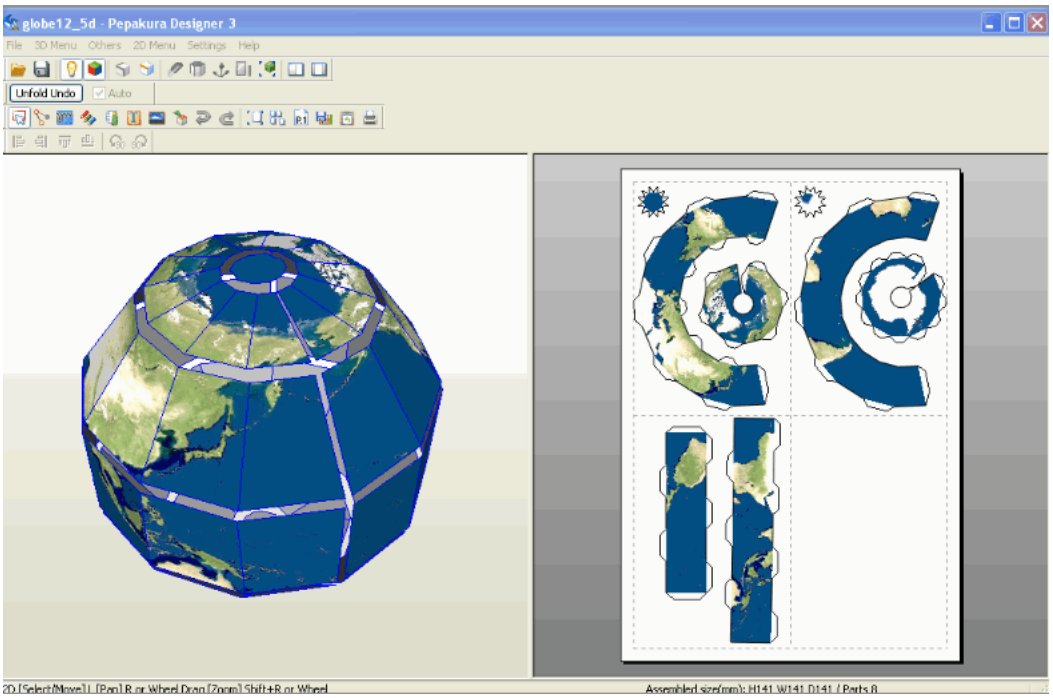
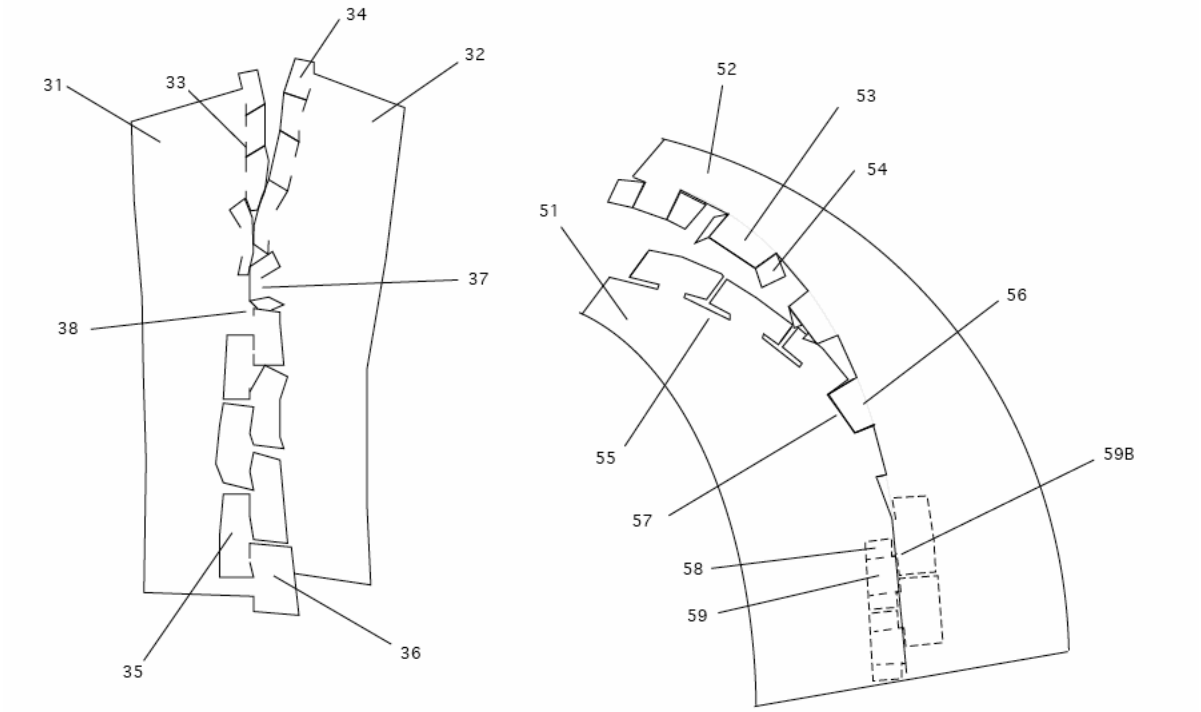
A PAPER 3D GLOBE

