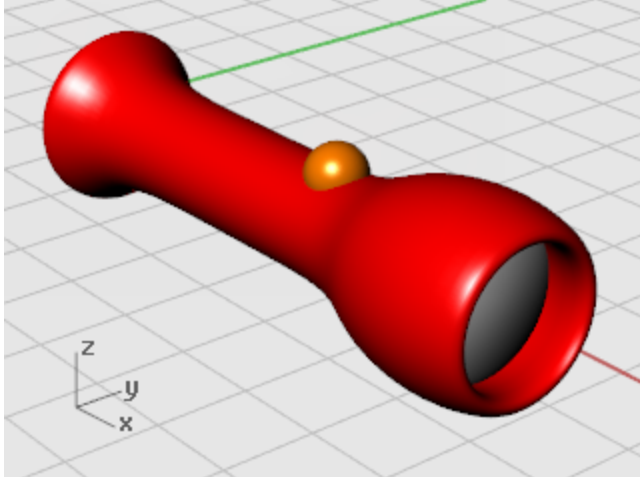


Chapter 13: Flashlight - Revolve Curves

Creating surfaces from curves and joining the surfaces together allows you much greater freedom. This tutorial introduces the concept of drawing curves and one method of creating surfaces from those curves.



You will learn how to:

- Draw free-form curves based on an existing object.
- Edit control points.
- Revolve surfaces around an axis.

Revolving curves is a good method for creating tubular shapes like vases, wineglasses, and chair legs.

You are going to use a basic flashlight as a guide for drawing the curves you will need for the new model. Using the basic flashlight gives you a frame of reference for deciding about the size and shape of the object.



To get started

- ▶ Open the tutorial model file **Flashlight.3dm**.

Set up the model

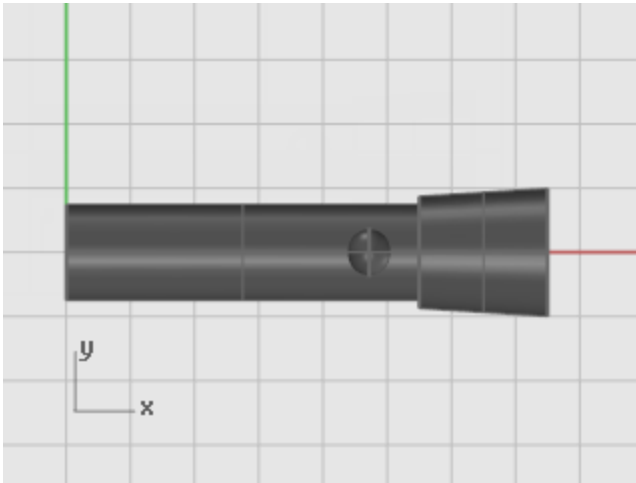
You are going to trace around the old flashlight. To make this easier, you will lock the objects. When objects are locked, you can see them and snap to them, but you cannot select them. This keeps the objects from interfering when you want to select things close by. You can still use object snaps to snap to locked objects. You will then create some curves and revolve them to make the new flashlight.



Lock the flashlight objects

1. **Select** all the objects.
Press the **Ctrl** and **A** keys to select all the objects in the model.

2. On the **Edit** menu, click **Visibility > Lock**.



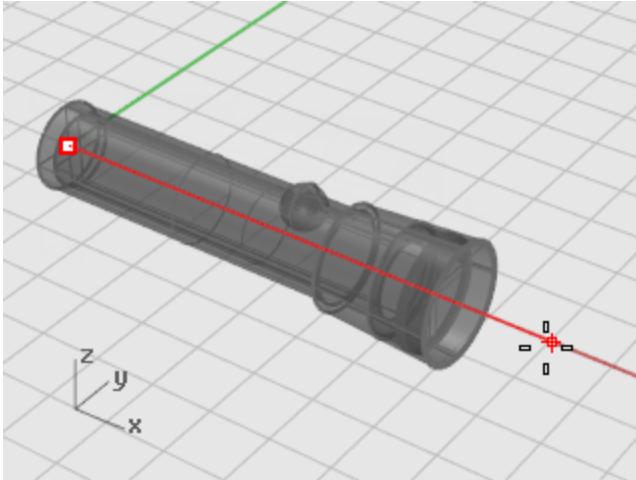
Draw a centerline

Draw a construction centerline through the center of the old flashlight.



