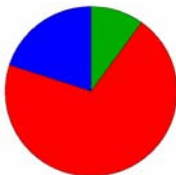


Transformational Geometry with Technology

Making a Hexatessellation		Grade 7
	<p>Description</p> <p>Students use <i>The Geometer's Sketchpad</i>[®] to make a tessellated design that has a regular hexagon as its base.</p> <p>This activity addresses the following grade 7 geometry expectations:</p> <ul style="list-style-type: none"> ▪ 7m56 - create and analyse designs involving translations, reflections, dilatations, and/or simple rotations of two-dimensional shapes, using a variety of tools (e.g., concrete materials, Mira, drawings, dynamic geometry software) and strategies (e.g., paper folding); ▪ 7m57 - determine, through investigation using a variety of tools (e.g.,... dynamic geometry software, ...), polygons or combinations of polygons that tile a plane, and describe the transformation(s) involved. 	<p>Materials</p> <p>Internet art gallery; GSP; Handout (directions)</p>
Assessment Opportunities		
<p>Minds On...</p>	<ol style="list-style-type: none"> 1. Visit one of the following on-line art galleries to look at selected works by M.C. Escher; in particular, look for the following titles in which he used a “hexatessellation” in order to make a tiled design: Reptilien (reptiles) (1943); Sun and Moon (1948); Interlaced Hexagon; Reptiles-Frogs; Symmetry Watercolor – Fish (2 versions); Symmetry Watercolor – Butterfly; <ol style="list-style-type: none"> a. http://www.artcyclopedia.com/r/imagenetion-mc-escher.html (most complete collection; preview collection first due to possible “nudity” concerns – may wish to show this site from one computer, e.g. using “Net Support” or digital projector to avoid students’ visiting what some might deem to be inappropriate images) b. http://www.artchive.com/artchive/E/escher.html c. http://cgfa.sunsite.dk/escher/index.html d. Discuss where the hexagonal “base” for each pattern might be (if projected onto a whiteboard, it could be sketched in atop the projected image; note that the hexagonal base is visible in “Reptilien”). 2. Review use of transformational tools in “Sketchpad”. 	<p style="text-align: center;">↻</p>
<p>Action!</p>	<ol style="list-style-type: none"> 1. Students retrieve file, “regular_hexagon.gsp” from shared drive. They may accept the size given, or adjust it. 2. Following the directions sheet, “Hexatessellation.pdf”, students make their own hexatessellation. Note: It is recommended that all students first duplicate the “elephant” design from the directions sheet, in order to build skill and confidence; afterwards, they can start from scratch or “undo” as far as desired and make extreme modifications to the sample. 	<p style="text-align: center;">↻</p>
<p>Consolidate Debrief</p>	<ol style="list-style-type: none"> 1. What other plane shapes can be used as the bases for this kind of tessellation? Must they be regular shapes or will anything do? 2. What happens if you make one “Wave” design and rotate it to all other sides? 3. With the particular method shown here, changes to the original image are not repeated in the others, as they might in some other tessellations. Why not? Is it possible to use other types of transformations to make the same design, but have the ability to repeat changes on all copies? 	<p style="text-align: center;">↻</p>
<p><i>Application</i></p> <p><i>Differentiated Exploration</i></p>	<p>Home Activity or Further Classroom Consolidation</p> <p>Try to duplicate, as far as the technology will allow, one of Escher’s lithograph designs using “Sketchpad.”</p> <p>Whenever art involving transformation geometry is mentioned, Escher immediately is held up as an example. Is it fair to always use him as an example?</p>	