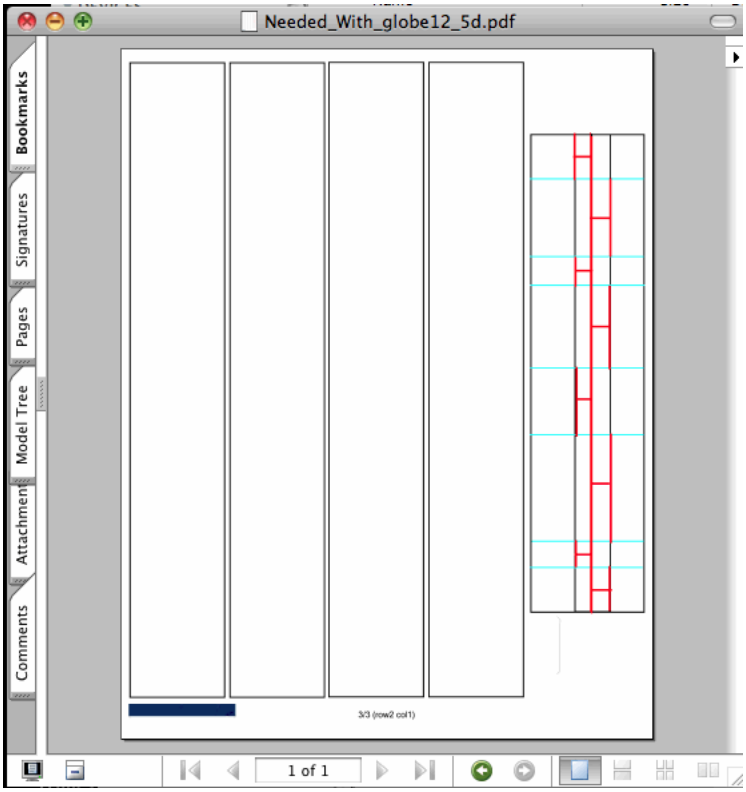
An inexpensive online program called Pepakura is used in this example to map a 3ds globe file into 2D surfaces for paper construction.



