

Creating a Mandala Using Tangrams

Mandala is a Sanskrit word that means "whole world" or "healing circle". From Native American and Tibetan sand paintings to Gothic rose windows and Hindu mantras, mandalas are used as symbols for meditation, protection and healing.

CSOs: G.3.14; G.3.18; TEC 9-12.1.2; TEC 9-12.3.4; RL11.2.1

Day One Introduce Tangrams and history. The original can be traced back to ancient Chinese culture. A set of tangrams consists of seven geometric shapes (two large triangles, one medium sized triangle, two small triangles, a square and a parallelogram). The word "tangram" originates from "Tang", which was a Chinese dynasty of 618-907 A.D. during which time printing and an interest in art were developed. "Tang" came to mean Chinese. Later "gram" was added, meaning "drawing".

Given a tangram pattern printed on cardstock (<http://mathforum.org> or www.strongmuseum.org), the student will cut out the pieces.

Given mirrors and graph paper, TSW place pieces of tangrams on graph, plot points, use mirrors to reflect and plot points; TSW utilize patty paper to translate.

Day Two Given the tangrams, TSW reflect, translate and rotate the pieces. Define and discuss symmetry. Brainstorm and list symmetrical figures in environment. Extra credit opportunity: bring to school an object from nature or life that is symmetrical. Due Day Five.

Day Three Using the computer lab and Geometer's Sketchpad (if your students are unfamiliar with the program, this activity may take an extra day in order to introduce the program) TSW translate, rotate and reflect geometric shapes. This is also an opportunity to show how Geometer's Sketchpad can measure segments and angles.

Day Four Utilizing the portable or computer lab, TSW research the word "Mandala". Suggested websites:
<http://standards.nctm.org/document/examples/Chap4/4,4/>; www.pbskids.org;
<http://mandalaproject.org>; <http://library.thinkquest.org/16661/escher.html>

Utilize colored chalk on a chalkboard or a large sheet of bulletin board paper to record individual definitions/impressions on the meaning of the word "Mandala". (We have found it spelled mandala or Mandala.)

Day Five Extra credit opportunity: symmetrical objects were shown to class. Examples included a butterfly, a leaf, and a quilt.

Introduce project by reviewing impressions from the websites. (We printed examples that we found online). Present the student with a rubric and directions on the parameters of the project. Our parameters included: must utilize one or more of the tangram pieces, can use colored pencils/markers/crayons or may use fabric, paper, tissues paper, water colors, etc. (from home). The student was also asked to include drawings/tracings/copies of pictures that represent important people, values, goals, etc. in his/her life. An additional requirement of the project was that the student was to utilize the writing process to create a 5-sentence paragraph that explained the design of his/her mandala.

The students were given a circle (attachment) that allowed the largest tangram to be reflected across the diameter.

The students were given practice paper to experiment with designs.

Day Six The students began working on the final design of their mandala projects. Designs not completed in class were assigned as homework.

Following a review of the composition of a good paragraph, the students began a rough draft of their paragraphs.

Day Seven Mandalas were cut out and glued to a variety of colors of cardstock. Rough drafts were peer and/or teacher-edited.

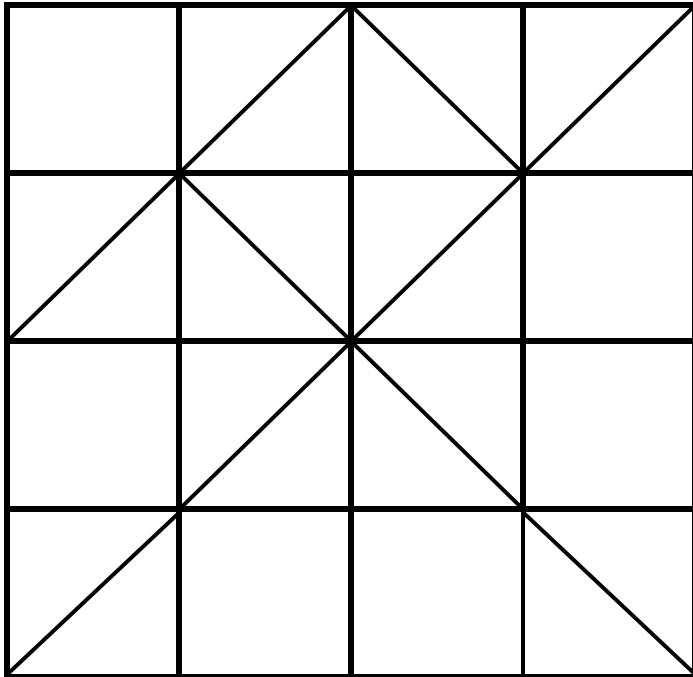
Day Eight Computer Lab - The students used Microsoft Word, 12 point, any font, given margins, and typed and printed their paragraphs. The paragraphs were glued to the cardstock with the student's mandala.