Draw the construction centerline

1. On the **Curve** menu click **Line > Single Line**.
2. At the **Start of line...** prompt, use the **Center** object snap to place the start of the line at the center of the flashlight base.
3. At the **End of line...** prompt, turn **Ortho** on, and draw the line through the exact center of the old flashlight.



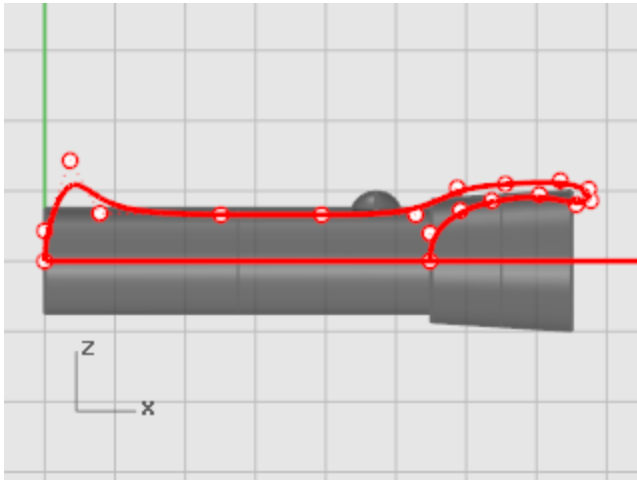
Draw the body profile curve

You are going to draw a *profile curve* that you will use to revolve to create the flashlight body. A profile curve defines a cross-section of one half of the part.



Draw the body curve

1. On the status bar, click the **Layer** pane and make the layer **Free Form Body** current.
2. On the **Curve** menu, click **Free-Form > Control Points**.
3. At the **Start of curve...** prompt, in the **Front** viewport, start drawing a curve around the flashlight body as illustrated.

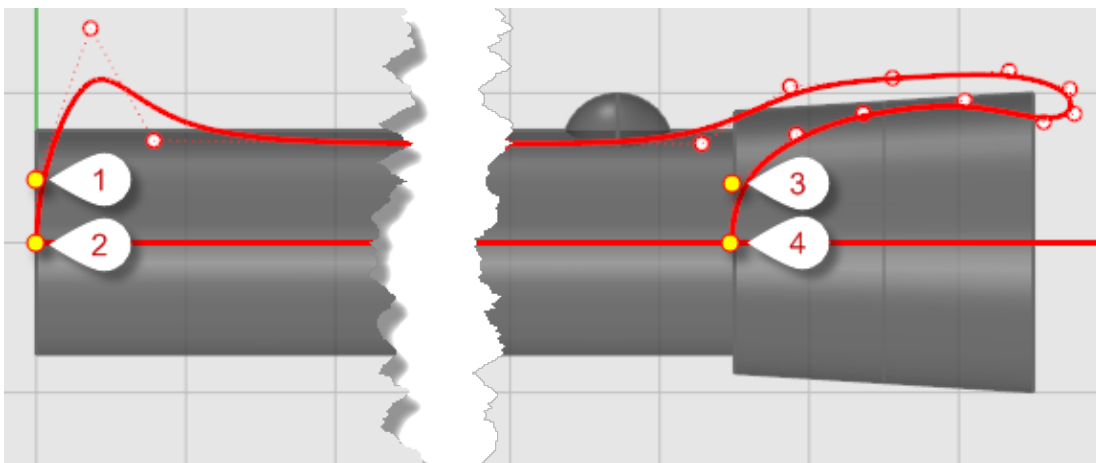


Use the **End** object snap to start the curve at the end of the construction center line.

Use the **Near** object snap to end the curve on the construction center line.

Starting and ending the curve exactly on the line is important so that later when you revolve the curve to create a solid, there will be no gaps or overlapping parts.

When drawing the curve, use **Ortho** to control the first two (1 and 2) points and the last two points (3 and 4) on the curve. If the first two points and the last two points are placed in a straight line, the curve will start and end tangent to that line.



4. When you have placed the last control point, press **Enter** to finish drawing the curve. To place the last two points in a straight line with each other, use **Grid Snap**, **Ortho**, or **Perp** object snap.

Draw the lens profile curve

Make another profile curve for the lens.