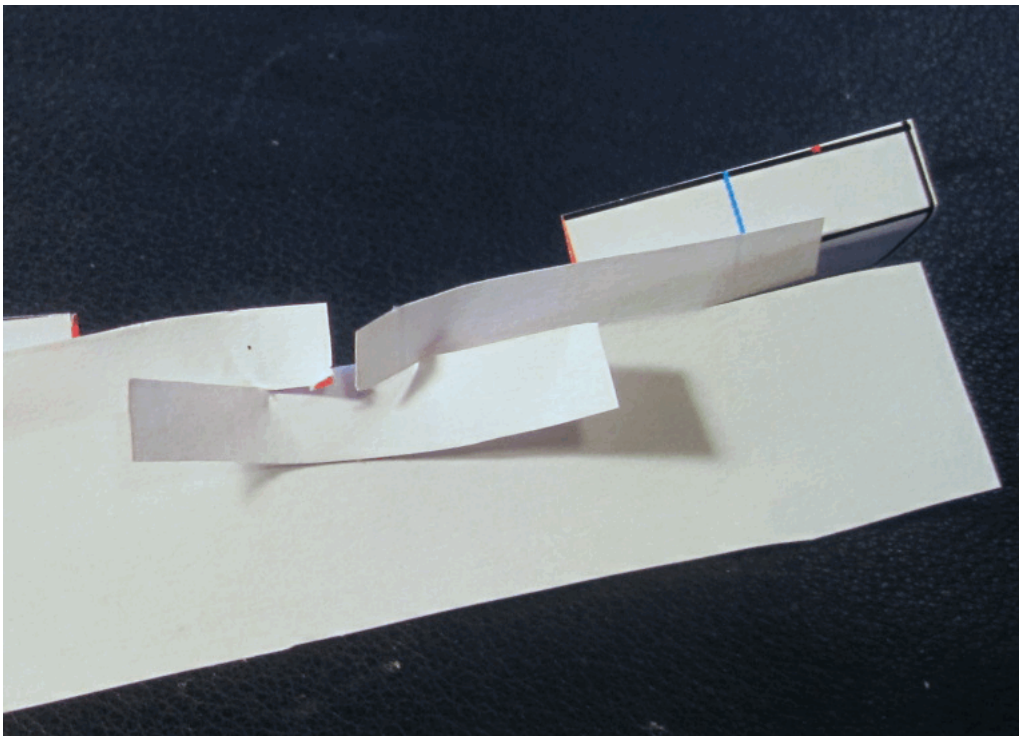
Connecting the curved paper surfaces of the globe however is not straightforward.



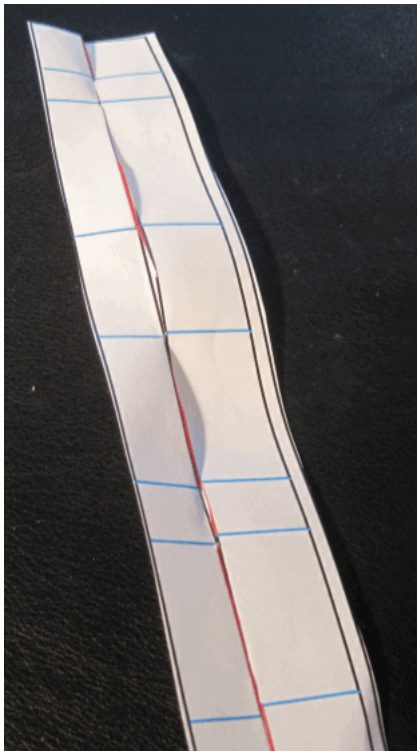
A patent application has been filed a on an easy way to auto-align curved surfaces. Since this method makes joining curved surfaces considerably easier, it would be nice if a patent for this method could provide some needed legal leverage in making this method freely available to everyone. It is not obvious that taking people to court is the best way to promote innovation. Could inventions be made to go Open Source? The application number is 13157914, and it was filed at 2011-06-10 under the name of "An Auto-Aligning Joint Architecture. The application and source files can be found here.



The pdf file named "Needed_With_globr12_5" includes a example geometry to demonstrate how the self aligning tabs work. When all the red lines are cut, the tabs are ready for assembly.

