

Geometric Models: the Wonderful Tridimensional

Kaleidoscope

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Abstract

The traditional kaleidoscope uses the prism as a basic unit. Through the reflections of the mirrors on the inner surfaces of a prism, we can see many symmetric axles and patterns. However, traditional kaleidoscope only presents two-dimensional images.

The three-dimensional kaleidoscope we designed uses the pyramid as a basic unit. We can see three-dimensional images via mirror faces on the inner surfaces of the pyramid. Our examination shows that not all pyramids are able to show three-dimensional images but only pyramids with specific angles do.

The kaleidoscope we designed differs from the traditional kaleidoscope in the following ways:

①Our three-dimensional kaleidoscope not only shows three-dimensional space, but also shows it through two-dimensional planes.

②Our three-dimensional kaleidoscope is based on three kinds of pyramid: three-sided pyramid (tetrahedron), four-sided pyramid (square pyramid) and five-sided pyramid (pentagonal pyramid). Each kind of pyramid has its own charm in showing its reflected images.

③Each kind of pyramid is separated from its entire geometry. However, it can present the whole view of the geometry after mirrored.

Our exploration shows that two dimensional and three dimensional worlds can change into one another under specific conditions. Perhaps before long we can discover more dimensions and explain the relationships between each kind of dimension.

This treatise mainly involves the principles of Euclidean Geometry and Projective Geometry.