

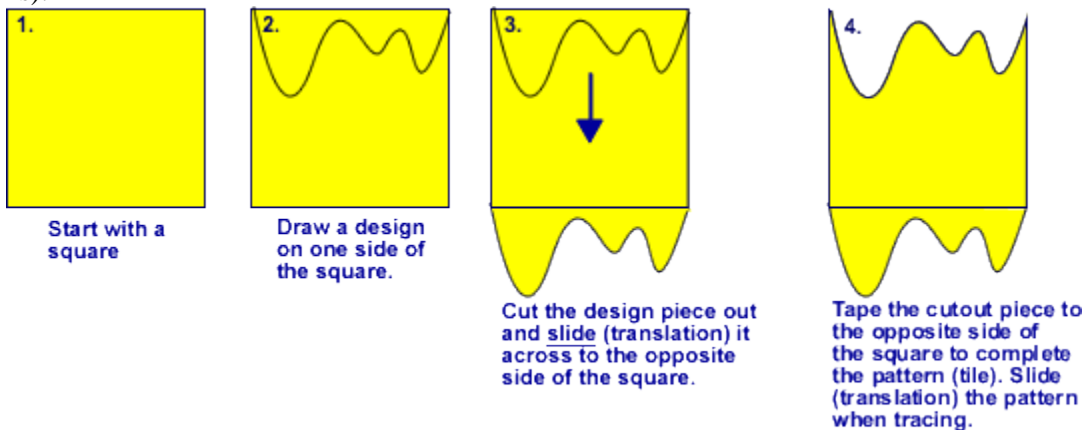
Basic Techniques for Single-Figure Tessellations

A **tiling** of an object is a pattern of figures that fills the object with no overlaps and no gaps. Tessellations usually refer to tilings of a plane by repeatedly tracing a single geometric object.

- The word "tessella" means "small square" (derived from "tessera", the Greek word for "four"). That lines up nicely with what we picture when we say "tiling."
- It's generally good to construct a tessellation shape out of sturdy material. It also helps to mark the edges (e.g., with different colors).
- The examples show single edge-modifications, but you can modify multiple edges to get more interesting shapes.

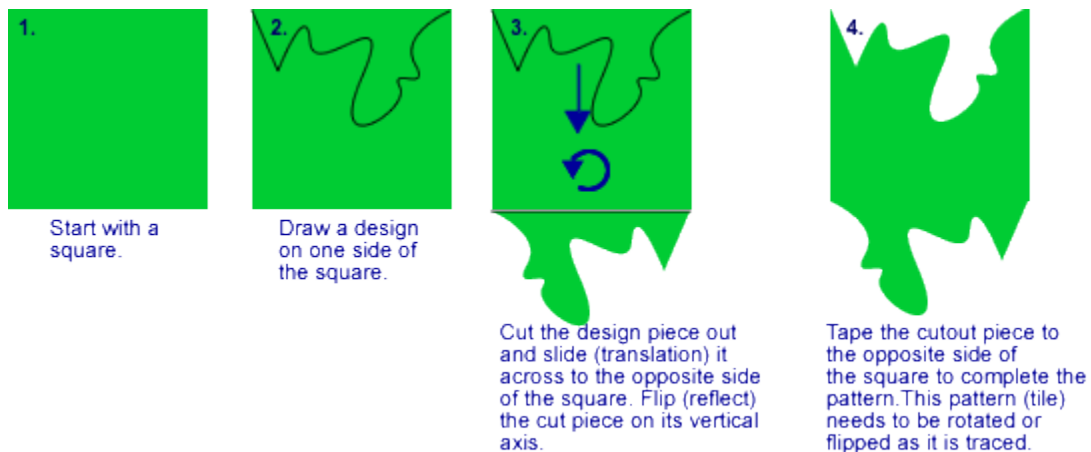
Simple Translation Tessellation

Polygon should have opposite sides that are parallel and congruent (e.g., squares, parallelograms, regular hexagons).



Glide Reflection Tessellation

Polygon should have opposite sides that are parallel and congruent (e.g., squares, parallelograms, regular hexagons).



Side-Rotation Tessellation

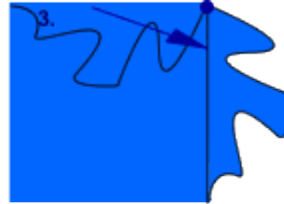
Adjacent sides must be congruent (e.g., squares, equilateral triangles, regular hexagons, parallelograms). The central angle must divide 360 degrees.



1. Start with a square.



2. Draw a design on one side of the square.



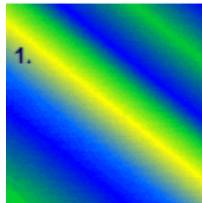
3. Cut the design piece out and turn (rotate) it on an end point until it lies evenly with an adjacent side of the square.



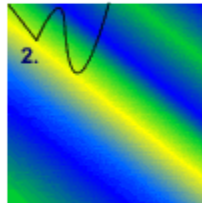
4. Tape the cutout piece to the adjacent side of the square to complete the pattern. This pattern (tile) needs to be rotated as it is traced.

Midpoint-Rotation Tessellation

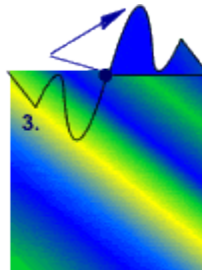
The underlying pattern must tessellate the plane (e.g., triangles, squares, quadrilaterals, regular hexagons)



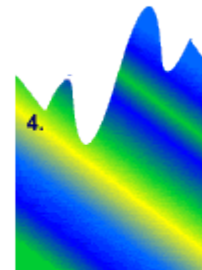
1. Start with a square.



2. Draw a design "nibble" from one corner to the midpoint of a side of a square.



3. Cut the design piece out and turn (rotate) the "nibble" about the side's midpoint onto the remaining half of of the square. (uncut portion, same side)



4. Tape the cutout piece to the uncut half of the same side of the square to complete the pattern. This pattern (tile) needs to be rotated as it is traced.

Arbitrary Quadrilateral Tessellation

Begin with an arbitrary quadrilateral ABCD. Rotate by 180° about the midpoint of one of its sides, and then repeat using the midpoints of other sides to build up a tessellation.

