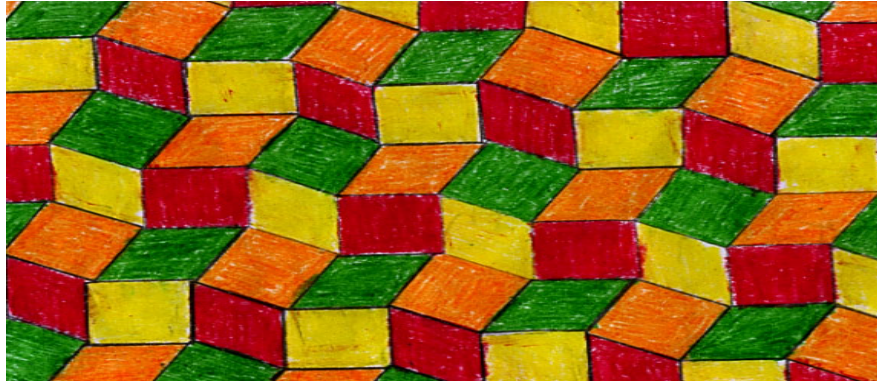


Tantalizing Tessellations

Exploring With Pattern Blocks and Templates

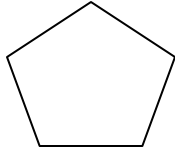


M.C. Escher (1898-1972), a Dutch artist, is best known for his work with tessellations. He derived his inspiration from the Islamic art in the Moorish Palace *Alhambra* in Granada, Spain (1922 and 1936). While fascinated with the Moorish mosaics, Escher made a significant departure from these abstract designs by including living things in his art such as horses (*Pegasus*, 1960), birds, and reptiles.

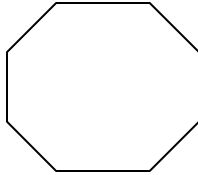
You will be creating designs called tessellations using transformations. With a little imagination and the use of color, you can tile the plane with your own “*tantalizing tessellations*” capturing the spirit of Escher.

Note: When you are asked to “tile the plane”, this infers a section of the plane as the pattern would continue endlessly unless bounded by a section of the plane.

1. Begin with the orange square from a set of pattern blocks and completely cover a section of a sheet of $8\frac{1}{2}$ "x 11" paper. Make a sketch of your tiling and record any transformations used.
2. Continue tiling a section of the plane ($8\frac{1}{2}$ "x11" paper) using each of the other pattern block pieces. Make a sketch of each tiling and record the transformations used in the process.
3. Imagine that you are tiling a floor with these pattern blocks. Which of the pattern blocks would tile the floor without any spaces or holes in the design?
4. Use the template below and patty paper or tracing paper to tile the plane with a regular pentagon. What do you observe?



5. Do you think that it is possible to tile a plane with a regular octagon? Why or why not? Validate your conjecture by using the template below and tracing paper. What do you observe? How can you explain the results?



6. What generalization can be applied to regular polygons that can tile a plane?
7. Do you think irregular polygons can tile the plane? To help answer this question, read page 430 of *Discovering Geometry* by Michael Serra (Key Curriculum Press).
8. Now combine two or more pattern blocks to form a pattern and use this pattern to tile the plane. Trace your design and color it to create a mosaic design. Describe any transformations used to tile the plane.
9. The repeated patterns used to tile the plane are called ***tessellations***.