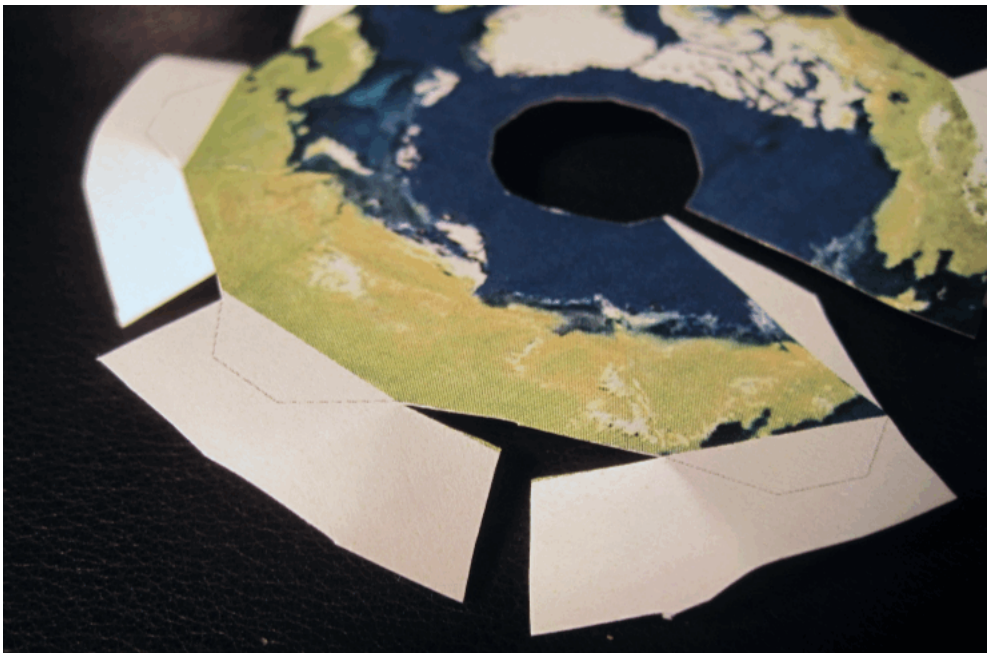


The tabs are created by making T shape cuts along the edges of the surfaces which are meant to be joined together. Each tab is cut to fit between two other tabs on the other sheet. The tabs appear to want to join the two surfaces together much like a zipper.



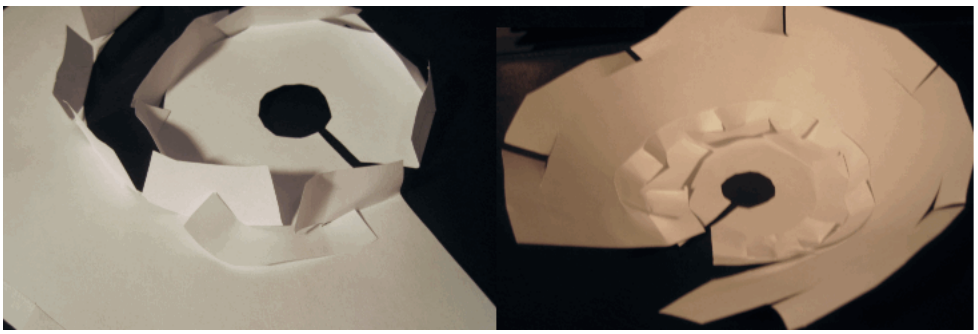
When all the tabs are fitted together, all the tabs want to lay flat.
On the other side, the two sheets want to be aligned to each other.
Notice that the spacing of the tabs is not critical.

Applying the self alignment method to the Pepakura printout only requires
first that the tab regions should be cut about twice as thick as the printed tabs.

