Octahedron 3-Compound

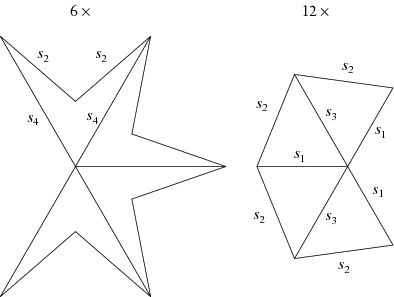
[DOWNLOAD Mathematica Notebook](http://mathworld.wolfram.com/notebooks/Polyhedra/Octahedron3-Compound.nb)

|  |  |
| --- | --- |
| Octahedron3-CompoundFrame | Paper sculpture of the octahedron 3-compound |

A [polyhedron compound](http://mathworld.wolfram.com/PolyhedronCompound.html) consisting of three octahedra. It is the dual of the [cube 3-compound](http://mathworld.wolfram.com/Cube3-Compound.html). The illustration to the right above shows a paper sculpture of the octahedron 3-compound.

It is implemented in [*Mathematica*](http://www.wolfram.com/products/mathematica/)as [PolyhedronData](http://reference.wolfram.com/mathematica/ref/PolyhedronData.html)["OctahedronThreeCompound"].

A hollow version of the octahedron 3-compound with beveled edges like that illustrated above (where the pair of horned lizards inside the compound have been omitted) appears at the central image in M. C. Escher's "Stars" wood engraving (Forty 2003, Plate 43). One of the lesser stars in the lower right corner of this lithograph is a solid octahedron 3-compound.



The octahedron 3-compound with unit edge lengths can be constructed using the net shown above with lengths given by

|  |  |  |  |
| --- | --- | --- | --- |
| s_1 | = | 1/4sqrt(2) | (1) |
| s_2 | = | 1/2sqrt((21)/2-7sqrt(2)) | (2) |
| s_3 | = | sqrt(2)-1 | (3) |
| s_4 | = | 2-sqrt(2). | (4) |

The surface area of the compound is

|  |
| --- |
| S=3sqrt(2)(8-5sqrt(2)) approx 4.83. |