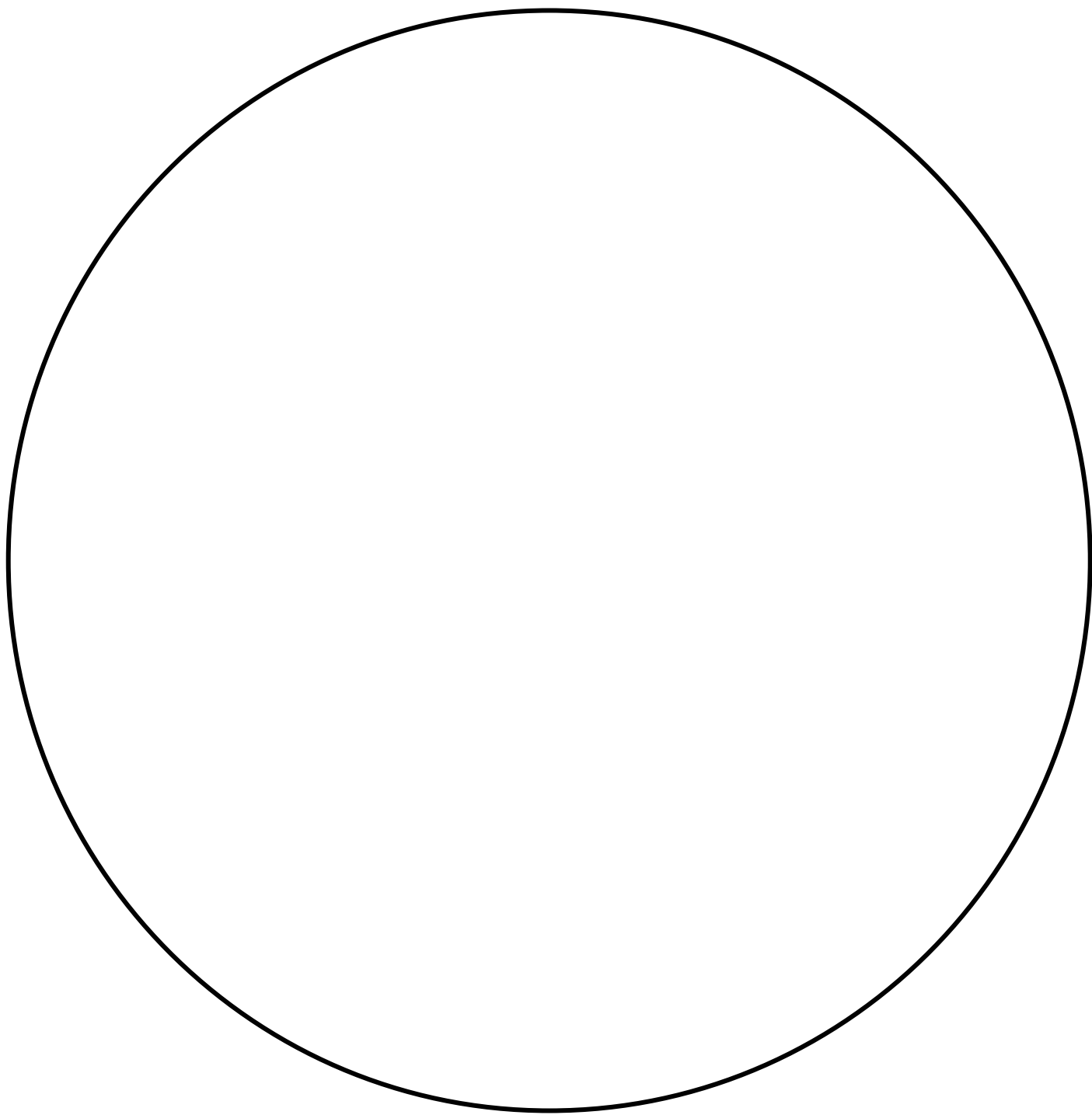
Day Nine The students presented and explained their mandalas to the class.

Enrichment: The mandalas can be utilized for a variety of activities including area and congruency. An internet resource that could be helpful is: <http://mathforum.org>

If you would like to explore Escher as part of this unit, investigate the Escher Museum at <http://cte.jhu.edu/techacademy/web/2000/heal/mathsites.htm>.

The website www.earthmandalas.com includes instructions for using Photoshop Version 4 or 5 to translate a slice of a digital photograph to create a mandala.





MANDALA PROJECT GUIDELINES

1. You may translate, reflect or rotate the tangram pieces to create a pattern within the given circle.
2. You may choose to include circles as part of your tessellating design.
3. Colored pencils and markers are being provided; however, you might consider completing preliminary pencil sketch work in class and completing the mandala outside of the given classroom time. Fabric, tissue paper, watercolors, etc. may all be used to complete the pattern. Be creative!
4. Include drawings/tracings/copies of pictures that represent important people, values, goals, etc. in your life. We assume that your family is very important to you. Please include representations of things other than your family.
5. Create a (minimum) 5-sentence paragraph (thesis statement, 3 supporting details, concluding sentence) that describes your mandala and the symbolism within it.
6. You will be graded on:
 - Utilizing tangrams (20 Points)
 - Translate/Reflect/Rotate (10 points)
 - Paragraph (10 Points)
 - Punctuation (10 Points)
 - Spelling/Grammar (10 Points)
 - Materials (5 points for pencil/marker sketch; additional points (up to 10 total points) for materials found outside of class).