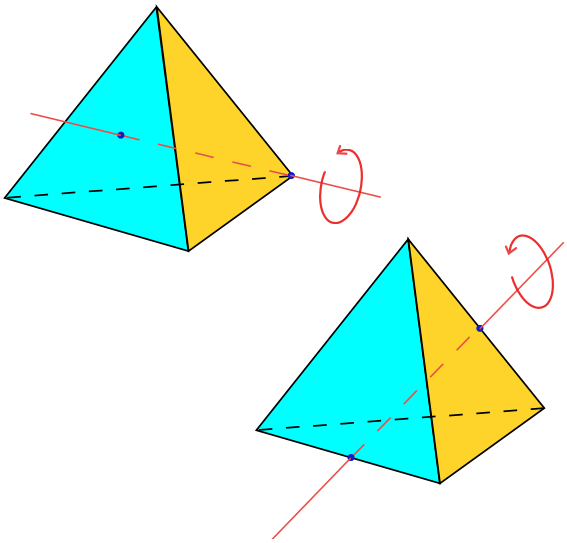
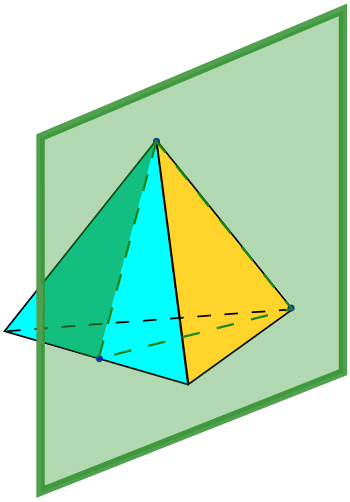
Tetrahedral symmetry (A_4 or S_4)

8 × rotation by 120° (OP)

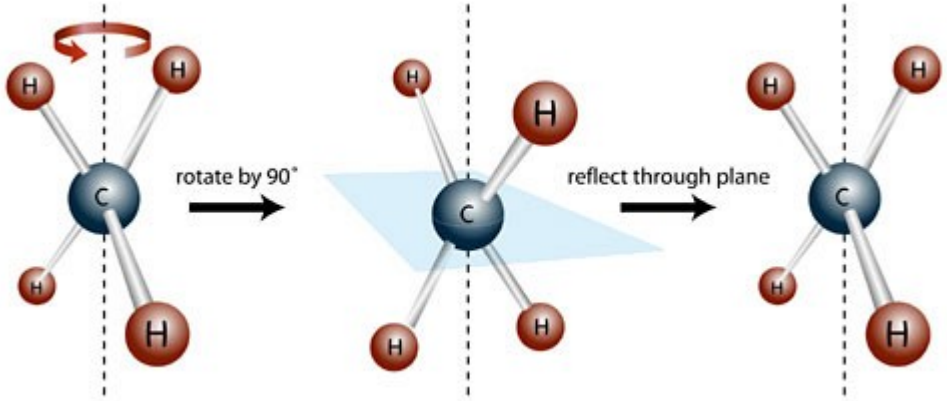


6 × reflection in a plane (OR)



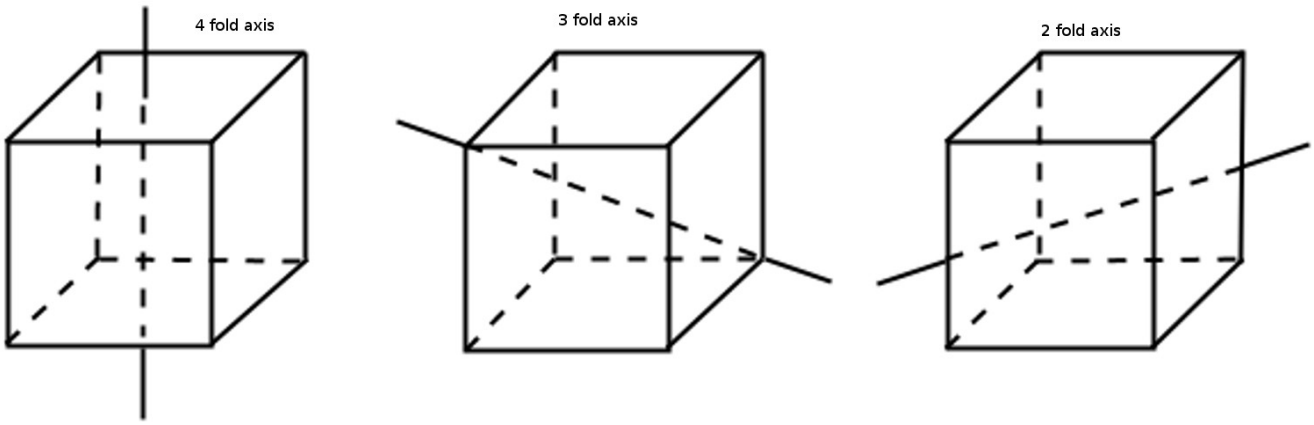
3 × rotation by 180° (OP)

6 × rotoreflection by 90° (OR)



1 × identity (OP)

Octahedral symmetry



(a) (b) (c)

Orientation preserving (S_4):

1. 1 × identity
2. rotation (a) about an axis from the center of a face to the center of the opposite face by an angle of 90°: 3 axes, 2 per axis, together 6
3. ditto (a) by an angle of 180°: 3 axes, 1 per axis, together 3
4. rotation (b) about a body diagonal by an angle of 120°: 4 axes, 2 per axis, together 8
5. rotation (c) about an axis from the center of an edge to the center of the opposite edge by an angle of 180°: 6 axes, 1 per axis, together 6

For orientation reversing ones multiply by –id ($S_4 \times C_2$).

Octahedron is dual to the cube: