

Squeeze Bottle Design

Presenter Professional 3.0 is ideal for product and graphic design on the Macintosh and the Power Macintosh. It takes full advantage of the powerful high-end Macintoshes while offering an easy to use and consistent interface. In this tutorial, you are going to explore the way it can be used for product design. The product design we are creating now is typical of what's on the shelves these days: Products with lots of curves and organic form that's pleasing to the touch. Simple polygonal modelers just can't keep up with Presenter Professional 3.0's curvy spline-based surfaces when it comes to the needs of industrial designers.

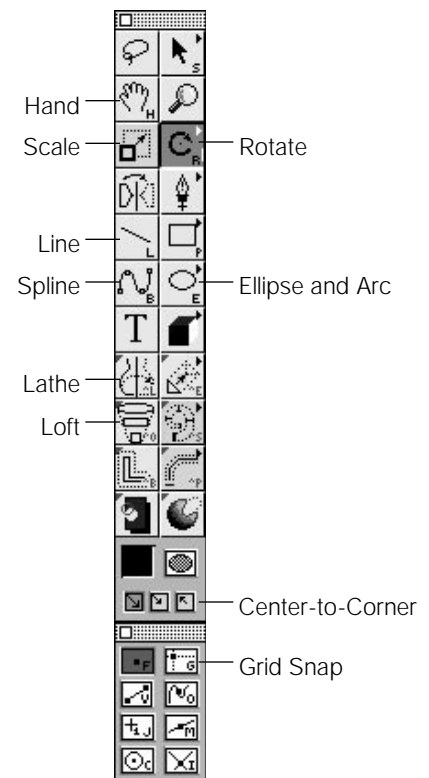
Creating a Squeeze Bottle

In this exercise, you will create a squeeze bottle with finger and thumb grips and a top with grips. Groups will be used to make your modeling efforts more effective and efficient. Except for placing a few circles, you will primarily use transformation and reshape techniques to perform the design. You will use the Ellipse, Arc, Lathe, and Loft tools for modeling. Guide Lines to help keep the design in proportion, the Hand Tool to re-position an object, the Clone and Duplicate transformations, the Scale and Selector tools for reshaping, and the Statistics palettes for area and volume measurement. The diagram shows the location of all the tools used in this tutorial.

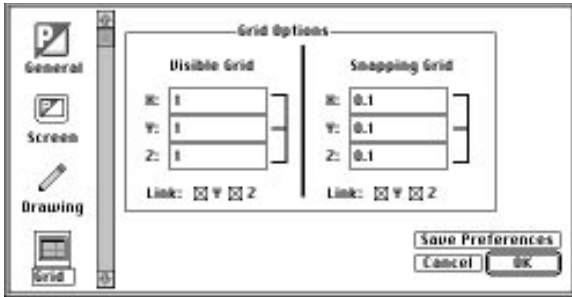
Getting Started

You will start by creating the main part of a container using cross-sectional design techniques and finish the product using basic lathing techniques. Where lathing is the process of revolving a profile to create a 3D shape, lofting, or "skinning" as it's sometimes known, is the process of draping a smooth surface over a series of cross sections.

To start, launch the ModelPro application. Select Create Folder from the Group menu. At the prompting of the dialog, type "Body" as the group name. Click Add to create the folder.



Preparing the Drawing Environment



Grid Preferences palette

Note: If you want a different grid size, you can change the grid settings in the Grid Preferences dialog from the Edit Menu.

