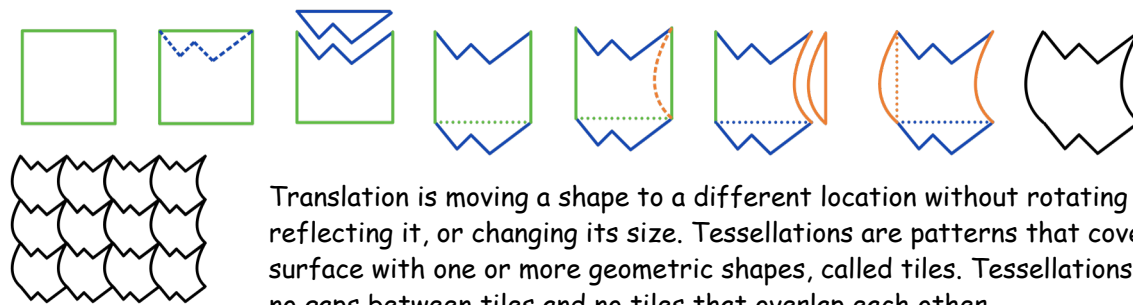
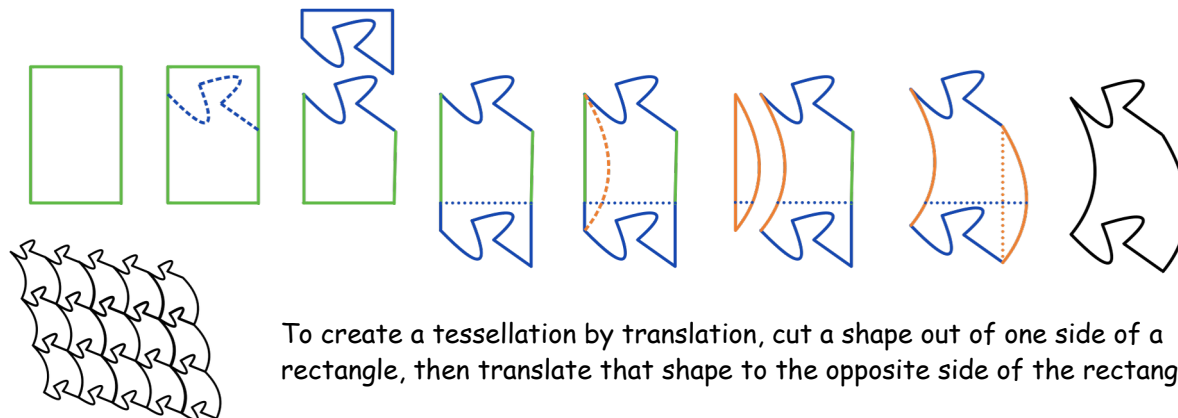


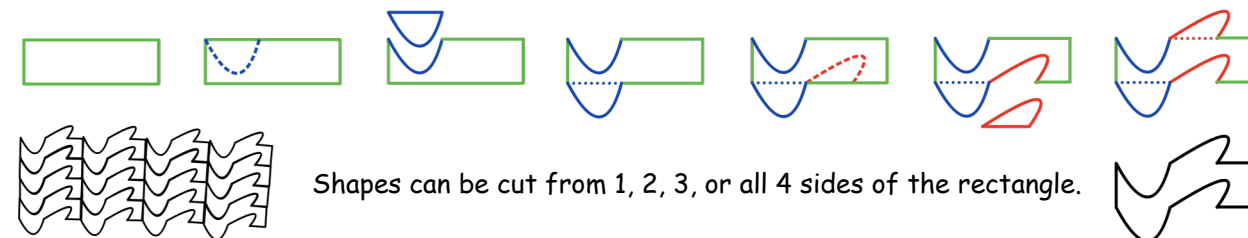
Tessellations by Translation



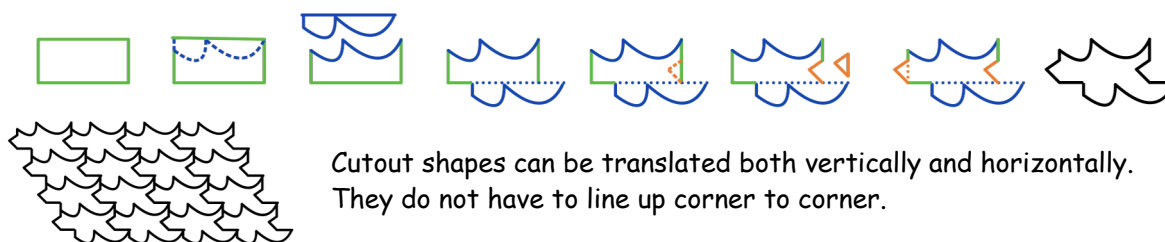
Translation is moving a shape to a different location without rotating it, reflecting it, or changing its size. Tessellations are patterns that cover a surface with one or more geometric shapes, called tiles. Tessellations have no gaps between tiles and no tiles that overlap each other.