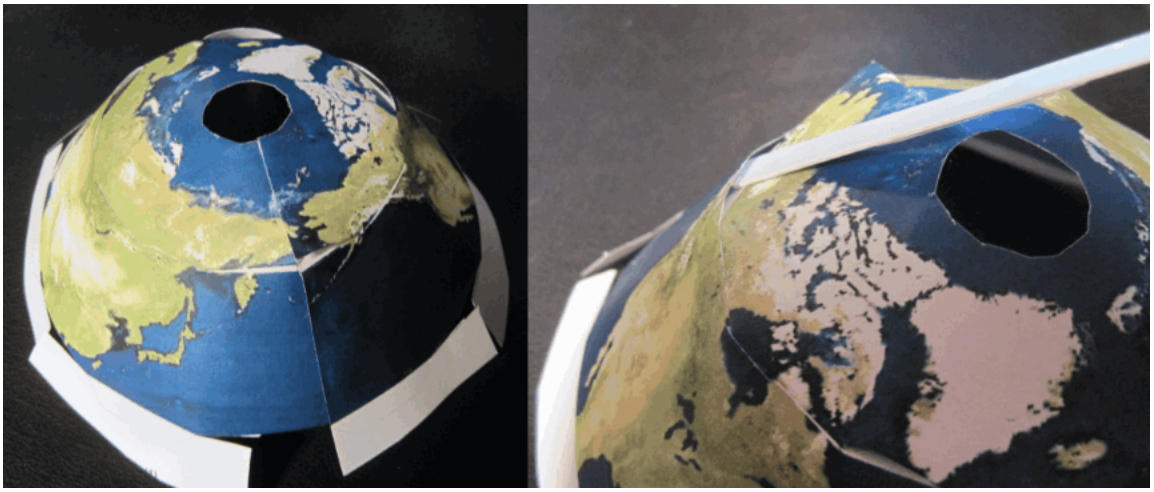


Next, T shape cuts are made between each printed tab region instead of following the printed outlines.

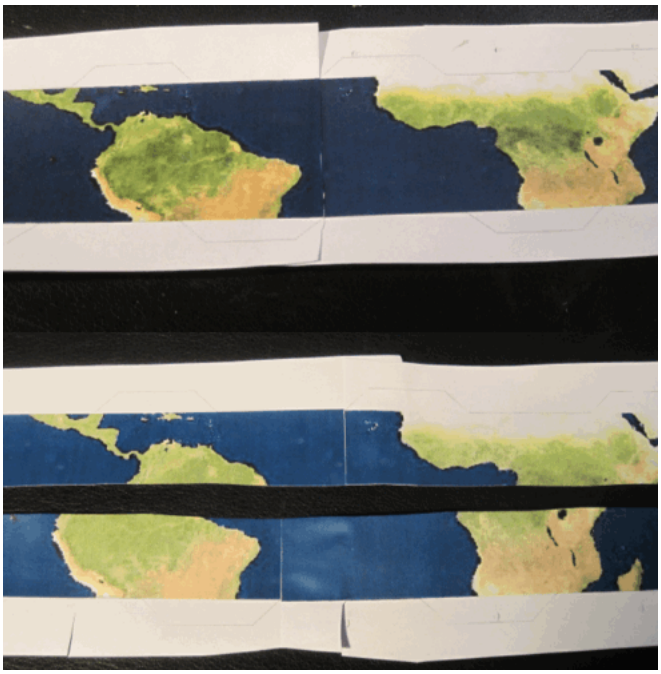
The Pepakura printout automatically provides the tab spacing needed to align all the tabs between the sheets.