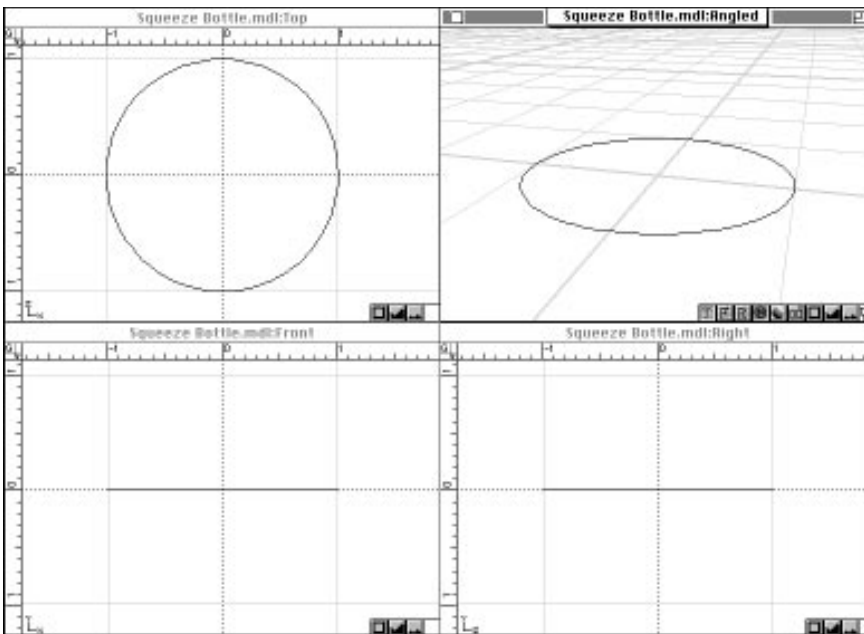
Note: The Galactic Core, to Presenter Professional 3.0 users, is the center of the drawing universe. To others it is the Origin point (0,0,0).

Both the Visible and the Snapping grid will be used to help in the design process. Under the Options menu, click on Show Grid to display the grid in the Top, Front, and Right views. Click on the Top Grid icon in the Angled View to display the angled grid. Click on the Snap Grid icon in the Drawing Options portion of the Tool palette to enable grid snapping. Select Preferences under the Edit menu. Click on the Grid icon and type 0.1 in the X box under Snapping Grid. Click OK.

Drawing the Initial Cross Section

The circle will be the basic cross section to be in constructing the squeeze bottle.

In the Top Window you are going to create a 2" diameter circle drawn out from the Galactic Core. First, select the center to-corner option in the Drawing Options portion of the Tool palette.



Creating a circle

Select the Ellipse (Circle) Tool from the Tools Palette. Draw a 2" diameter circle in the Top View window with its center at (0x,0y) by clicking and holding on the point where the two origin lines. Drag out one inch while holding the Shift key down.

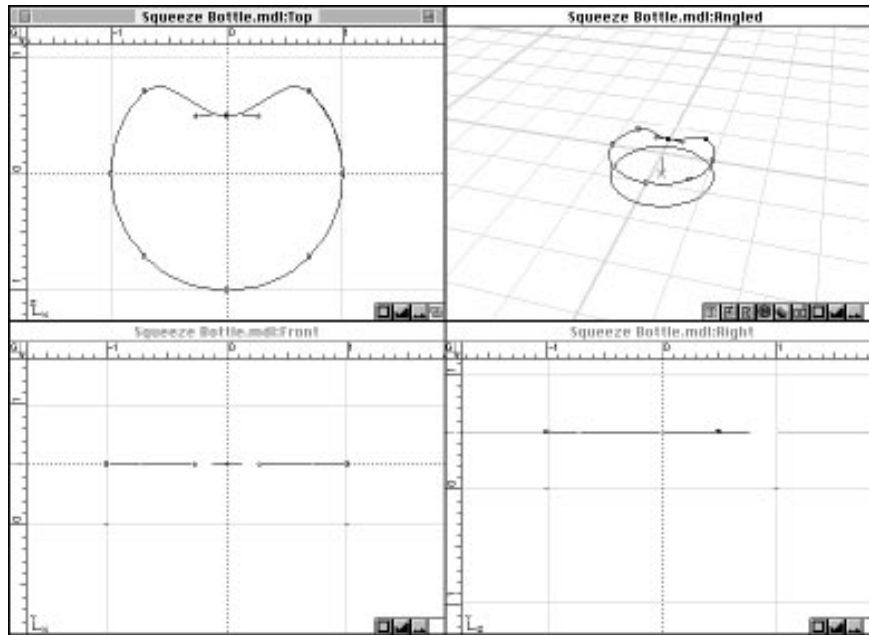
Creating the Cross Sections

The initial design will include two basic cross sections consisting of a circle and an indented circle cloned from the first circle.

Set the drawing depth by placing the cursor at 0.5 " along the vertical ruler at the left in the Front View & hitting the Space Bar. Draw another 2" diameter circle in the Top View exactly the same as the first.