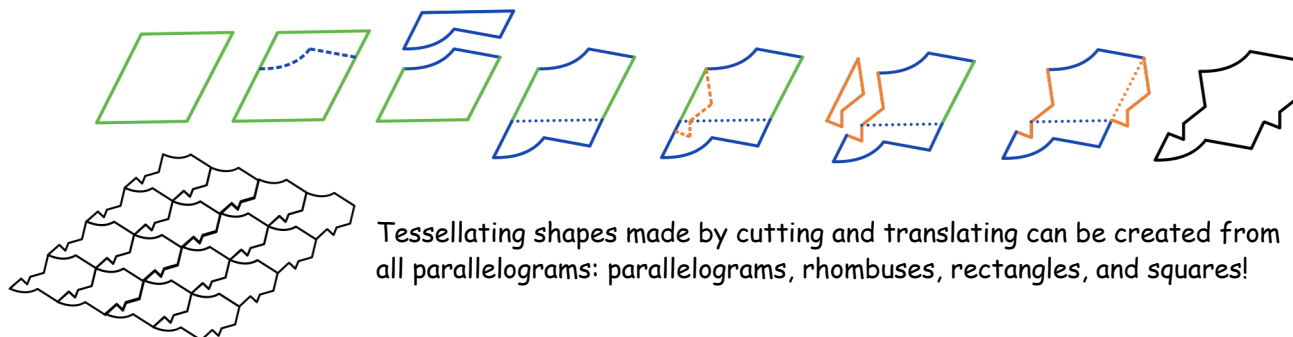
To create a tessellation by translation, cut a shape out of one side of a rectangle, then translate that shape to the opposite side of the rectangle.



Shapes can be cut from 1, 2, 3, or all 4 sides of the rectangle.



Cutout shapes can be translated both vertically and horizontally. They do not have to line up corner to corner.

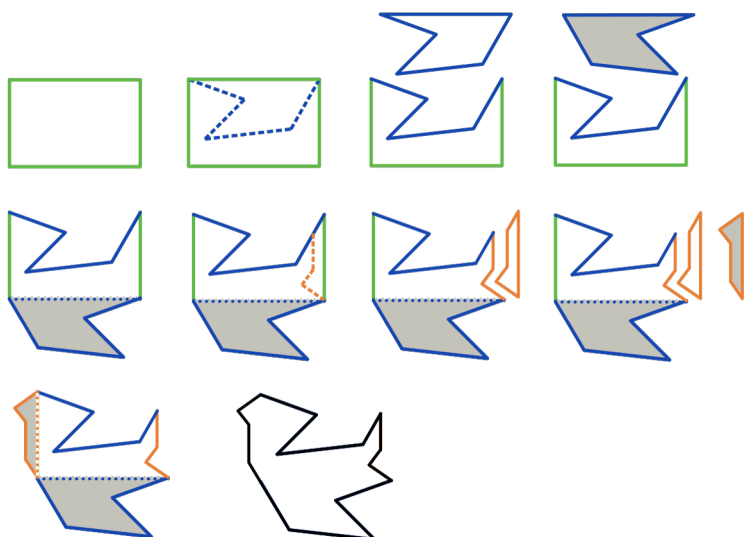
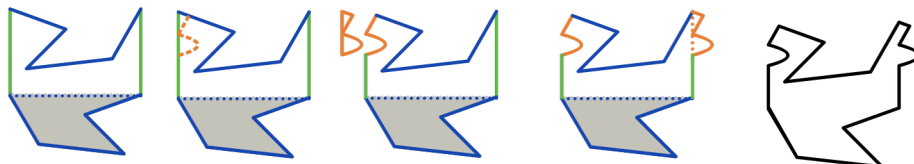
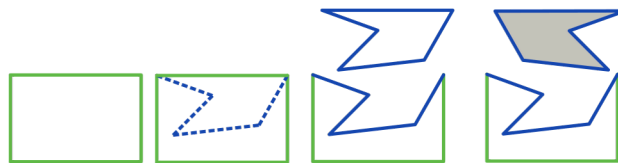
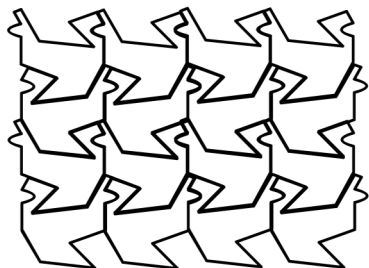


Tessellating shapes made by cutting and translating can be created from all parallelograms: parallelograms, rhombuses, rectangles, and squares!

