

Tessellations That Use Rotations

Description: Students construct an irregularly-shaped tile based on an equilateral triangle, and then use rotation to tessellate the plane with it.

Technology Strength: By creating the tessellation and then dynamically changing the original tile, students get a deeper understanding of the what makes the tessellation work.

Objectives: Use rotation to tessellate; explore rotational symmetry

Prerequisites: Experience with equilateral triangles, translation, tessellation, and rotation

Suggested Grade Level: 9 to 10

Sketchpad Level: Intermediate

Suggested Duration: 45 minutes

Suggested Classroom Setting: Whole Class, Student Pairs. This activity, designed for use by student pairs, can be easily modified for whole-class use.

Preparation: Review the Activity Notes. Work through the steps on the worksheet and make a copy of the worksheet for each student. See the presentation sketch for an example of completed student work.

Materials: None

Student Worksheet(s): Tessellations That Use Rotations

Student Sketch: Tessellations Using Rotation.gsp

Presentation Sketch: Twisted Triangles Work.gsp

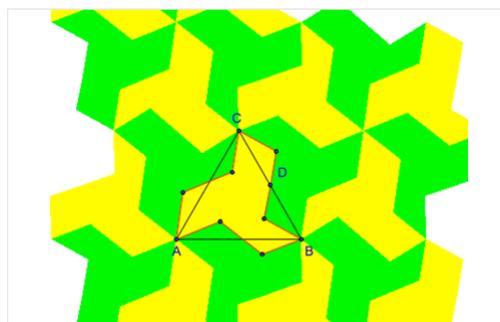
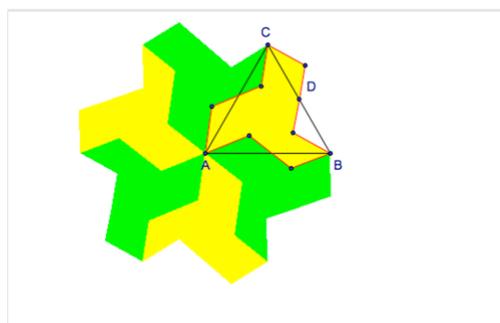
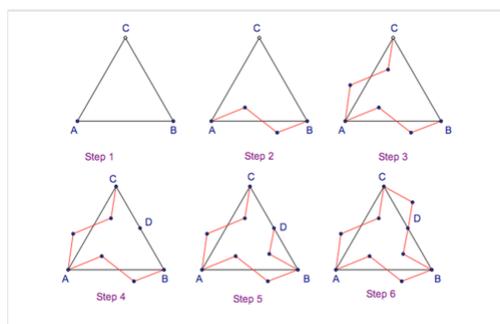
Vocabulary: Tessellate, tessellation, rotational symmetry

Sketchpad Version: GSP5

Using the Sketch:

Students construct an equilateral triangle, labeled ABC , and use rotation to construct an irregularly-shaped tile based on the triangle. Students mark point A as the center of rotation and rotate the tile five times by the appropriate number of degrees to surround point A with tiles. They then mark point D as the center of rotation, where point D is the midpoint of segment BC , and rotate the group of six tiles by 180° .

Next, students examine the tiles around various points and determine the rotational symmetry about these points. Finally, they use the appropriate rotations to fill in tiles around points B and C and then experiment with their tessellation by dragging one of the original vertices.



Sketch Tips:

Sketch Tips show skills needed in this activity, and the step at which the skill is first used.

Sketch Tip	Tip Sheet or Tip Video
Step 1: Use a custom tool from a different document	Using Custom Tools
Step 3: Rotate an object using Transform Rotate	Rotating and Dilating
Step 4: Construct a midpoint using Construct Midpoint	Constructing Points
Step 9: Color an object using Display Color	Changing Color
Step 11: Undo actions using Edit Undo	Undoing and Redoing