

Creating a 3D globe in Adobe Illustrator

by nutella

Creating a 3D globe looking at it head on (straight) is easy, so we are going to create one in an angle. Yeah, baby!

Since I am working on Windows, I will declare the keyboard equivalents now, so I won't have to spell it out all the time for Mac users.

Windows: Alt = Mac: Option
Windows: Ctrl = Mac: Command

First, set your "Constrain Angle" in your preferences panel to a value other than 0. This will help us drawing circles and ellipses in an angle. In this tutorial I set the constrain angle to 75 degrees. Then turn on View > Snap to Grid, hold down your Shift + Alt keys and drag out a perfect circle from the center.

Switch to the Line Tool and drag out a small reference line from the top anchor point of the circle, as indicated in the picture.

We are going to use this reference line to create marks around the circle. This will help us later determine where to place our latitude lines later. First let's do some calculation. How many latitude lines do we want? Let's say I want five. That's a good number. If you want more, do the calculation accordingly. So, the easiest way is to divide 90 degrees by the number of latitude lines you want. Since five is a good number, $90 \div 5 = 18$.

Switch to the Rotate Tool, then hold down Alt and click the center point of the circle to bring up the Rotate dialog. Clicking the center point of the circle with the Alt key down will set the rotation center to the center (DUH!) of the circle, so the reference lines will rotate around the circle. For angle, type in 18 (from the previous calculation) and click "Copy". Now keep pressing Ctrl+D (Object > Transform > Transform Again) until you get the reference lines going all around the circle.

We are going to turn these line to guides, so select all the reference lines and press Ctrl+5 (View > Guides > Make Guides).

Turn OFF the "Snap to Grid" feature and turn ON Smart Guides (View > Smart Guides). Switch to the Line Tool and connect the top and bottom anchor points of the circle. I made that a little longer in the picture. Now connect the reference line pairs horizontally as indicated in the picture. Since you have Smart Guides ON, this will snap the anchor points of your lines, so you can do this precisely. You only need to connect the top half of the reference lines. As you see in the image, I didn't connect the bottom half. We won't need that.

OK, it's time to draw our first latitude line. Switch to the ellipse tool and make sure "Snap to Grid" is OFF and "Smart Guides" is ON. Since we set the Constrain Angle to 75 degrees in the Preferences panel when we started, our latitude ellipses will draw in the correct angle. So hold down the Alt key (to draw the ellipse from the center), move your cursor to the center of the big circle and draw out an ellipse until the ellipse's end anchor points will touch the circle. You'll have to eyeball it. You can also zoom in for this to make sure the ellipse's anchor points touch the circle exactly. (You can also use the scale tool to copy-scale the big circle.)

Placing this first ellipse is crucial. How fat or skinny you make this first ellipse will determine the angle the globe will make to be rotated. Of course we are not going to do any rotation, but it will just give you the illusion as if the globe would be rotated at a certain angle. So make your ellipse something like in the picture to the left.

Now here's fun part. Duplicate this ellipse, so that its center point will be on the midpoint of the next horizontal line that connects the reference points on the side of the circle. In other words, the centerpoint of the next ellipse will be located at point A as shown in the picture.

The easiest way to do this is to - making sure that you still have "Smart Guides" ON and "Snap to Grid" OFF - hold down Alt (for duplication), click the ellipse you just drew, then just move it until its center will snap to point A.

Now switch to the Scale Tool and make sure that the center of scaling is in the middle of this duplicated ellipse (this should be the default). Click outside the ellipse - somewhere around point B or so and while holding the Shift key, carefully scale this ellipse until its side meets the circle as indicated by the arrows. You can also do this via the Scale dialog if you don't trust your hands.

Repeat the above procedure as many times as many horizontal connecting lines you have, as indicated in the picture.

So just duplicate the last ellipse and move it up - along the vertical line that halves the big circle - until its center point meets the center point of the next horizontal connecting line above it. Then scale it so that its side will touch the side of the big circle.

When you are done with the upper part, just duplicate the ellipses and move them down (or mirror them) to the bottom part of the circle.

We are almost done! Now let's draw the longitudes!

In this picture on the left, I hid a couple of lines just for the sake of the illustration, so you can see better what needs to be done.

Use the horizontal bisector line of the circle (oh, the words I can come up with!) and draw a vertical line from all its anchor points (left, middle and right). Actually there's no anchor point in the middle, but just imagine as if there would. Remember, this vertical line will not actually be "vertical" but it will be in an angle, since your Constrain Angle is set to 75 degrees in the Preferences panel. These lines are indicated by the arrows.

Select all three and blend them (Object > Blend > Make). Double click the Blend Tool and in the Blend Options panel, set the Spacing to "Specified Steps" and enter 2 for its value. You can use more if you want more longitude lines.

Select the blend then go to Object > Blend > Expand. Then ungroup, and press Ctrl+5 (View > Guides > Make Guides) to turn these reference lines to guides. These are the points along we are going to draw our longitudes.

Select the outer circle and switch to the Scale Tool. By default, the center of scaling will be in the center of the selected circle. This is what we want.

Click on the left (or right) anchor point of the circle and by holding the Alt key (to make a duplicate at the same time as we scale) slowly drag it inwards until your cursor will snap to the first reference point (that we just created from the blend). You can hold down the Shift key to constrain your dragging.

It is important that you click the left (or right) anchor point, because this will constrain the scaling horizontally so we won't scale the circle down vertically. We want the same height.

Do the same procedure again, but this time scale and move the circle to the next reference point. Finally, I just drew a single straight line from top to bottom in the middle of the circle to create the illusion of a single longitude line in the middle.

And here we go. I unhided the previously hidden lines. I assigned the longitude and latitude lines 0.25 weight for stroke and the outside circle received a 1 pt stroke.

This would create a wireframe effect with a "see-through" globe.

If you want a globe that is not see through, use the Scissors Tool to cut the longitude and latitude lines where they touch the circle and remove their un-needed back part.

Now you can color your globe. Have fun *globing!*

As a last step, you can map a flat world outline onto your globe. But that's another tutorial...

