, and the vertices turn red.

   This technique is called **region-select**. It's the most common method for making **sub-object** selections.
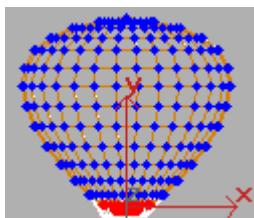
Name the sub-object selection:

With hundreds of vertices or faces, **sub-object** selections are often hard to recreate exactly. So it's a

good idea to give these selections a name you can recognize later. Any selection (object or sub-object) can be named and retrieved in **3ds max**. As your modeling skills develop, you'll begin to recognize the advantages of named selection sets.

● On the *Selection Sets* toolbar, toward the right side of the interface, you'll find a blank list. This is where you name the current selection. In this case, type in **bottom of apple** and press *ENTER*.

This selection name is stored with the file.

You might have many named selections on a single object, but you will only see **bottom of apple** in the list when you return to the *Vertex* level of the *Editable Poly*. At this level, you could make multiple selections and give them each a different name. You could then experiment with which selection works best for the modeling effect you want.

Use *Soft Selection* to blend changes to your mesh:

The *Soft Selection* setting helps the selected region blend with the rest of the object.

1. In the *Modify* panel, scroll to and open the *Soft Selection* rollout.
   You can scroll any command panel by dragging the hand cursor that appears in blank areas of the panel. Click to open the rollout.

2. Turn on *Use Soft Selection*.
   The vertices are now displayed in a graduated color ramp.
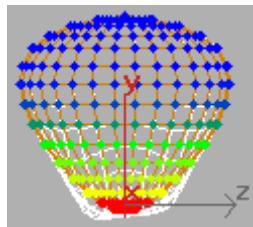
3. Adjust the *Soft Selection Falloff* setting watching the viewport shading change until the lower half of the apple is affected.

Next

Completing the Apple

Completing the Apple

This lesson continues from the previous one. You are working at **Vertex** level with **Soft Selection** active. The bottom half of the apple is selected.

**Apply a displacement modifier to your apple:**

Here you apply a **Displace** modifier to move only the currently selected vertices on the bottom of the apple. You use a **bitmap** (an image) to control this movement, or displacement.

1. Make sure the **Vertex sub-object selection** is active (blue) in the modifier stack and the vertices are visible in the viewport. Then, click the **Modifier** List drop-down arrow. From the **Object-Space** category in the drop-down list, choose **Displace**.

   This applies the **Displace** modifier. You won't see much change until you adjust its parameters.

2. Adjust the **Strength** spinner in the **Displacement** group. You should see the effect happening only on the lower half of the apple.

3. On the **Parameters rollout > Image group**, click the **Bitmap** button labeled **None**.

4. In the **Select Displacement Image** dialog, choose **appledis.jpg.**

   The **preview** window at the bottom of the dialog shows the bitmap you're applying.
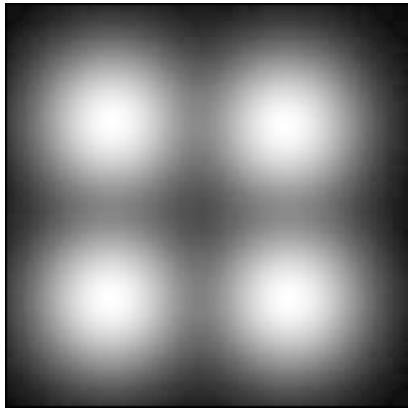
   The bitmap is a black square with four fuzzy white blobs. The white areas will displace more than the black, producing the characteristic four bumps on the bottom of the apple. The fuzziness of the bitmap image creates a smooth transition.

5. Click **Open** to apply the bitmap.

6. In the **Parameters rollout > Displacement** group, drag the **Strength** spinners (the small arrows next to parameter fields) to increase and decrease the **Strength** parameter a little. Again watch the effect in the viewport.

   Negative values push the bitmap image into the mesh. Positive values draw the image out, producing bumps. Try a value of **-5.0**. You can change this later if you need to.
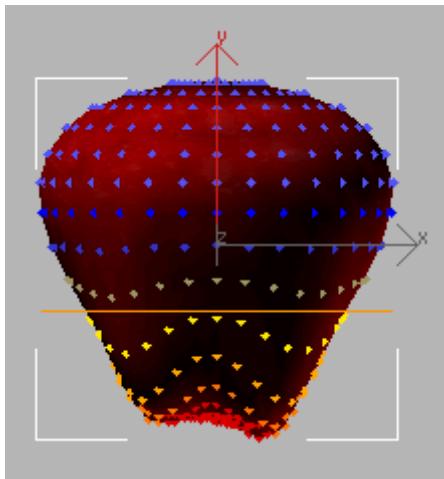
Complete the top of the apple:

To complete the apple shape, you'll add an *Edit Mesh* modifier to create a second soft selection, and then copy the *Displace* modifier to the top half of the apple.

