



WELCOME TO THE **3RD** DIMENSION!

Congratulations on your decision to print our **Kongoscope Tri-Dimensional Viewer**. We're certain it will provide years of enjoyment as you perceive the world with an enhanced sense of depth.

Please observe all safety precautions. We at **KONGO!** will not be held responsible for any nightmare visions or blown minds resulting from the misuse of our product.

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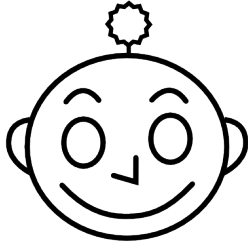
A - PARTS LIST

- Kongoscope_Shell_A.stl, 2 prints (black color preferred)
 - Kongoscope_Shell_B.stl, 2 prints (black color preferred)
 - Kongoscope_Connector.stl, 2 prints
 - 4 pieces of 2" (5.1 cm) square mirror (see "A Note On Mirrors")
 - 1 #8-32 Bolt, 1-1/2" or longer
 - 1 #8-32 Nut (locking nut preferred)
 - 4 #6 1-3/4" Wood or metal screws
 - 2 metal washers, 7/16" diameter(optional)
 - Craft foam, paper, or cardboard for shimming mirror
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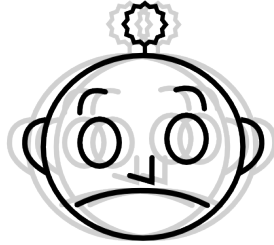
B - A NOTE ON MIRRORS

This item requires four 2" mirrors. While any dimestore mirror will work, we emphatically recommend "first surface" or "front surface" mirror. If you use normal mirror, the image will have to travel through two layers of 45° glass (for each eye) resulting in ghost

Fig 1.



A happy image in a first surface mirror.



An unhappy image in a regular mirror.

images that will degrade your perception of the third dimension. (Fig 1.)

(If you think you'd enjoy seeing ghosts, check out the latest **KONGO!** catalog for our **ECTOPLASMIC IMAGER**. Its use is still legal in most states, and any side effects have proven to be temporary.)

Here are a few online retailers of first surface mirror, cut to size:

[Edmund ScientificsOnline - item #30523-24](#)

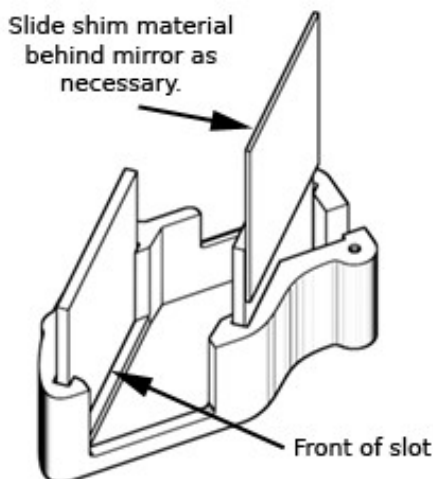
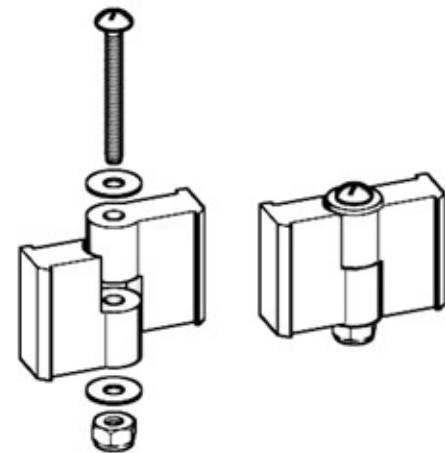
[FrontSurfaceMirror.com - 3mm 2x2"](#)

When you receive your mirror, it will probably be covered by a protective film because the reflective surface is easily damaged. Peel the film off carefully. If you can see the edges of the glass through the mirror, you're actually looking at the back of the mirror.

C - ASSEMBLY

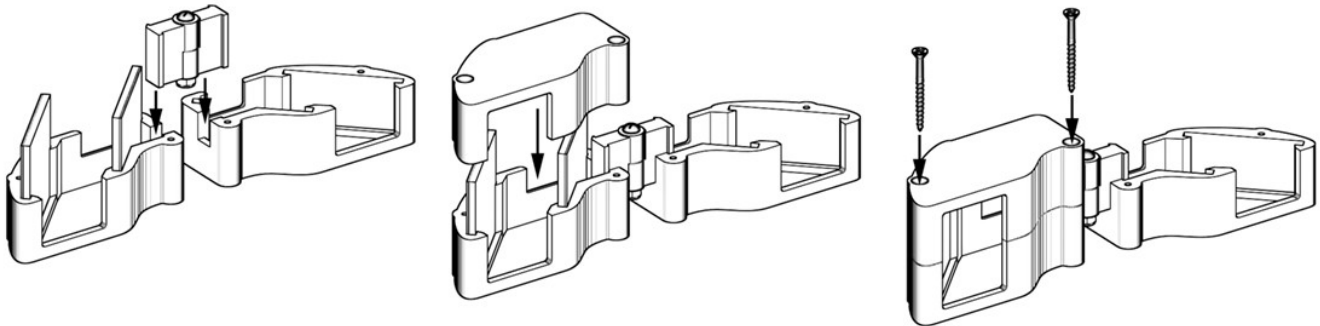
1. Print two copies of each stl file, preferably in black. Or paint the prints matte black. Other colors are distracting to the eyes while trying to perceive the 3D image.