Lofting Tutorial

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Indenting a circle

Click on the Selector tool to select it. Since the circle is selected as an object, click off the circle to de-select it. Click on the top circle in the Front View to display the vertices. Move the cursor to the top of the circle in the Top View. Click and hold on the top-most vertex of the circle in the Top View Window. Drag the vertex down halfway toward center. Use the rulers as a guide as to how far to drag.

You will proceed by making three copies of the two cross sections. Holding the Shift key down, select both cross sections. Choose Duplicate under the Edit Menu. Type "3" into Total # of Copies text edit Type -1 into Y Translate box under Move. Make sure that "Linear" under Method is selected. This creates six evenly spaced contours. Click on OK.

Holding the Command key, click in the Fit to Window icon at the bottom right of any window (it looks like an open square) to see what you've done.

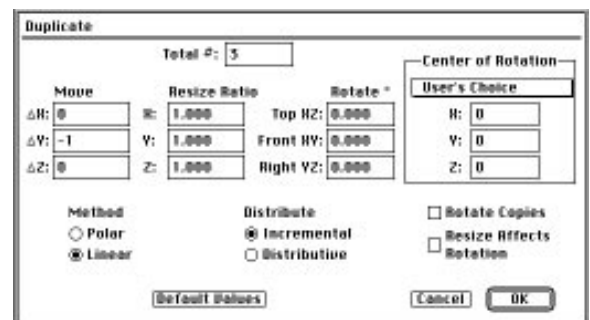
The six cross sections make up the main part of body of the bottle with three finger grips. If you haven't done so, save your design now.

Note: The Shift key constrains the ellipse so that it is drawn as a circle.

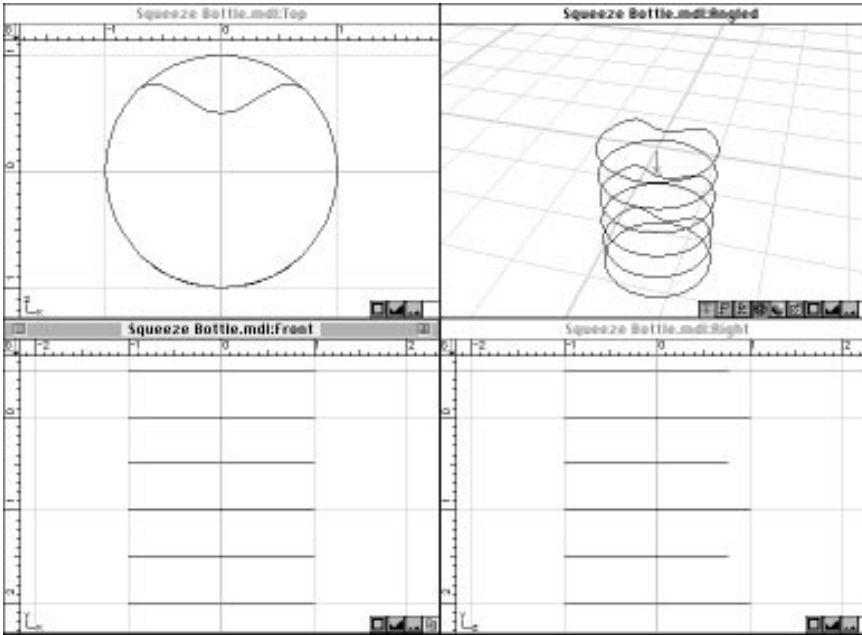
Note: When you press the space bar, ModelPro sets the drawing plane to a depth that goes through the point the cursor was on when the bar was pressed. It informs you by saying "Lock" and re-positioning the grid in the Angled View to fit the new drawing plane. With the grid displayed in the Angled View, a red line extending from a red "X" to the plane marks the depth.

Note: Presenter Professional works in 3-D like FreeHand and Illustrator work in 2-D. "Digital Clay" describes this intuitive push and pull type of object sculpting.

Note: To display the vertices on an object, use the Selector Tool and click on the object. The vertices can now be edited but the object cannot be moved. To display the object control points, use the Selector Tool, hold the Option key down and click on the object. The object can now be moved or scaled depending on whether you click and drag the object or click and drag one of the four control points.



Duplicate dialog box



The six cross-sections

Note: With the Selector Tool selected, clicking and dragging an object and pressing the Option key creates a duplicate object at the new position. This provides an interactive alternative to using the Clone command.

Note: Cross sectional design, along with 'Digital Clay' sculpting, provides the basis of ModelPro 3.0's sophisticated modeling.