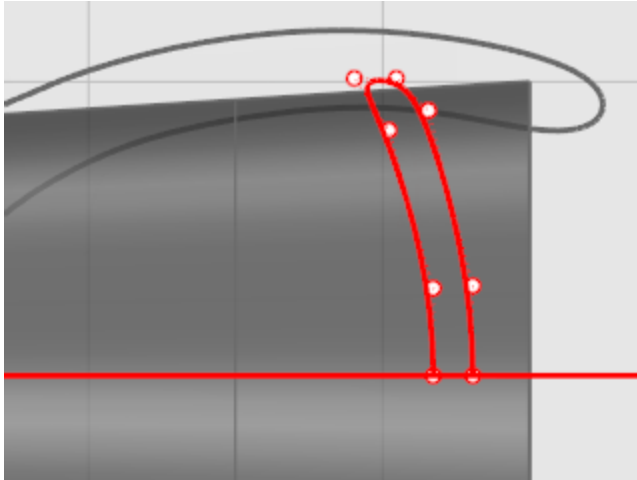


Create the lens

1. On the **Curve** menu, click **Free-Form > Control Points**.
2. At the **Start of curve...** prompt, in the **Front** viewport, place the first control point of the lens profile.

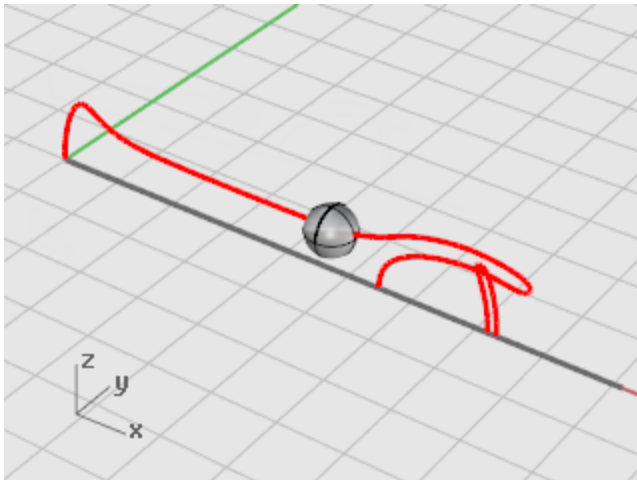
Use the **Near** object snap to start and end the curve on the construction centerline.

Place control points in the upper part of the lens curve so it crosses the body profile curve.



Get the old flashlight out of your way

1. On the **Edit** menu, click **Visibility > Unlock**.
2. Select all the objects except the two profile curves you just drew and the switch sphere.
3. On the **Edit** menu, click **Visibility > Hide**.



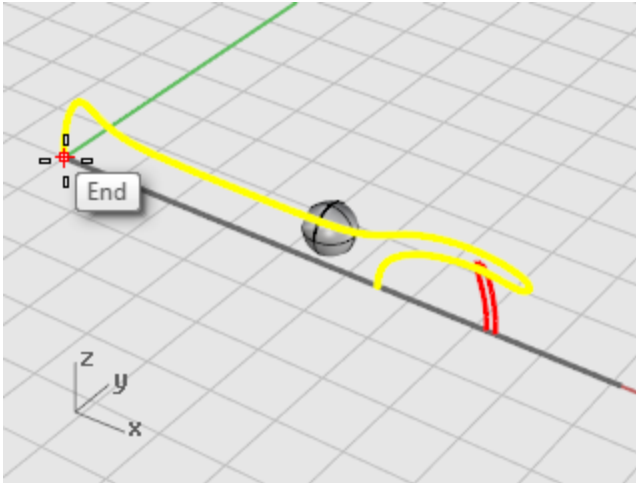
Build the flashlight body

To make the body, you will revolve the profile curve 360 degrees. You will use the endpoint of the curve and ortho to establish the rotation axis.

