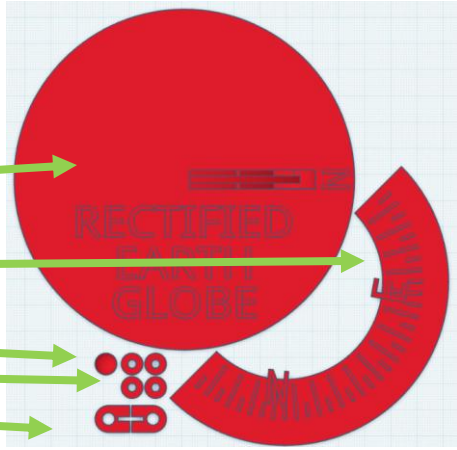
Instructions to Assemble the 3D Rectified Earth Globe

- Parts Needed.
  - All parts of the 3D Printer Model in the STL File.
  - A Skewer: I bought a package of 100 for $1.00 at the supermarket. They are bamboo, 10-inches long, pointed on one end.
  - A 2-1/2 inch diameter Earth squeeze ball.
  - 3 nylon 10-32 bolts (set screws)

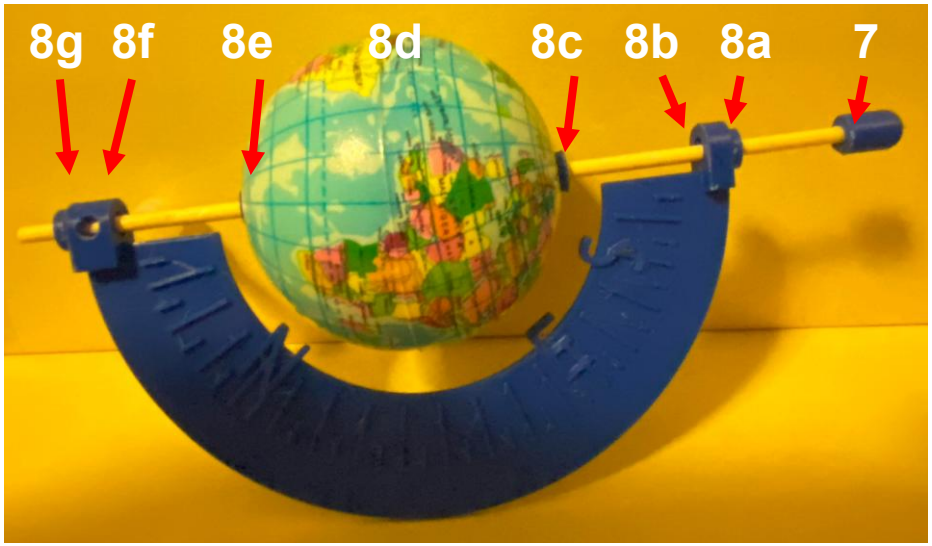
<u>The Construction Process:</u>

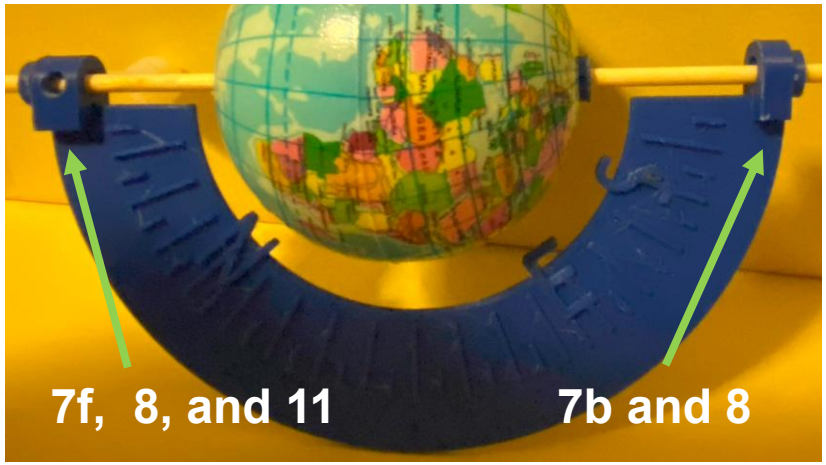
1. Download the Zip F.
2. Extract the STL Files for your 3-D printer.
3. For the northern hemisphere use the base and protractor for north. For the southern hemisphere use the files for south.
4. No brim or supports should be needed.
5. The file contains:
   - The base
   - A protractor
   - A top piece for the axis
   - 4 tight fitting rings for axis
   - 2 clamps to connect the axis to the protractor (small & large)



6. Print the file. My slicer complained about stability issues, but it printed fine. Total time: 4 hours and 30 minutes.
7. Place the end cap on the flat end of the skewer. Use a dab of superglue to hold it in place if it is loose.