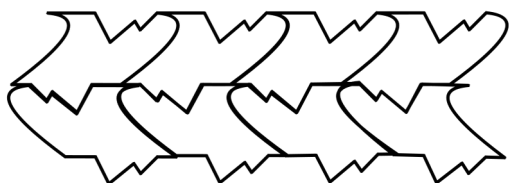
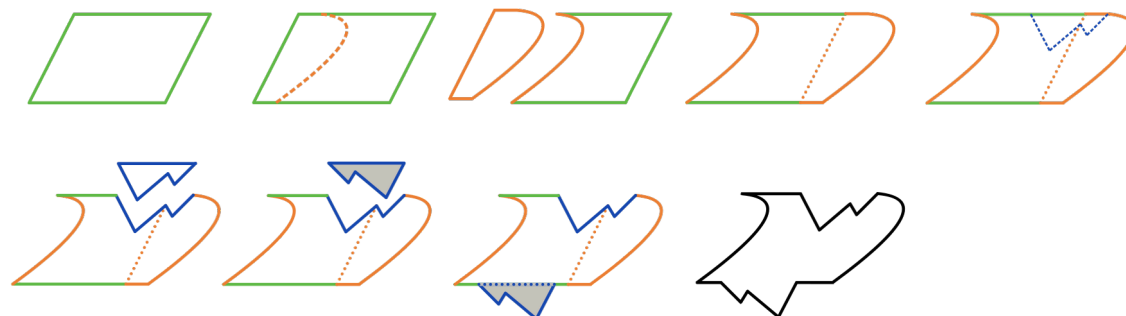
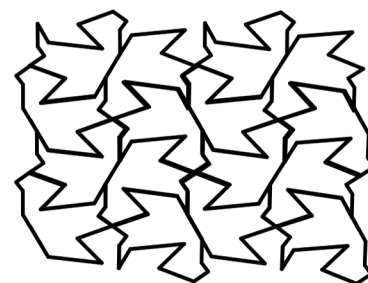


Tessellations by Reflection

Shapes can also be tessellated by reflection. In the diagrams, the grey shapes represent shapes that have been reflected. When making tessellation tiles out of paper, the grey side represents the back side of the paper.



One or both sets of parallel sides of the parallelogram can be reflected to make a tile that tessellates by reflection.

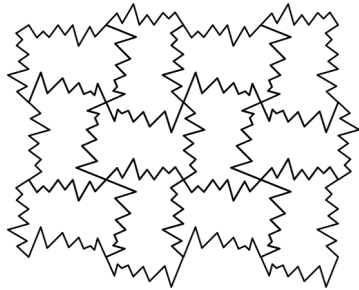
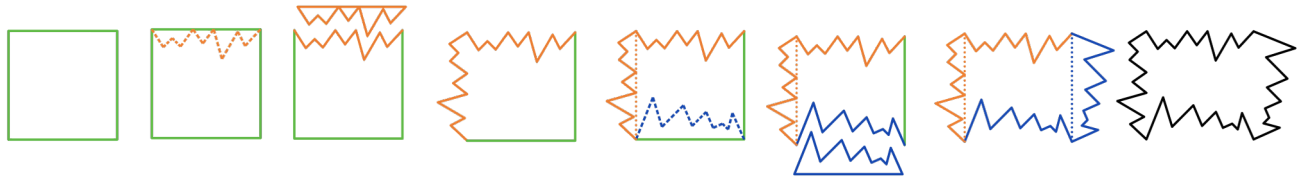


Shapes that tessellate by reflection can be made out of all types of parallelograms including parallelograms, rhombuses, rectangles, and squares.

