

Pearl Vault Puzzle

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Background:

The "Magic Disk" puzzle is a well-known coordinate motion puzzle whose pieces move in a plane.¹ Its three congruent pieces assemble and disassemble only if all three are simultaneously moved towards or away from the disk's center. Professor Dr. Bruce Patterson² had the ingenious insight of applying the same puzzle mechanism to the faces of a regular polyhedron³. Doing so with a tetrahedron results in a three-dimensional coordinate motion puzzle requiring the four pieces to be moved inward or outward relative to the tetrahedron's center.

The Puzzle:

With Bruce Patterson's permission, the puzzle was modeled in OpenSCAD, prototyped on a consumer grade FDM 3D printer, produced in volume using MJF printed nylon (similar to SLS), and dyed black. In addition to the coordinate motion puzzle mechanism, the design also includes:

1. Rounded tips. Primary research has revealed that puzzlers dislike puzzles that give them puncture wounds.
2. Elimination of one of the three layers found in the Magic Disk design. Pearl Vault's three dimensional form results in four pieces instead of the Magic Disk's three and so the motion of each Pearl Vault piece is constrained by three other pieces instead of just two. This makes a third layer unnecessary.
3. Creation of an internal chamber. It is well-documented in the literature that puzzlers are irresistibly drawn to puzzles that have something rattling inside. In the case of the Pearl Vault, a gleaming white pearl (albeit fake) is the reward for a successful puzzler.

Pearl Vault Objective:

Free the pearl!



¹ <http://www.2ndlook.nl/3dpuzzles/puzzles/magicdisk/engdescription.htm>

² <https://www.psi.ch/de/people/bruce-patterson> (Paul Scherrer Institut)

³ Bruce Patterson, "Shell Puzzles", in *Cubism for Fun #113*, November 2020, pp. 31-33