Introduction to Ellipses
(Circles in Perspective)
The oval and ellipse are the exact same height and width. However, the oval is not convincing—it is not a circle in perspective like an ellipse.
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In this lesson you will learn how to draw a circle in perspective. A circle viewed or drawn in perspective becomes an ellipse. This will come in handy if you ever want to draw tires, arches, columns, cylindrical buildings, or anything else that is based on a circle in perspective.
**Introduction to Ellipses: Curves and Arches**
(These “Proportional Measurements” apply to all ellipses)

**Proportional Measurements**

Ellipses are roughed in by sketching approximate distances from the fixed guide lines.

The “circle grid” on the left is fixed with guidelines and has three key numbers to remember.

The circle passes through the corner diagonal lines (Green) of all four corner squares about 3/5 to 2/3 distance from the outside edge of the bounding box.

The circle passes through the vertical and horizontal lines (Blue) of the four corner squares at approximately 1/4 distance from the outside edge.

It passes through at 1/8 point at the adjacent squares. (Purple)
Introduction to Ellipses
(Circles in Perspective)

To avoid an ellipse that looks “pinched” on its sides, place the 1/8 dots correctly (Purple dots).

Though the 3/5 and 1/4 dots are the most important numbers to remember, the 1/8 dot distance (Purple dots) must be correctly placed, as well.

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Introduction to Ellipses: Curves and Arches
(Building the Ellipse Perspective Grid)

Refer to your “Circle Grid Guide”. It contains the five perspective lines used in creating the ellipse perspective grid.

Create your structure and its bounding box. Establish your EL, MP, and VP. To simplify this demonstration, EL and MP are the same.
Introduction to Ellipses: Curves and Arches
(Building the Ellipse Perspective Grid)

Converging perspective lines from VP must be equally spaced to assist you in plotting your ellipse.

Make sure your converging perspective lines on your ellipse perspective grid line-up from VP and have equal vertical space between them.

Determine how far in from the left side of structure your first ellipse starts. Draw line “A”
Introduction to Ellipses: Curves and Arches
(Building the Ellipse Perspective Grid)

Determine how wide the first ellipse will be.
Draw vertical line at that point. “B”.

Determine how wide the first space will be. Draw vertical line at that point. “C”.

Now that you have established the first ellipse and the first space, you have your first “Ellipse-Space-Combo” (E-S-C). To establish more E-S-Cs, use the same method as “Repeating Objects w Spaces” as in previous lesson’s slides.
Use the “Repeating Objects” technique for determining the end of the second ellipse and its space combo. (Blue diagonal line from point “A” through MP where “C” intersects MP to bottom perspective line)

Label the point on the bottom perspective line as “D”

From point “D”, draw a vertical line up to the top converging perspective line. (Blue line)

This line “D” establishes the width of the second “Ellipse-Space-Combo” (E-S-C) and represents the end of the second (E-S-C).
Now that we have the first ellipse, first space, and second ellipse-space combo ("ESC") established, we can figure how wide the second space is.

Use the “Crossover-Lines” technique for determining the start of the second space.

From point “B”, draw a diagonal line down to point “D” (Green line)

From point “C”, draw a diagonal line down through the intersection of lines “B-D” and “MP” to the bottom perspective line.

Mark point on bottom perspective line as “D1"
Draw a line up from “D1” to the top perspective line. (Marked “D1”)

This line defines the beginning of space #2 and the end of ellipse #2.
If you want to add more (E-S-Cs), use the “Repeating Objects” technique above. (Purple lines)

Remember to intersect MP at the point where the end of the second space intersects MP

This technique creates more “E-S-Cs”. Build as many as you want.
Introduction to Ellipses: Curves and Arches
(Building the Ellipse Perspective Grid)

“Direct-Method” vs “Crossover-Lines” technique to establish the width of spaces

After establishing more “E-S-Cs”, you can easily establish the remaining spaces’ widths by a more “Direct-Method”. Run a new line (Burgundy) from the beginning of the first space “B”, through where line “D1” (the beginning of the second space) intersects “MP”, to the bottom perspective line. This is the width of the third space. This works for the remaining spaces.

This is the shortcut technique for establishing the width of spaces after the second space is established.

You must use the “Crossover-Lines” technique to establish the second space. Thereafter, you can use the “Direct-Method” shortcut.
Introduction to Ellipses: Curves and Arches
(Building the Ellipse Perspective Grid)

“Direct-Method” vs “Crossover-Lines” Technique
to Establish the Width of Spaces

Draw a vertical line (“E”) up from the bottom perspective line where the burgundy diagonal lands to the top perspective line. This establishes the width of the third space.

