

Lesson Title: Tessellation Creation Using Excel

Curriculum: **Math – Geometry**

Grade-Level **6–8**
9-12

Prerequisites: Basic usage of the computer and Microsoft Excel.

Atomiclearning Video Lessons:

Mac: **Excel 2004: Part B #1, #3, #4 & #9**

Windows: **Excel 2003: Part G #1, #6, #12#, 13**

National Standards For Math

Grades 6–8

- **NM-GEO.6-8.1:** Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.
- **NM-GEO.6-8.2:** Specify locations and describe spatial relationships using coordinate geometry and other representational systems.
- **NM-GEO.6-8.3:** Apply transformations and use symmetry to analyze mathematical situations.
- **NM-GEO.6-8.4:** Use visualization, spatial reasoning, and geometric modeling to solve problems.

GRADES 9 - 12

- **NM-GEO.9-12.3** Apply Transformations and Use Symmetry to Analyze Mathematical Situations
- **NM-GEO.9-12.4** Use Visualization, Spatial Reasoning, and Geometric Modeling to Solve Problems

Washington State EALR Correlation:

Math:

Grades – 6–8 & 9-12: **2.1, 2.3, 3.14.1, 4.2, 5.1, & 5.2**

National Education Technology Standards for Students – Performance Indicators:

Grades 6–8: **4, 6 & 8**

Grades 9-12: **5, 7, 8 & 10**

Purpose:

Students will:

- understand the concept of tessellations.
- express that understanding by creating two tessellations.

Description:

Introduce tessellations to middle or high school class with this fun and hands-on computer lesson. The lesson can be taught during a discussion of symmetry (reflection, rotation, translation) and is best used as an introduction to tessellations.

Students can view the drawings of M.C. Escher at <http://www.mcescher.com/> (“*Symmetry*”), as well as online research, to deduce what tessellations are. Then each student creates tessellations from both regular and irregular polygons.

Activities:

- Make sure each student is able to create a tessellation with the chevron (regular polygon).
- Encourage students to try to make more tessellations using other basic shapes, such as circles, squares, hexagons, octagons, and so on.
- Have students record the results of their attempts – what shapes worked in tessellations and what shapes did not – and share the results with their classmates. Brainstorm with students why some shapes worked and others did not.
- Give students time to create uniquely shaped and colored polygons, and then explore why some of the irregular polygons might not have worked.
- Conclude the lesson by printing black and white copies of students irregular polygon tessellations and displaying them in class.

Tools and Resources:

- Student access to the Internet
- Student access to Microsoft Excel (and possibly a word processing program, such as Microsoft Word)

Assesment:

Students will be assessed on their:

- understanding of what a tessellation is; and
- understanding of why some regular and irregular polygons can be used in tessellations and others cannot.

Credits:

Atomiclearning