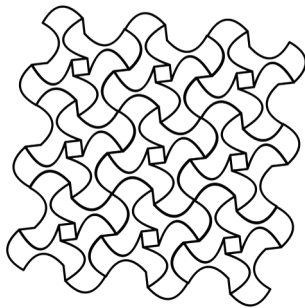
Find more tessellation instructions @
<https://www.instructables.com/member/liio/>



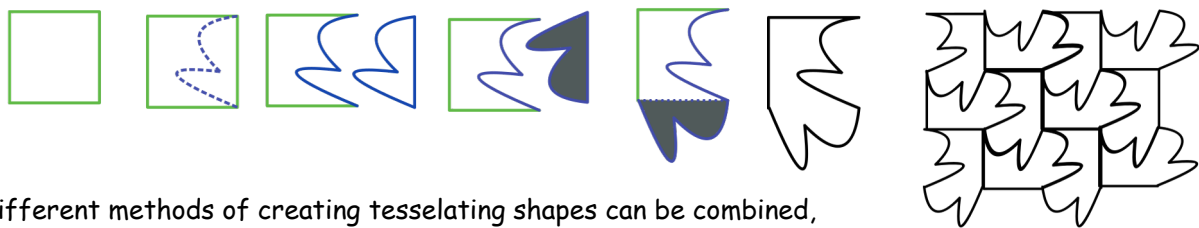
Tessellations by Rotation



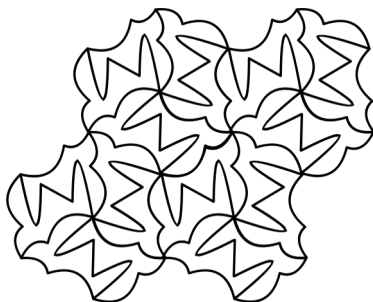
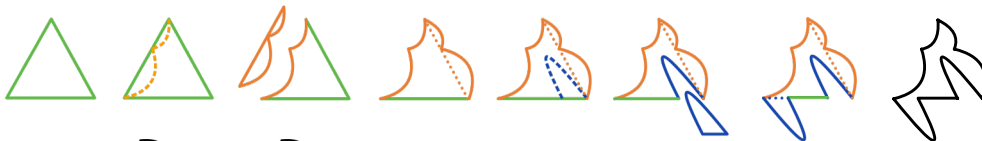
Squares can be used to create tiles that tessellate by rotation. To create a tile that tessellates by rotation, cut a shape out of one side of a square, then attach the shape to an adjacent side of the square after rotating the shape 90 degrees.



If a cutout shape is offset after rotating it 90 degrees before re-attaching it to the base of the tessellating tile the tile will no longer tessellate a surface perfectly on its own. However, the tile can tessellate a surface in combination with square and rectangular tiles.



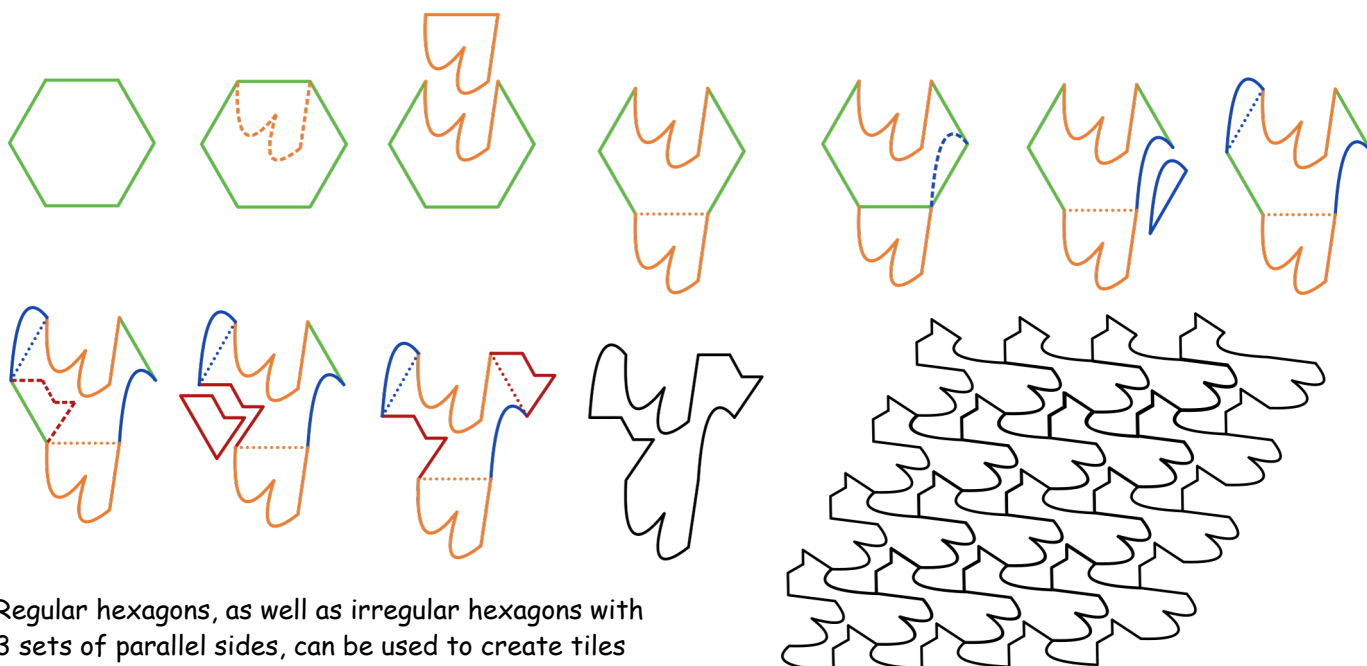
Different methods of creating tessellating shapes can be combined, for example this tile tessellates by rotation and reflection.