Remember, you have to use the “Crossover-Lines” technique to establish the second space’s width. Thereafter, use the shortcut “Direct-Method” for the remaining ESCs.
Introduction to Ellipses, Curves, and Arches
(Building the Ellipse Plotting Grid Lines)

I have truncated and enlarged the slide to better illustrate how the next steps work.

Building the Ellipse Plotting Grid Lines.
Introduction to Ellipses, Curves, and Arches
(Building the Ellipse Plotting Grid Lines)

Copy the lines from your “Circle Grid Guide” over to your perspective template. Draw them in the first ellipse box.

Draw an “X” from corner to corner.
Introduction to Ellipses, Curves, and Arches
(Building the Ellipse Plotting Grid Lines)

Next, draw the three interior vertical lines (Green dotted lines). Make sure they intersect the “X” lines where the “X” lines intersect the perspective lines from VP.
Introduction to Ellipses, Curves, and Arches
(Building the Ellipse Plotting Grid Lines)

This is how your first ellipse box should look.
Next, draw a diamond in the middle of the box. The points of the diamond line up with the exact center of each of the four edges of the ellipse box. (See points marked as “A”)

You created four new Xs, one per quadrant.

You now have an exact copy of the “Circle Grid” without the circle, except, it is in perspective.
Introduction to Ellipses: Curves and Arches
(Plotting the Ellipse)

Next, plot the ellipse points that you will use to sketch your ellipse. Carefully, visually divide the triangle shapes on the lines corresponding to the proportional division on the “Circle Grid”.

Memorize the three measurements, 3/5, 1/4, and 1/8, and you will have all you need. After you practice a dozen of these, (flat and upright), you will no longer need the “Circle Grid Guide”.

Three key measurement numbers

Plot dots on lines at key measurements

1/8 1/4 3/5

1/4

1/8

1/8
Introduction to Ellipses: Curves and Arches
(Plotting the Ellipse)

Notice that 3/5 distance on the upper right quadrant diagonal line is shorter than 3/5 distance on the upper left quadrant diagonal line. Perspective distorts everything.

This process is really a “Close Enough” task and requires the eye and brain to fight it out. You can adjust or fine tune the plot dots. I adjusted several dots, several times.
Introduction to Ellipses, Curves, and Arches
(Sketching in the Ellipses)

Whereas you can use a compass to draw the perfect circle in the “Circle Grid” box, you will have to hand-draw the ellipses. (At best, it’s a frustrating exercise for a perfectionist.)

With pencil in one hand and eraser in the other, lightly sketch a line connecting the dots. This is where you will better see how well you plotted. When happy, draw darker ellipse line.
I've restored the larger perspective grid and structure so I can put in two ellipses.

Repeat drawing the straight lines and Xs in the second ellipse area. Repeat plotting the dots. Repeat connecting the dots. Repeat adjusting.
Notice how much more space there is in the upper left area “A” than in the upper right area “B”.

Notice how much steeper the downward curve is on the right upper half of the ellipse than on the left.

Line “B” curvature is much steeper than line “A”.
The Finished Ellipses

What else can we make out of this 2-ellipse drawing?
A building with arches over doorways would work.
Do you see a bicycle? Or sun glasses?
Doing Something With the Ellipses
Short Detour: Optical Deception

Optical Illusions. Which looks larger? Right or left. Can you explain what “seeing” rules are on display here?
Doing Something With the Ellipses

Make a bridge. I want only a little over a third of the upper structure to be above the water line. The black dotted line is my water line.
Removing the bottom of my grid structure now allows water and boats to pass underneath and through my arches.
All bridges have lights and light posts on them. However, they need to be in proper perspective. Proper perspective means not just with height aligned with VP, but they need to get thinner as they move away. I roughly used the ‘Repeating Objects” technique by estimating (eyeing) things.
Introduction to Ellipses, Curves, and Arches
(Building Bridges—or buildings, furniture, and other stuff)

Just to double check the lights, I ran the diagonal lines with the “Repeating Objects” technique. Not bad, pretty close. (As they say, “Good enough.”)
Introduction to Ellipses
(Building Bridges—or buildings, furniture, and other stuff)

Rough sketch a "Circle Grid" the size of your first ellipse (arch). Place it next to the start of your structure.
See Lesson 6 for ellipses tutorial and homework on the web site.

Homework Assignment: Ellipses
(Do at least two full arches and three ducks)