Select Clone from the Edit Menu to clone the circle and create the second cross section. With the Selector Tool selected, hold the Option key down and click on the cloned circle.

Click and hold the newest circle in the Front View window and drag down 0.2".

With the same (bottom) circle selected, choose the Scale Tool from the Tool Palette. Choose an anchor point by selecting Center Object(s) from the pop-up menu of anchor options. In the Top View, grab a control point on the object and decrease the size of the radius of the object by 0.2 inches by holding the Shift key and dragging in to the center of the circle along a diagonal.

Holding the Command key, click in the Fit to Window icon at the bottom right of any window to see what you've done.

Save your design.

Taper the Bottom of the Bottle

Now, you'll add two cross sections and scale the last one to create the tapered bottom of the bottle.

Use the Hand Tool in the Front View window to move the bottom contour up to the middle of the window. Select the Ellipse Tool.

In the Front View window, position the cursor 0.5" below the bottom contour & hit the Space Bar to set a drawing depth. Draw a 2" diameter circle in the Top View to create the first cross section.

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Taper the Top of the Bottle

Now, using a similar technique, create the tapered top sections of the bottle. Three cross sections will be added and the last one will be scaled to create the taper.

Use the Hand Tool in the Front View window to move the top contour down to the middle of the window.

In the Front View window place the cursor 0.5" above the top cross section & hit the Space Bar to set a depth. Select the Ellipse Tool. Draw a 2" diameter circle in the Top View. This puts the first cross section in its place.

With the Selector Tool selected, click and drag the circle up 0.5" in the Front View and press the Option key before releasing. This puts the second cross section in its place.

With the Selector Tool selected, hold the Option key down and click on the newest circle to select it. Click and drag the circle up 0.2" in the Front View and press the Option key before releasing. This puts the third cross section in its place.

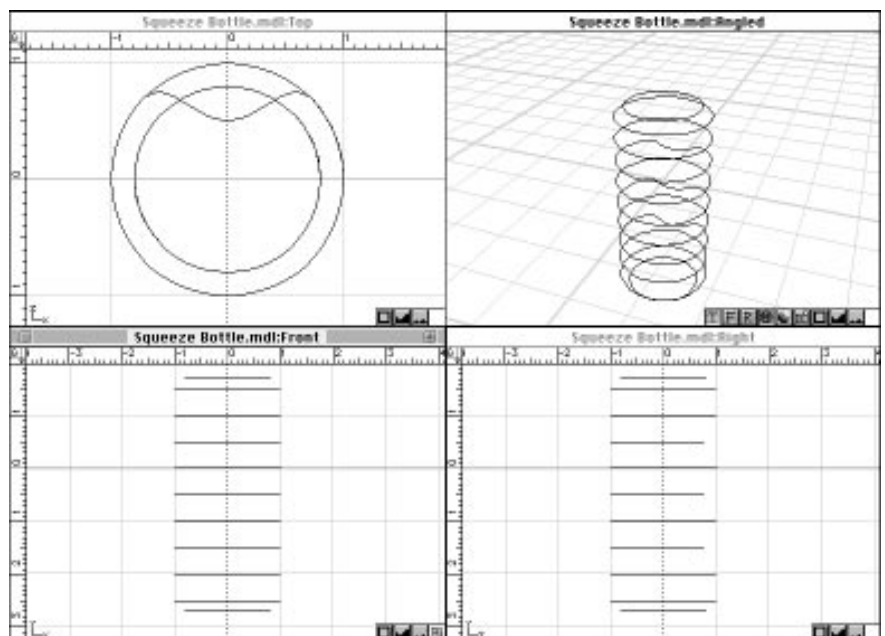
With the same (top) circle selected, choose the Scale Tool from the Tool Palette. The anchor point should already be set at Center Object(s) in the pop-up menu of anchor options. In the Top View, grab a control point on the object and decrease the size of the radius of the object by 0.2 inches by holding the Shift key and dragging in to the center of the circle along a diagonal.

Holding the Command key, click in the Fit to Window icon at the bottom right of any window to see what you've done.

