

# KALEIDOSCOPE

Kaleidoscope with Removable/Interchangeable Object Chamber

*Note:* These are my shop notes from 1993. I have tried to improve the notes a little and added the pictures. Measurements are based on mirrors of  $7 \frac{3}{4} \times \frac{3}{4}$  inches. Plexiglas of  $\frac{1}{16}$  inch thickness was used for the dust caps and the cells. Adjust and verify your measurements.

This kaleidoscope was turned from koa and the overall length is  $9 \frac{3}{8}$  inches.

I have made multiple cells to fit one barrel and have made sets which included two barrels (one with three mirrors and one with two mirrors) with interchangeable cells. In addition, you can cut colored Plexiglas filters to fit between the cell and barrel. There are many options available including.



1. Cut the block for the barrel. Make an inch or so longer than required, approximately  $2 \times 2 \times 9$  inches.
2. Drill a  $1 \frac{1}{8}$  inch hole in the barrel. The hole must be a little longer than the mirrors plus the two dust caps. Do not drill all the way through the block.
3. Rough turn barrel.

4. Cut off end of barrel. Make cut about 1/8 inch more than total of the mirrors and two dust caps.
5. Square barrel ends.
6. Make eye cap using 3/4 inch stock. (The barrel can be made to include the eye cap, as I did on later efforts.)

Mark 1 5/8 inch diameter circle.

Drill 1 3/8 inch hole to fit over barrel. Make 1/2 inch deep.

Drill 3/8 inch eye hole.

Turn eye cap.

Turn tenon on barrel to 1 3/8 inch diameter, 1/2 inch long.

Glue eye cap on barrel.



7. Turn barrel to 1 1/2 inch diameter. Turn tenon 1/2 inch long for cell.
8. Drill and countersink 3 11 mm holes for bullet catches on the barrel.



9. Sand and finish.
10. Cut  $2 \frac{1}{8} \times 1 \frac{3}{4}$  block for cell.
11. Turn cell, including the groove for the bullet catches.
  - outside diameter = 2 inches
  - inside diameter =  $1 \frac{9}{16}$  inches
  - inside cell =  $1 \frac{3}{8}$  inch.



Aloha

Tom Young

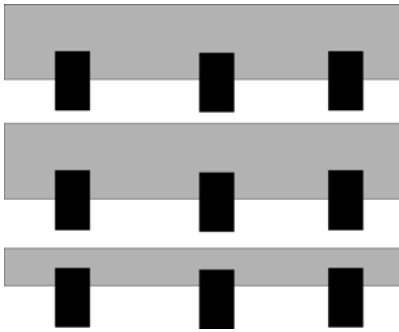
## You can Create a Kaleidoscope

The exterior of a kaleidoscope can be made of nearly anything. The important part is, you must house the mirror system in something to protect it. Many shapes are used to house the mirror system but the simplest is a tube. To build a 2 or 3 mirror kaleidoscope, you must create a triangular tube. I use SCOTCH BRAND 471 tape to hold the mirrors together. It is similar to electrical tape in appearance but it comes in 2 inch wide rolls and it isn't as stretchy. It is important to use tape that doesn't deteriorate over time. I called 3M and spoke with someone that narrowed my search to two types of tape, they sent the data sheets for the products and sent a sample of each . One is SCOTCH BRAND 471 and if I run out, I use Scotch type 33+ electrical tape. The problem with some electrical tape is a chemical reaction between the adhesive and the tape. Over time, the adhesive separates from the tape and the bond fails. What's left is a goeey mess. I'm sure there are other brands of tape that will last as long as 3M but I haven't looked for them since I found these. I have also used Duct tape, it's a lot stickier and more difficult to re position.

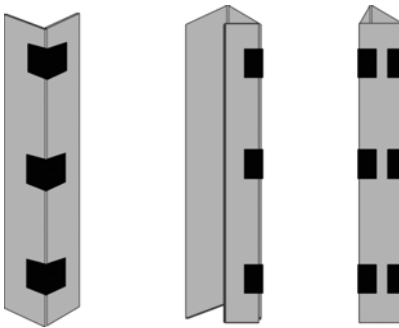
**OK lets build a kaleidoscope.**

First cut three strips of mirror. I think you should use inexpensive mirror like mirror tiles for your first scope. Mirror tile will cost less than \$10.00 for a package of 6x12x12 inch mirror tiles. First surface mirror can cost as much as \$35.00 for a 12X16 inch sheet so practice on the mirror tiles.

OK, cut three stripes of mirror. 2 each 1 1/2 x 8 inch and 1 each 3/4 x 8 inch. Now, using black electrical tape, place 3 strips of tape about 1 inch long across one edge of each of the mirror strips.



Next, take the two wide strips, and stand them on end on the table top. Put two edges together (one edge will have tape on it the other will not) hold the strips in a wide V shape with an overlap of about the thickness of the mirror and tape the two edges together.



Now, with the two strips still on end, place the small strip on end and tape one side of the small strip to one edge of the other two. You should have a triangular tube that is open on one side. Tape the remaining edges to complete the tube. Congratulations, you have just created a teleidoscope. ( a mirror system without an object chamber )The image you have in your teleidoscope may not have the number of points in the star as you would like. So, you need to adjust the mirror angle.

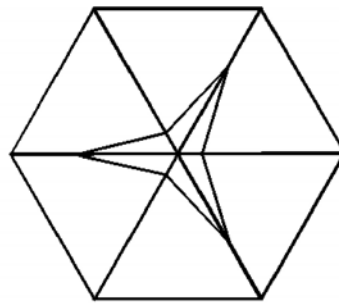
Mirror Angle Chart

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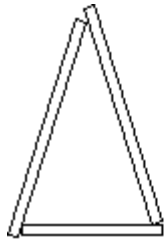
<b>MIRROR ANGLE CHART</b>	
60 degrees =	6 images and a 3 pointed star
45 degrees =	8 images and a 4 pointed star
36 degrees =	10 images and a 5 pointed star
30 degrees =	12 images and a 6 pointed star

<b>27.5 degrees = 14 images and a 7 pointed star</b>
<b>22.5 degrees = 16 images and a 8 pointed star</b>
<b>20 degrees = 18 images and a 9 pointed star</b>
<b>18 degrees = 20 images and a 10 pointed star</b>
<b>16.8 degrees = 22 images and a 11 pointed star</b>
<b>15 degrees = 24 images and a 12 pointed star</b>

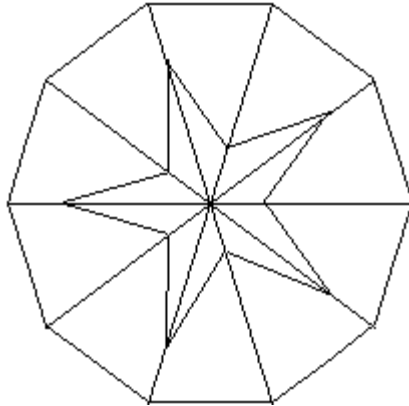
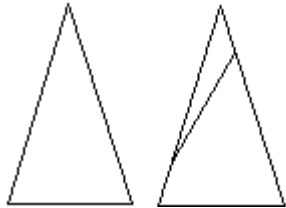
Draw an X on a sheet of paper and place the paper on the table. Look down through the triangle tube, being careful not to injure your eye, align one of the lines on the paper across the viewing area. This will create the star. By changing the angle of the two wider mirror strips, will change the number of points on the star. Use the tape to secure the mirrors at the desired angle.



**NEXT**



36 Degrees 10 images 5 pointed star



*NEXT*

15 Degrees 24 images 12 pointed star