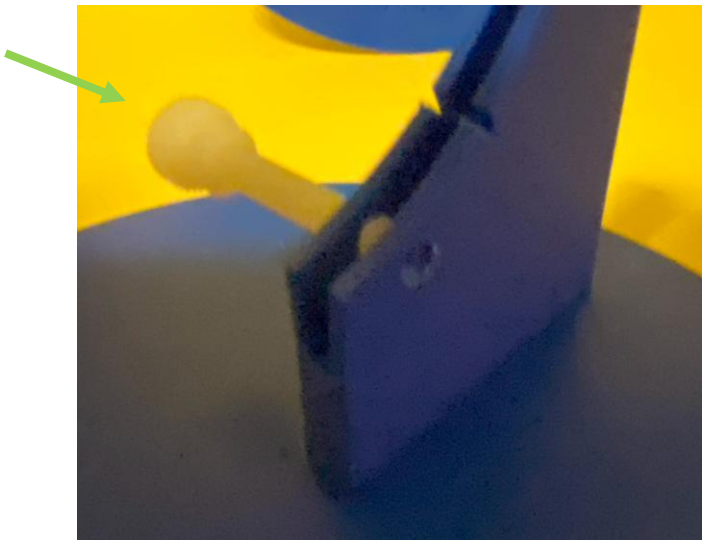
8. Place these parts on the skewer in this order. Push them on from the pointed end:
    a. A ring – tight fitting, position it 1-inch from the end cap.
    b. The small clamp – this is loose fitting.
    c. A second ring – tight fitting, position it 2 and 1/4-inch from the end cap.
    d. Skewer the Earth ball from the north pole to the south pole for the northern hemisphere. South pole to north pole for the southern hemisphere. Position it next to the second ring.
    e. A third ring – tight fitting, position it next to the Earth ball.
    f. The large clamp – also loose fitting.
    g. The fourth ring – tight fitting, position it 1 and 1/4-inches from the third ring.





9. Use a small dab of glue to attach each clamp to the outer edges of the protractor.
10. Once dry:
    a. Hold the skewer with the end cap downward.
    b. Adjust the position of the Earth ball and the two rings on either end until the ball is centered in the protractor.
    c. Adjust the ring closest to the pointed end until it is touching the closest clamp.
    d. Cut the skewer so that only 1/4-inch extends beyond the fourth ring. It will be about 7-inches long.
11. There is a hole in the vertical part of the base. It needs to be tapped to handle the nylon bolt. I used a 10-32 NF nylon bolt (set screw). I used a #21 drill bit to slightly enlarge the printed hole.
12. There is also a hole in the larger (lower) clamp that needs to be tapped.
13. Place the protractor in the base.

14. Insert the set screw on the back-side of the protractor and hand tighten it.
15. Insert the set screw on the back-side of the larger (lower) clamp.



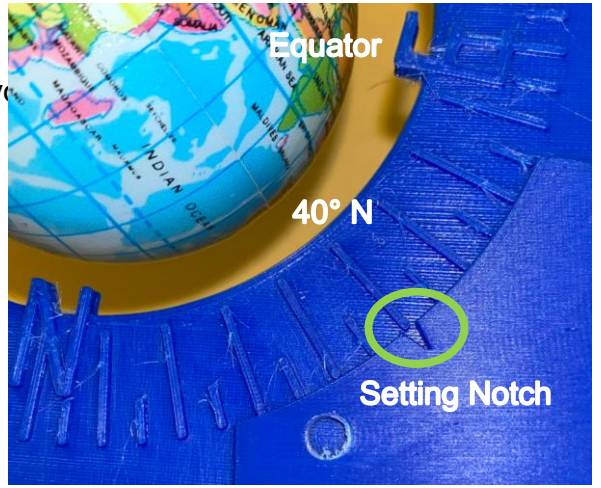
16. The fully assembled Rectified Earth Globe:

Front

Back

Rectifying the Earth Globe:

1. To set your latitude - Loosen the set screw and rotate the protractor until yo
    a. It can be set from the north pole to (90° N) to 20° S of the equator.
    b. When the skewer is horizontal you are at 0° latitude (the Equator).
    c. Rotate the protractor until you reach your latitude.
    d. Each long mark is 10° and each short mark represents 5°.
    e. Hand tighten the set screw.
2. Example, set to 40° N latitude:



3. To set your location – Rotate the skewer using the end cap until your location is pointing straight up.
4. Tighten the set screw on the larger (lower) clamp to keep the Earth ball from rotating and to keep your location pointing straight up.
5. Your Earth ball is now Rectified.

What your Rectified Earth Globe Tells You:

1. Go outside on a sunny day.
2. Point the end cap towards north.
3. The globe shows you the correct direction of the Sun at that time, on that dat, for your location.
4. The lit side, the side facing the Sun, shows what parts of the Earth are in daylight and those parts that are in darkness. The terminator is not very easy to see.
5. The terminator shows you who is experiencing sunrise and sunset at that time and date.
6. The globe shows you which pole is in daylight.