2. Join the two connector pieces with the #8-32 bolt and nut, as shown. A locking nut is a nice touch, and the metal washers are optional. Please ignore these recommendations if the judgement of your family and friends means nothing to you. Tighten the nut only enough to make swiveling the connectors take some effort.



3. In a copy of Shell_B (the shell with screw holes that don't pass completely through it), slide two mirrors into their slots. The mirrored surfaces should face inward, toward each other. The slots are designed to allow mirrors up to 4mm thick; most likely yours will be thinner. Since it's critical that the mirrors be perfectly vertical, you must shim them from behind so they are pressed firmly against the front of their slot. 2" squares of craft foam, paper, or cardboard should do the trick.

4. When you're certain the mirrors are secure and vertical, place a Shell_A so that you can bridge the shells with the connectors. Then add the other Shell_A on top of your Shell_B and mirrors. Use two #6 wood or metal screws to hold the two shells together. **DON'T OVER-TIGHTEN THE SCREWS.** If you strip the plastic in the pilot holes, you'll need to use wider screws or glue to join the shells. Or print another shell.



5. Sorry, but now repeat **Step 3** to make the other half of the viewer. Experience will make constructing the second one easier and not at all tedious....right?

6. Mazel tov! If all has gone well, you've completed your **Kongoscope Tri-Dimensional Viewer!** If not, you've got a curious mass of plastic and glass, the uselessness of which will taunt you until you finally admit defeat and toss the mess into the garbage.

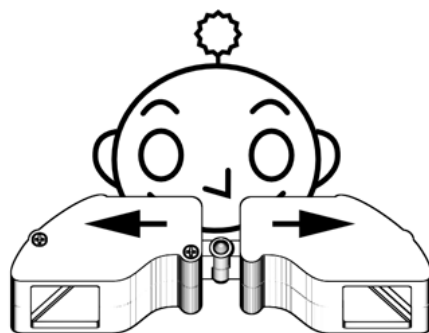
D - USE

Your **Kongoscope** is designed for viewing "stereo pairs", meaning two images depicting a scene from laterally shifted vantage points, mimicking how a pair of eyes would view the scene. The images can be printed or on a monitor. They must be arranged "parallel" style. That is, the image for the left eye is on the left, right on the right. "Cross-eye" arranged pairs are not supported at this time, due to a prejudice dating back to the Salem witch trials.

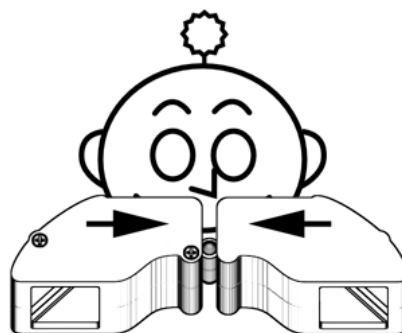
Or you can use the **Kongoscope** to observe the world around you in a new way. It's like ripping your eyeballs from their sockets and duct taping them to your temples, only less disgusting. The effect? Everything will have more depth! Really! We don't recommend walking around that way, however, unless you want to look like a doofus.

There are three ways to fine-tune your viewing experience:

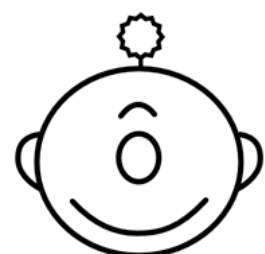
1. The viewer is adjustable to accomodate different interpupillary distances. Yes, it's a real word.



Wide-set eyes

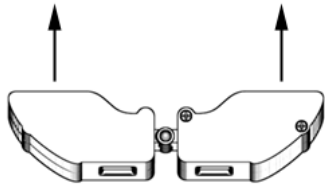


Narrow-set eyes

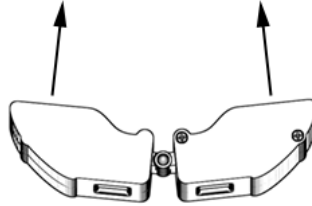


Perhaps we could interest you in one of our other products.

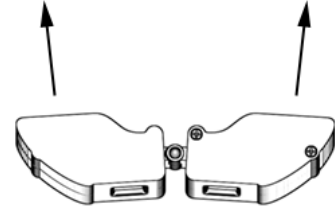
2. It's also adjustable for the viewing of stereo pairs of varying sizes.