1. On the *Modify* panel, choose *Modifier List > Object-Space Modifiers > Edit Mesh*.

2. [ ] the *Selection* rollout, choose *Vertex*.

    Warning: You want the Vertex sub-object level of the new (top) Edit Mesh modifier. Not the Vertex level of the (bottom) Editable Mesh.

    You are now working at the *Vertex* sub-object level.

3. Region-select the vertices on the top two or three rows of the sphere. Name the selection *top of apple.*

    Tip: You might notice that the original *Soft Selection* vertices are still displayed. Once you have selected the vertices at the top of the apple and turn on *Soft Selection*, the newly selected vertices should display correctly.

4. Open the *Soft Selection* rollout. Turn on *Use Soft Selection*, and adjust Falloff to about **8.0**. The *modifier* stack display shows you all the changes you've made to your object. The sphere is now shown at the bottom as an editable mesh. The successive modifiers that you applied to this sphere are above it.
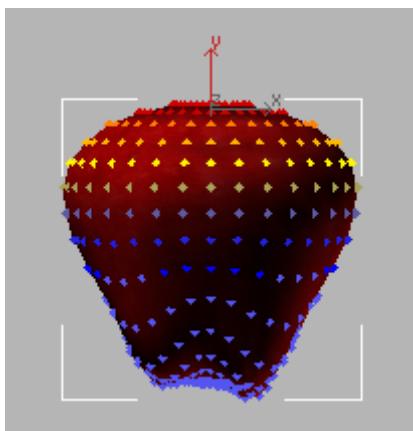

5. In the *stack* display, right-click *Displace* and choose *Copy*.

6. At the top of the *stack* display, right-click over *Edit Mesh* and choose *Paste* to add the duplicate *Displace* modifier to the stack.

    Warning: Do not highlight the Edit Mesh in the stack display. This will turn off the sub-object selection. Instead, just right-click over the Edit Mesh entry.

A copy of the **Displace** modifier appears above the **Edit Mesh** modifier in the stack, and its effect has been applied to the top of the apple selection.

7. In the **Parameters** rollout > **Displacement** group, set Strength to **2.0,** and **Decay** to **1.5**
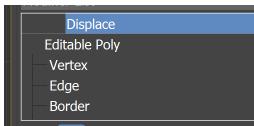
8.   Click on the small dark area left of **Displace**, and the **gizmo** appears.

The **gizmo** is a control for the modifier and defines where and how the effect will take place. By placing the **gizmo** just above the apple, you can get the effect you want.

9. Move the **gizmo** so that it's floating above the top of the apple.
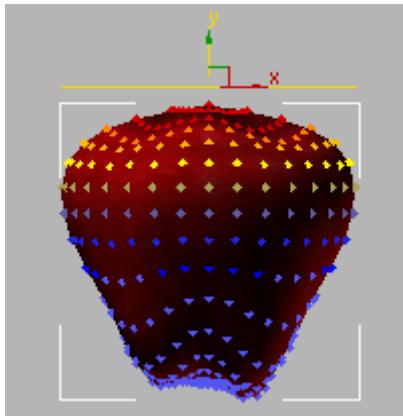
10. On the **Parameters** rollout for **Displace**, set the **Decay** parameter **1.5** to model the top surface into a characteristic apple shape. Again adjust the **Strength** parameter to fine–tune your effect.

11. In the stack display, click the **Displace** entry to exit the **sub-object** level and turn off the blue highlighting.

Next

Adding a Stem to the Apple

Adding a Stem to the Apple

In this lesson, you add some more visual interest to the apple. To create the stem of the apple, you make a cylinder using the **AutoGrid** feature to build the stem on the surface of the apple. You then add a **Bend** modifier to finish the stem.

Create the stem:

When you build an object in a viewport, the object is constructed on a grid. Up until now, you have been using the **home grid** to build the apple. Now you'll try using the **AutoGrid** feature. This uses a roving grid that is automatically created off a surface using face normals.