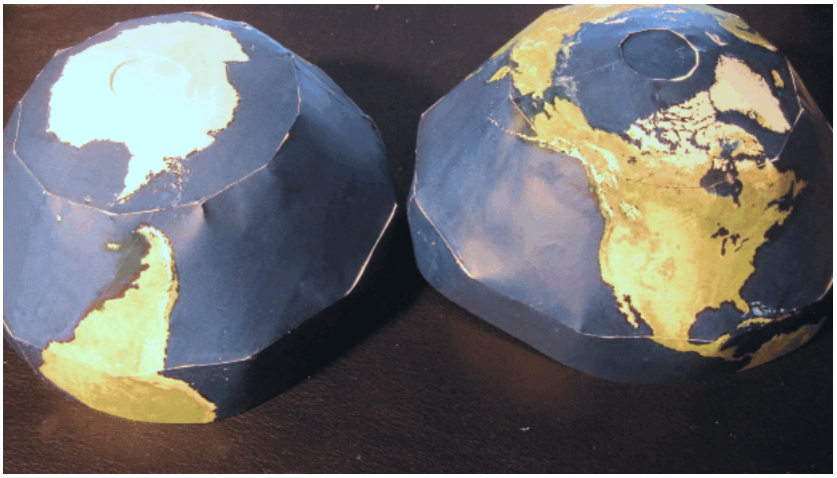
Each tab wants to fit between two other tabs on the other sheet.
The tabs tend to want to connect together like a paper zipper.
All the tabs will want to lay flat on one side of the two sheets.



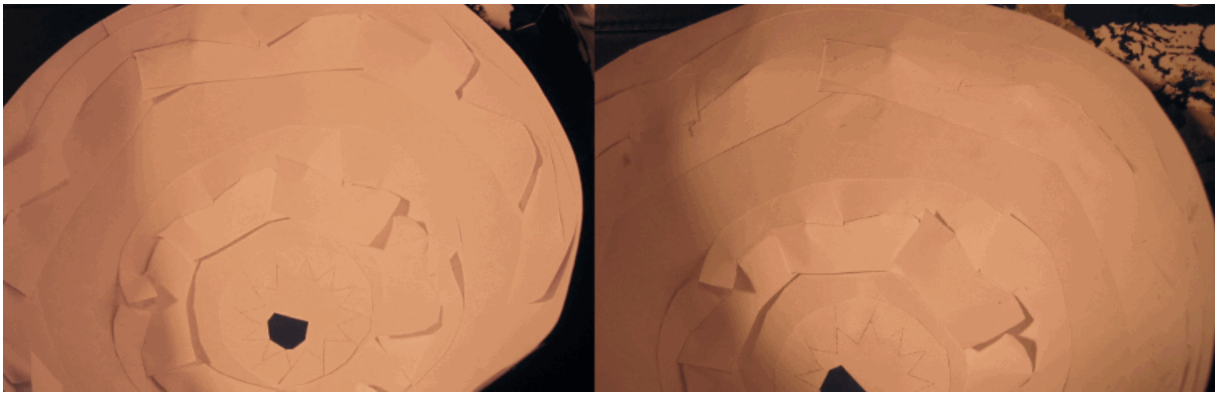
The two sheets will want to be aligned with each other on the other side. Beneath each surface edge on one surface side will be a tab to the other sheet. This means glue can be added and the two sheets can the aligned together as best as possible. Now the extent to which the seam will be seamless only depends on how precisely paper can be cut and aligned.



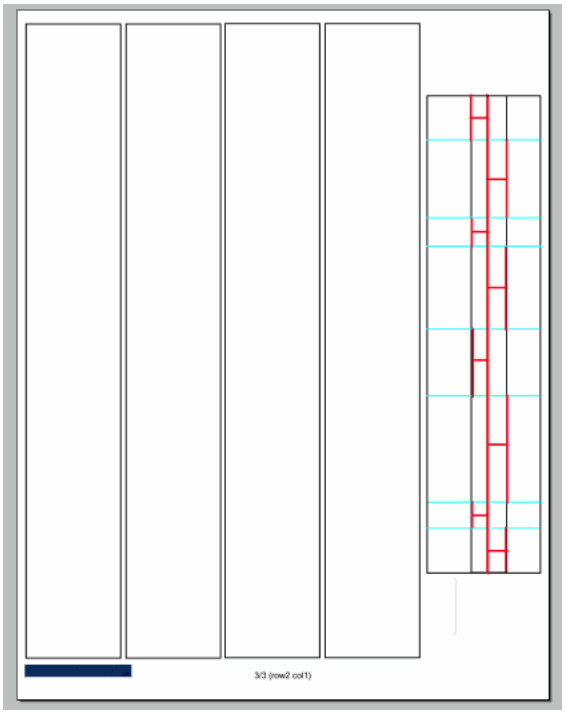
The equatorial region needs a few more details. First the Africa region needs to be glue to the South America Region. Second, this long equatorial strip needs to be cut along the equator as close as possible. The T shape cuts for the tabs can be made after that.