For most viewing, you'll want to keep your eyepieces aligned so you see straight ahead.



When viewing very small pairs, you can angle the eyepieces inward.



When viewing very large prints, especially ones far apart, you can angle the eyepieces outward.

3. Lastly, but certainly not leastly, move nearer or farther from the images.

Using a combination of these three techniques will allow you to view a wide range of pair formats. The goal is to see each image completely and centered in its respective eyepiece.

E - IMAGES

This viewer comes with a separate document, **Kongoscope_3D_Image_Funpack.pdf**, which is chock-full of stereo images to get you started and to show examples of the ideal size and format for your own pictures.

How do you make stereo pairs? The easiest way is to take a photo, then move the camera a little to the right and take another. View them side by side with your **Kongoscope**. Neato! Of course there are intricacies to making GREAT stereo images, but they're for the dedicated who will happily find them listed elsewhere.

The images in the Funpack were made using a computer graphics package called [Blender](#), but the process is similar to the photographic method. You build a scene, place a camera, render a picture, move the camera a little, and render another picture.

Nice people have stashed stereo images all over the interwebs for you to find. Unfortunately, some of them are in the dreaded "cross-eye" format. You'll have to download those files and swap the positions of the images in a photo editing program.

F - HEY, I DON'T SEE ANY 3D! (Troubleshooting)

Okay, calm down.

You've built this piece of junk, peered through it at some supposedly "3D" pictures, and all you've gotten is a headache. First it must be said that a *small* percentage of people have great difficulty perceiving depth this way, even if they have two good eyes. But chances are you either need a little practice, or your viewer needs some adjusting. Let's check the viewer first.



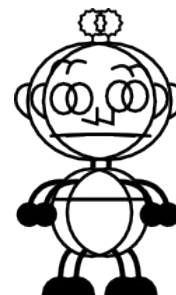
When you look at a pair from the Funpack.pdf, does it look like this guy? The important thing to note is he's vertically misaligned. That means at least one of your mirrors isn't perfectly vertical. That must be fixed.

The horizontal alignment isn't as worrying because you can correct for that using the three techniques described in section D after the vertical problem is fixed.

If mirror alignment doesn't seem to be a problem and you're still having difficulty, let's practice using the viewer.

Look through the viewer, with the two halves aligned (no angle), at a Funpack stereo pair that's straight ahead (not at an angle) from a distance of approximately 16". No 3D? Close your right eye. Is your left eye seeing the left image completely and well-centered? When your answer is yes, switch eyes. When you've gotten both eyes seeing what they're supposed to, open both eyes. Still no 3D? Try slowly backing away from the images. At some point, the images should fuse into a 3D image. If you're really far away, you might see three images. Concentrate on the middle one.

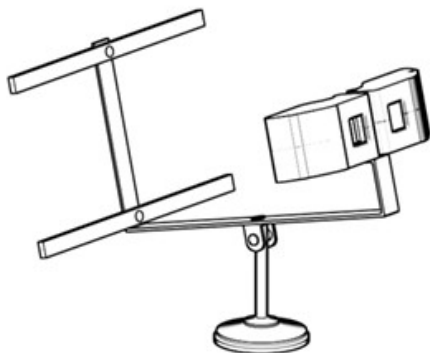
If what you're seeing is only slightly horizontally screwy, like this guy, you're close to success. Usually, backing up and/or relaxing your eyes (as if looking far away) will allow your brain to fuse the images and interpret 3D. When that happens, you can then practice moving closer while keeping the 3D "locked". You'll learn with practice what your eyes should feel like when viewing at a closer distance.



For most people, using a properly constructed **Kongoscope** will be cake. For some, it might take some practice. For a very few special people, it might not work. If that is you, we at **Kongo!** apologize for wasting your time, money, and trust. But know that you ARE special. And we'd like to meet you. Talk to you. Examine you. Your brain intrigues us.

G - MISCELLANEOUS

Mounting on a Stand - Hey, you know that #8-32 bolt holding the two connectors together? If you use a longer one, you could also use it to connect the viewer to something else. Like a stand for hands-free viewing or display purposes.



When you've settled on the perfect print size for your needs, and your proper viewing distance, make something that will hold the viewer and prints *juuuuuust* right. But make sure it's cooler looking than what's pictured here.

Useful links:

[Mutt्यान's Home Page](http://stereo.jpn.org/eng/index.html) is bursting with free 3D software: <http://stereo.jpn.org/eng/index.html>

Of special interest is his [StereoPhoto Maker](#) which makes converting cross-eye pairs a snap.

[Callipygian](http://www.callipygian.com/) is another free stereo pair editor: <http://www.callipygian.com/>

[Fun Science Gallery page](http://www.funsci.com/fun3_en/stscp/stscp.htm) on making stereoscopes and 3D pictures: http://www.funsci.com/fun3_en/stscp/stscp.htm

