

How does a Kaleidoscope work?

The Kaleidoscope is made using three long mirrors with the mirror-sides facing each other forming a triangle.

When looking down the tube that holds the mirrors, we see many images. Straight ahead, we see whatever is at the end of the tube (called the object). We also see multiple images of the object reflected in the mirrors. The multiple images are created by reflections of the object, and by reflections of the reflections.



Continued on the other side →



The object is reflected once in each mirror and from this reflection three images appear, represented by the blue triangles in Figure 1. The object is also reflected twice. If the mirrors were numbered 1, 2 & 3, the object is reflected by mirror 1 and then by mirror 2, producing another image. Other two-reflection images are made from double reflections of 1-3, 2-1, 2-3, 3-1, and 3-2 for a total of six images. Those double reflections add six images represented by green triangles in Figure 2 to the three from single reflections (the blue triangles). The object is also reflected three times, once off each mirror or even off one mirror (1st) to the second (2nd) and then back to the first mirror (3rd). This causes nine new images that are represented as red triangles in Figure 3. But there are more reflections - 4, 5, 6...in principle an infinite number, and each level of reflection produces additional triangular images that are seen even farther away from the object. This is how the Kaleidoscope produces the pattern that you see.

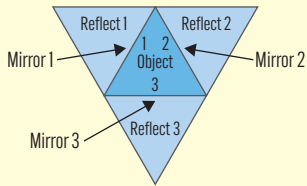


Figure 1. Images from Single Reflection

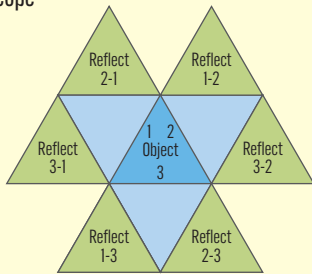


Figure 2. Images from Double Reflection

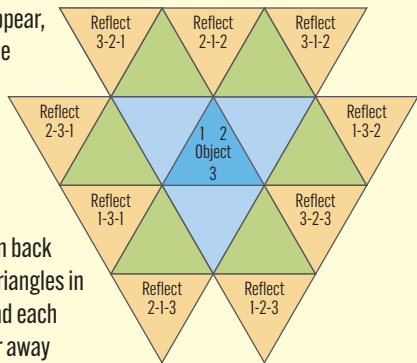


Figure 3. Images from Triple Reflection



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