

“Square Dance”

Four individuals position themselves at the corners of a square, which is marked on the floor with some orientation, such as North-East-South-West. The individuals learn to change positions in accordance with the various eight symmetries of the square, such as “Rotate 90 degrees”, “Reflect across N-S line”, “Reflect across “NE-SW line” (we need to think of better names for these).

The “caller” now calls out a sequence of moves. The challenge is then to return to the starting position in one move, thus illustrating compositions of symmetries that result in the identity (or trivial) symmetry.

Use this activity to determine inverses of each symmetry. Create a group table. Observe that some pairs of operations are not commutative.

Try this with other figures, such as hexagons. Is there any way to extend this activity to the symmetries of a cube?