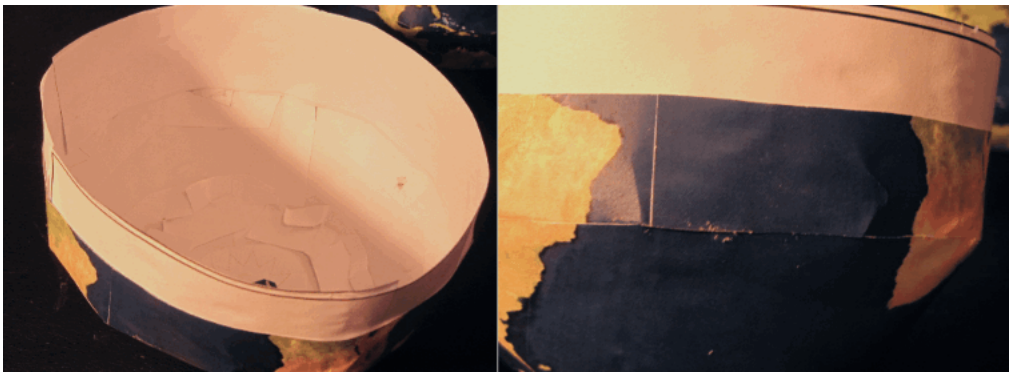
The two equatorial regions are added to form two hemispheres.



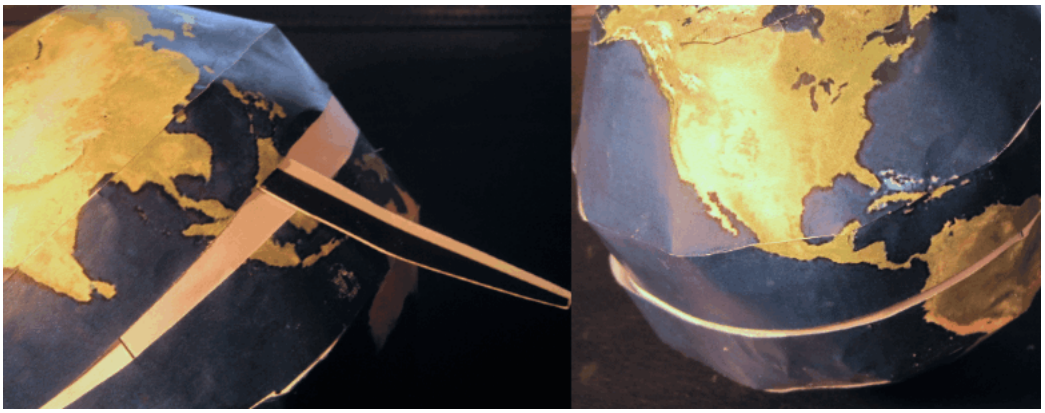
Usually it is not important to glue the inside of the globe. But the tabs of the equatorial regions need to be glued flat. This will help the two hemispheres to be joined together.



The four rectangles on the "Needed_With_globr12_5" pdf file are cut and glued inside the Southern hemisphere's equatorial region to create a cylinder.



These four rectangles need to be glued as flat as possible inside the Southern hemisphere's equatorial region. The result should be a multi layer cylinder that is just slightly smaller than the southern hemisphere's equatorial region. And therefore it should be slightly smaller than the Northern hemisphere's equatorial region as well.



The Northern hemisphere region can then be shoe-horned on to this internal cylinder. Then it’s back to glue and aligning the two seams together.

The final globe is shown on top of a laptop keyboard for scale purposes.

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