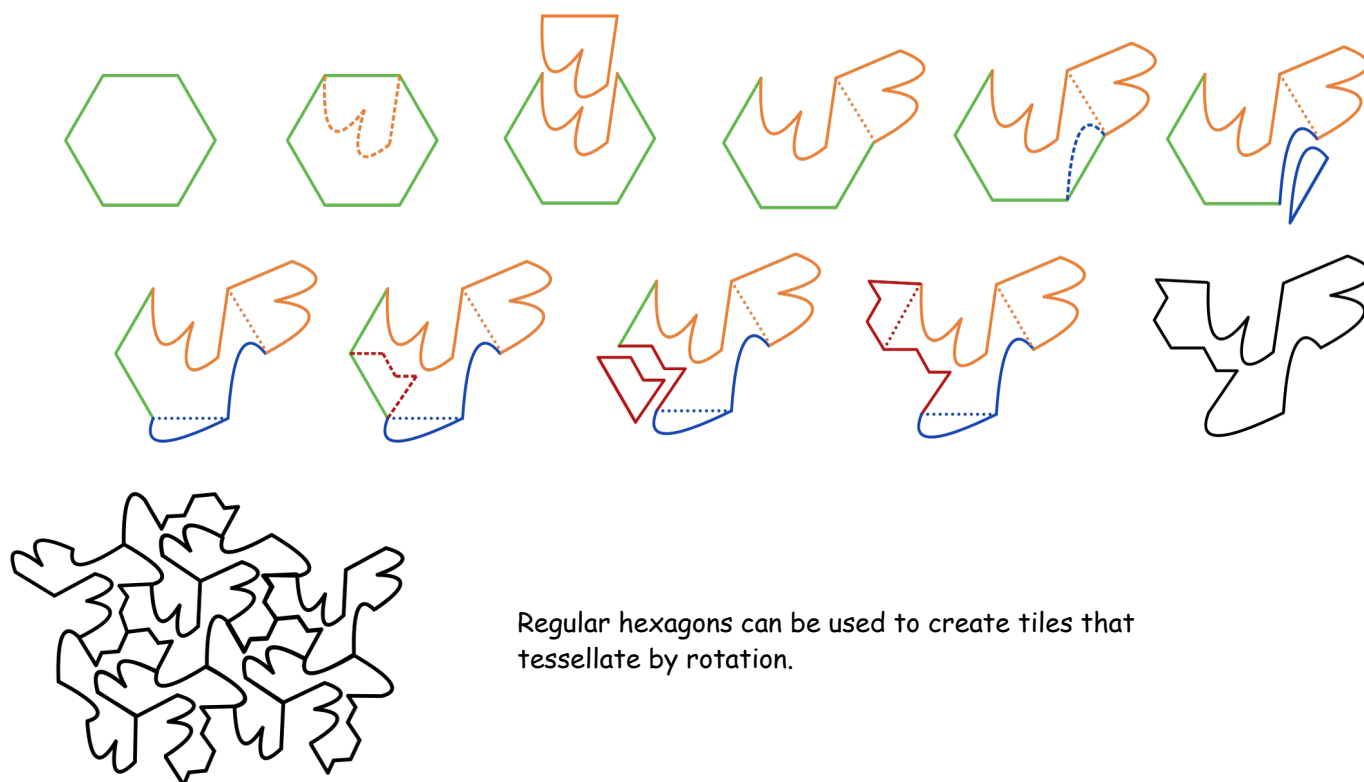
Triangles can also be used to make tiles that tessellate by rotation.



Tessellating Hexagons



Regular hexagons, as well as irregular hexagons with 3 sets of parallel sides, can be used to create tiles that tessellate by translation and reflection.



Regular hexagons can be used to create tiles that tessellate by rotation.