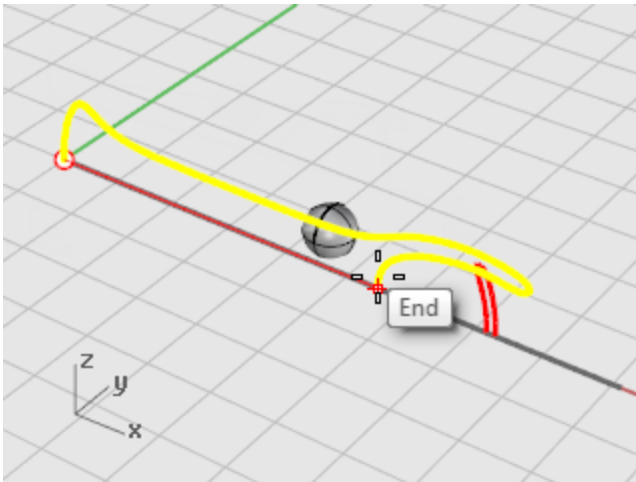


Create the flashlight body

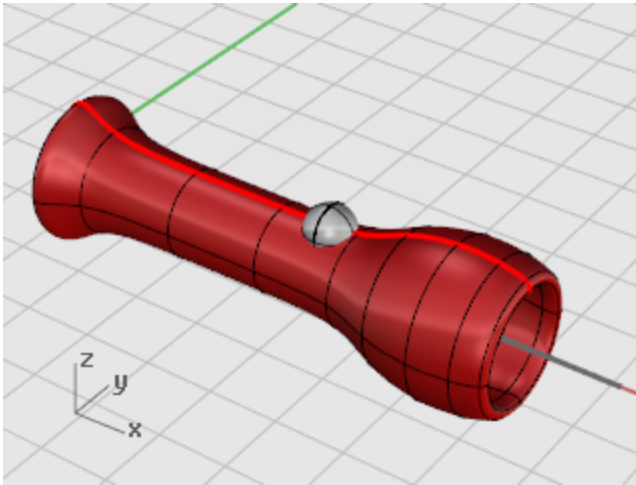
1. On the **Surface** menu, click **Revolve**.
2. At the **Select curve to revolve** prompt, select the body profile curve.
3. At the **Start of revolve axis** prompt, use the **End** snap to snap to one end of the profile curve.



4. At the **End of revolve axis** prompt, turn **Ortho** on, and specify the revolve axis line as illustrated.



- In the **Start angle...** prompt, click the **FullCircle** option.



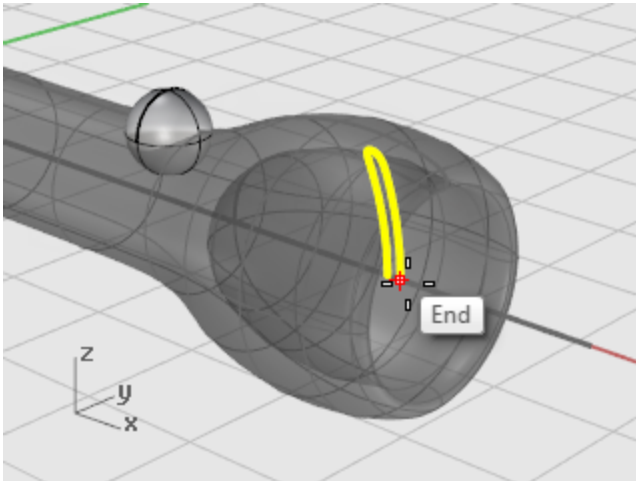
Create the lens

Now revolve the lens profile curve in the same way as the body.

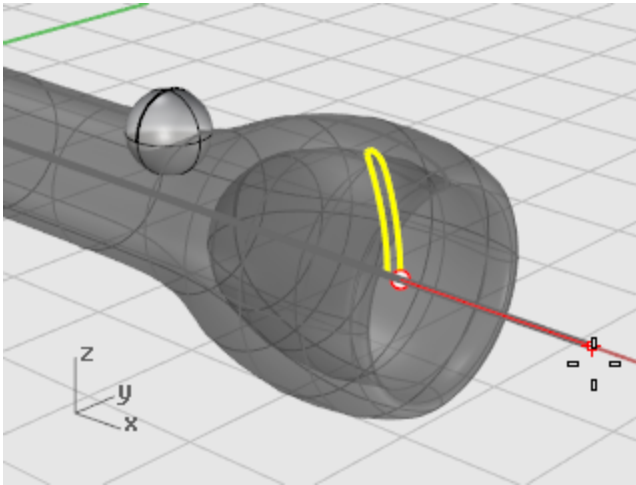


Revolve the lens profile curve

- On the **Surface** menu, click **Revolve**.
- At the **Select curve to revolve** prompt, select the lens profile curve.
- At the **Start of revolve axis** prompt, use **End** object snap to locate the endpoint of one of the curve profiles.



4. At the **End of revolve axis** prompt, turn **Ortho** on, and draw the revolve axis line as illustrated.



5. In the **Start angle...** prompt, click the **FullCircle** option.