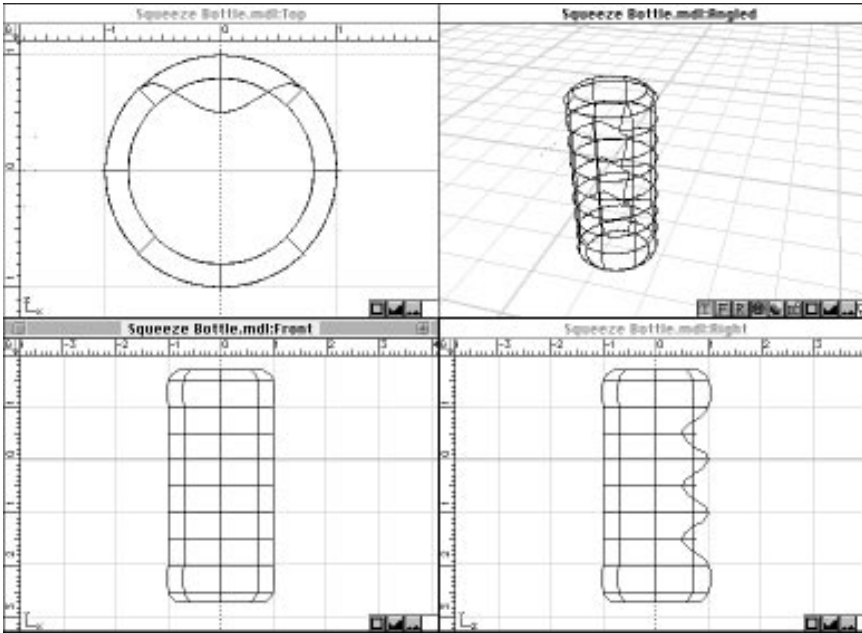
Note: Saving your design often and making backup copies is a very good habit to get into.

Note: Using the Selector Tool alone allows you to select an object and show its vertices when you wish to grab and move a vertex. Using the Selector Tool while holding the Option key allows you to select an object and show the bounding box when you wish to re-size the object or move the whole object. You should be familiar now with selecting objects and vertices and from now on you won't be prompted on how to select objects and vertices.

Note: With the Shift key held down, the Scale Tool lets you re-size evenly along



Bottle with tapered top and bottom



Lofted cross-sections

Connecting the Cross Sections

Now that you have the body's cross sections completed, it's time to loft a surface over them.

Choose the Selector Tool. With the Shift key held down, select each cross section from top to bottom. Select the Loft command from the Tools Menu. Hit Next Pair button until all connections have been previewed. Click on the Done button

Save your design.

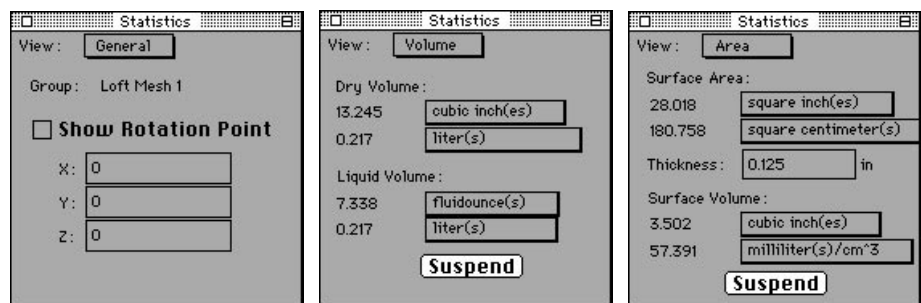
Note: An example of ModelPro 3.0's balance of freeform creativity and real world precision is the interactive Statistics palette. While Digital Clay sculpting is used to create a 3-D form, the statistics palette dynamically displays the volume and surface area. It can even tell how much material it will take to create the object, perfect for designers working in a production environment.

"Digital Clay" Sculpting

In product design, it is often important to know the size of the object that you're creating. Presenter Professional 3.0 provides the tools to accomplish this.

Click on the bottle in any window. In the Palettes pop-up under the Windows Menu, choose Statistics. Click and hold on the General option and drag down to select Volume or Surface Area.

Click on the Fold Away button to put it up in the right-upper area of the screen or in the Go-Away button to put it away.



