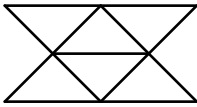


Tessellations

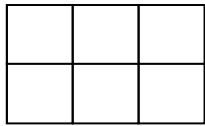
A *tessellation* is a pattern that evenly covers a surface, leaving no holes. The art of M.C. Escher is famous for using such patterns.

Three Regular Tessellations

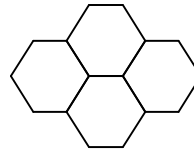
Triangles



Squares

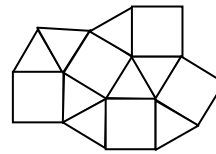
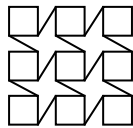
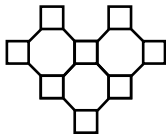


Hexagons



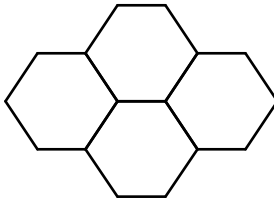
Other Tessellations

Mix shapes

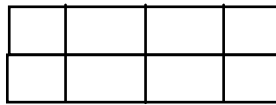


Overlay

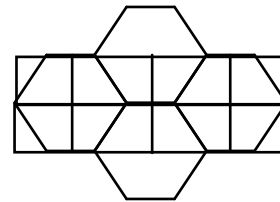
1. First tessellation



2. Plus second

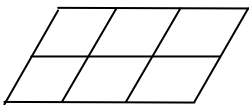


3. Result

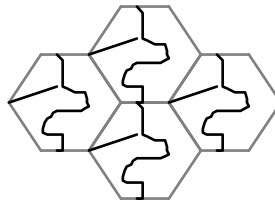


Modifications

A. Skew or Stretch



B. Chop up a unit (Assemble in various ways)

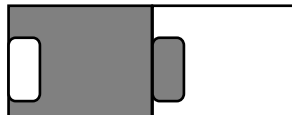


C. Translate across parallel sides

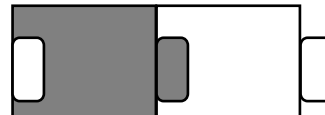
1. Cut from one side



2. Translate to other side

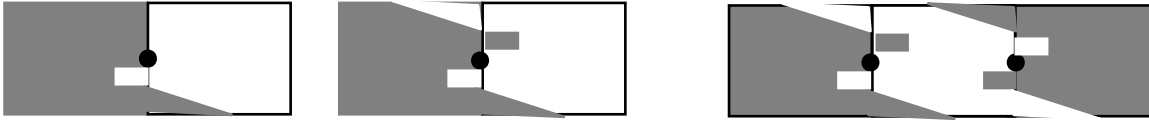


3. Repeat



D. Rotate around midpoint

1. Modify to midpoint
2. Rotate around midpoint
3. Repeat



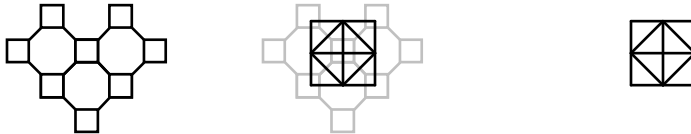
E. Rotate whole side

1. Same-sized, adjacent sides
2. Flip around corner



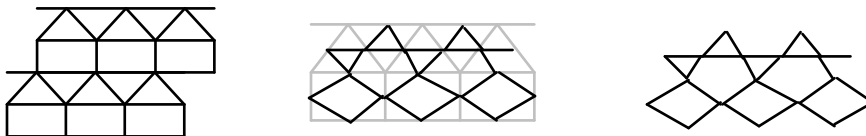
F. Connect centroids (center of gravity)

1. Initial shape
2. Connect centroids
3. Erase originals



G. Connect midpoints

1. Initial shape
2. Connect midpoints
3. Erase originals



H. Others - There are more... see the resources.

Uses

- Use tiles or puzzle pieces to create a training tool (on any topic).
- Mathematics - interesting considerations in thinking about polygons and angles, translation/reflection/symmetry as operations, ...
- Quilting - many traditional quilts are tessellations; interacts with color considerations.
- Art - "tessellae" is Latin for tiles (as in mosaics).

Resources

- *Tessellations: The Geometry of Patterns*, by Stanley Bezuszka, Margaret Kenney, and Linda Silvey. Creative Publications, Inc., 1977.
- *Introduction to Tessellations*, by Dale Seymour and Jill Britton. Dale Seymour Publications, 1989.
- *The Magic of M.C. Escher*, by M. C. Escher. Harry N. Abrams, 2000.
- <http://www.google.com/> - search for "tessellations"

Contact William.Wake@acm.org, <http://www.xp123.com>