1. On the Create Menu, choose **Standard Primitives > Cylinder.** The **Cylinder** button highlights on the **Create** panel.

2. On **Create panel > Object Type** rollout, turn on **AutoGrid**. This is a small check box directly under the **Object Type** rollout.

3. In the Top viewport, move the cursor over the apple.

   A tripod follows the cursor showing where the cylinder will be created. Try to locate the center of the top of the apple.
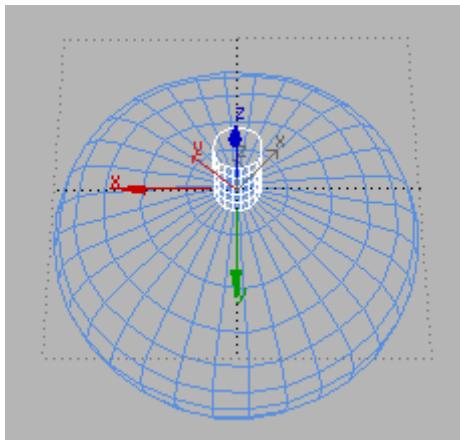
   AutoGrid lets you create the stem on top of the apple.

4. Add a cylinder on top of the apple. First drag and release to draw the base of the cylinder, and then move the mouse to set its height. Click to finish.
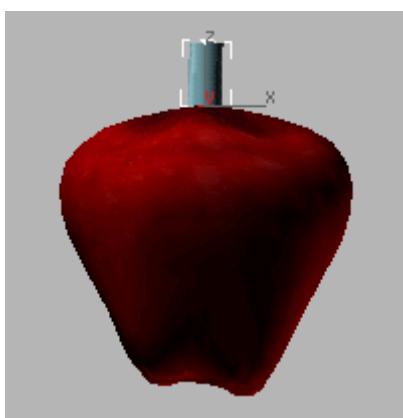

5. In the **Name And Color** rollout, change the color of the cylinder to green and name it **stem**.

6. On the **Parameters** rollout for the stem, set the

   following: ● Radius=**0.5**

   ● Height=**4.0**

- *Height* Segments=**12**

7. On the *Object Type* rollout, turn off *AutoGrid*.

8. On the *Modifiers* list, choose *Object-Space Modifiers* >
   Bend. This applies a zero-degree *Bend* to the cylinder.

9. On the *Parameters* rollout for the *Bend* modifier, adjust the *Angle* setting to bend the
   stem. Plus or minus **60** is about right. Experiment with the *Direction* parameter, although
   you can leave it at *0* if you want.

10. Right click in the Perspective viewport to active it, and press **F9** to *render last.*
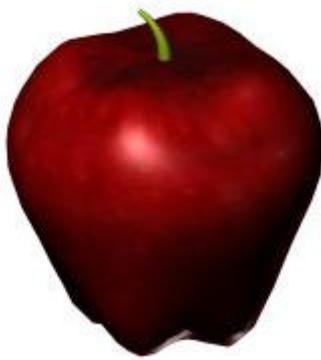
Rendered apple

If you want your stem to be similar to the one in the bottom illustration, apply a very slight

Taper modifier below the *Bend*.

11. Highlight the *Cylinder* in the *stack* display.

12. Add the *Taper* modifier at this point, it will then taper the cylinder before it is bent.
    **Warning: Applying the Taper modifier after the Bend will produce entirely different
    results.**
    After Adjusting the *Taper* modifier, highlight *Bend* to reactivate it.
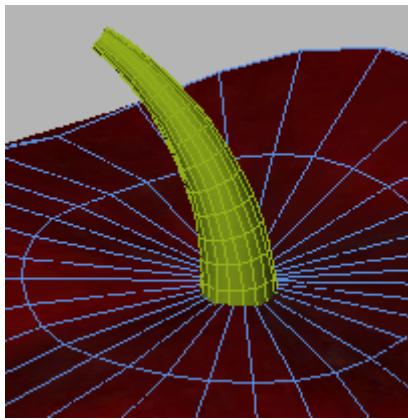
The cylinder is first tapered, then bent.

Save your work:

- Choose *File > Save As*. Save your work as **my_apple01.max** in your appropriate local folder.

  Note: A completed file, *tut_apple_complete.max* is also available in the
  Day-1 directory.

Summary

In this tutorial, you learned how to start with a primitive and shape the object using the ***Editable Mesh*** tools. You also learned how you can use displacement mapping to make an object appear more organic.