The Statistics palettes

Lofting Tutorial

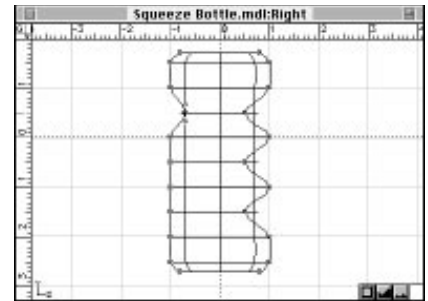
Making a Squeeze Bottle

Adding the Thumb Grip

Choose the Selector Tool and click on the lofted object in any window. In the Right View window, click and drag on the left-most point opposite the top finger grip to form a thumb grip.

Repeat the previous step for volume measurement to see what difference the design change has made in the volume.

Save your design.

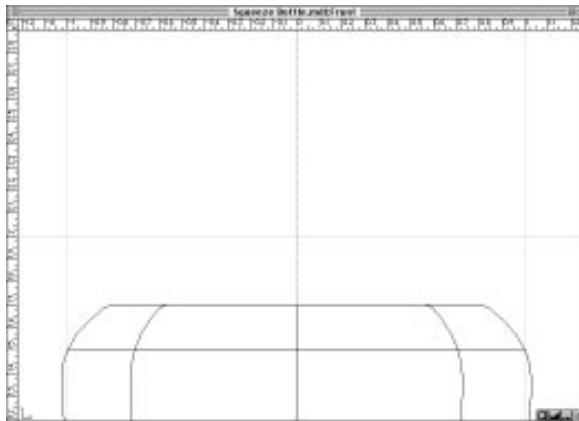


Bottle with thumb grip added

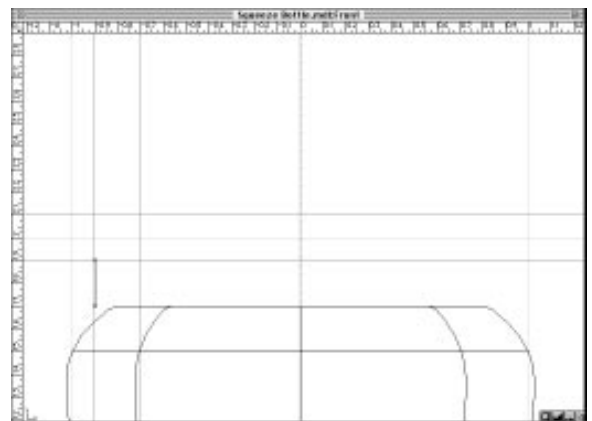
Topping it Off

To complete the bottle design, you are going to create the lid for the bottle. The lid's profile will be drawn and then lathed to form the lid.

First close the Body folder so that the new folder will not be part of it. Select Group from the Group Menu. At the prompting of the dialog, type Top as the group name. Click Add. Select a new color from the Color palette pop-up out of the Color Tool in the Tool palette. Now open the Body folder so that it can be used as a reference for drawing the lid.



Position the bottle for reference



Draw a vertical line

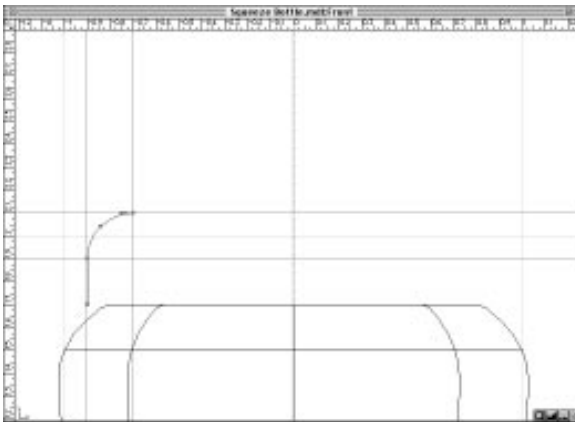
In the Top View, place the cursor at a Z depth of 0 and hit the Space Bar to set a drawing depth. Click in the Zoom Box to the right of the Front View window title bar to bring the Front View window to full screen. Click in the Fit to Window box. Using the Hand Tool, drag the bottle down so only the top portion is showing.

Note: The flexible snapping options in ModelPro 3.0 make it easy to create a custom workspace. Locking and Visible grids can also be modified and a drawing element can lock to any existing data point in any window, including the Angled window, for further accuracy.

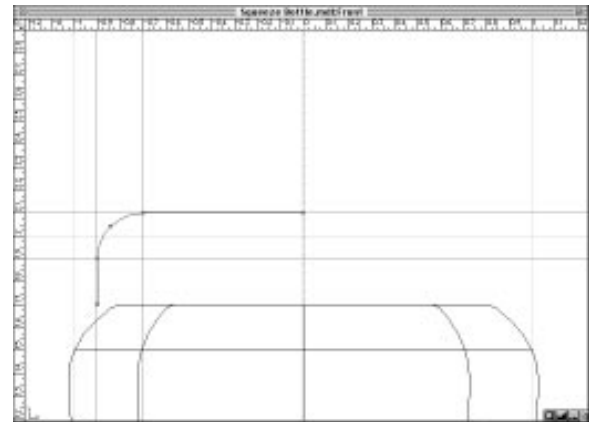
Some additional guidelines will be added to complete the design. Choose the Selector Tool. Click and hold on the Vertical Ruler Bar, then drag a guide out to -0.9". Drag another guide to -0.7". From the Horizontal Ruler Bar, drag guides to 1.9" and 2.1".

Select the Line Tool from the Tool palette. Draw a line along the -0.9 vertical guide from the top of the bottle to the 1.9" horizontal guide.

Select the 90° Arc Tool from the Ellipse Tool pop-up in the Tool palette. Holding the Shift key, draw an arc from the upper endpoint of the line you just drew to the intersection of the -0.7" vertical guide and the 2.1" horizontal guide.



Draw an arc



Draw a horizontal line

Select the Line Tool again. Place a horizontal line along the 2.1" Horizontal Guide from the upper endpoint of the arc to the center line Y axis.

Using the Selector Tool, select the joined elements. Choose the Lathe command from the Tools Menu. In the Lathe Tool Info palette above the windows, type 20 into the segments box. The Lathe Axes are already positioned on the Y=0 axis, so double-click to lathe.

When the Lathe operation is complete, click on the Zoom box at the upper right of the window. Holding the Command key, click in the Fit to Window icon at the bottom right of any window.

Getting a Grip on the Lid

To finish the design, you will add finger grips to the top so that it will come off easy.

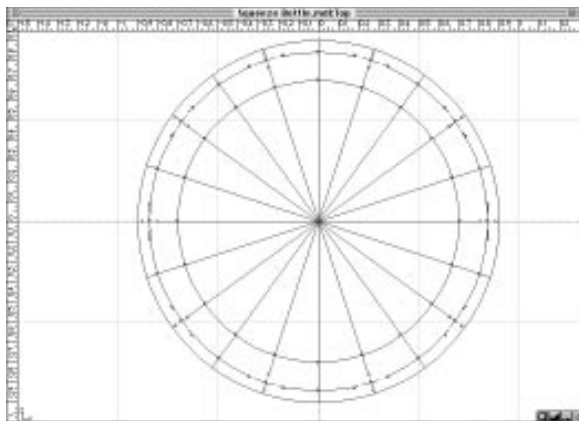
Turn off the Body group by clicking once in the D column of the Group palette next to Body. Click in the Zoom box on the Title Bar of the Top View window. In the lower right of the window, click on the Fit to Window icon.

Choose the Selector Tool and select the wireframe of the lid.

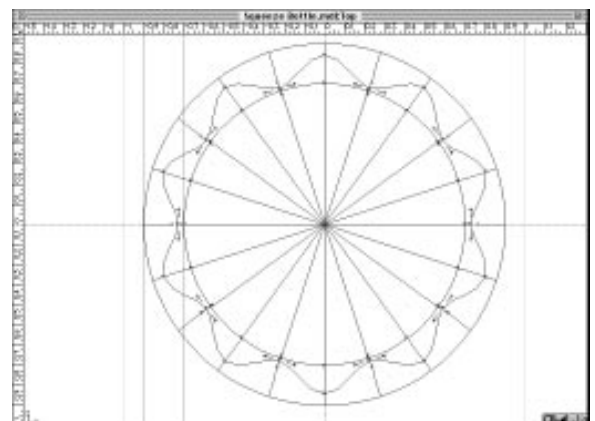
From above, the lid shows three concentric circles. Hold the Shift key down and select every other point in the second circle.

Click on the Scale Tool. Make sure that Center Object is selected. Click on one of the points on a diagonal, hold the Shift key, and drag toward the origin.

Save your design.



Select every other point



Lid with grips

This completes your design of the squeeze bottle with top. Click on the display shaded icon in the Angled View and use the Hand tool to see your design from different angles.



Notes