TESSELLATION PROJECT DIRECTIONS

You are to create a tessellation portfolio. In addition to your portfolio, you will be making your own tessellation masterpiece. Your tessellation will be created based on specific criteria. You MUST follow the guidelines given in order to receive full credit. The tessellation will be constructed on white poster board size 14" x 22" or larger. Your grade will be based on the following:

Portfolio Items	
Four examples of man-made tessellations	(4)
Three examples of tessellations in nature	(3)
Three examples of Escher tessellations	(3)
Escher Essay (1-2 page paper and reference page)	(15)
Tessellation Creation	
Pattern tessellates the entire poster	(5)
Template with modifications turned in	(5)
Appearance, neatness, guidelines followed	(5)
Creativity/Originality/Complexity	(10)
Total Points	(50)

Part 1 – Tessellation Examples

My first suggestion before you start to put your portfolio together is that you do some research on tessellations. Find the actual definition of a tessellation, identify the properties of tessellations, and take a look at the history of tessellations.

You will need to find four examples of man-made tessellations. Examples can be actual items such as wallpaper, floor tiling, carpet, an artist's work (non-Escher), etc., or they can be magazine or online printouts (color).

Additionally, you will need to find three examples of tessellations in nature. Again, this can be either an actual item or it can be a magazine or online printout. Another possibility (which could be kind of fun, actually) would be to take a photograph (digital or otherwise) of a tessellation occurring in nature and include your printed photo.

Finally, you will need to find three examples of artwork done by M.C. Escher, utilizing some method of tessellation. These can be found online or in print material.

Part 2 – M.C. Escher Paper

You are to write a 1-2 page paper on the Mathematical art of M.C Escher. Your paper should include

- His background. Who is M.C. Escher? Where he was born? What was his education? Etc.
- Escher's contributions to art and mathematics. How does he integrate Mathematics with art?

The paper should be typed, 12 point font, Times New Roman, double spaced, with 1 inch margins. *In addition* to the 1-2 pages you are to have a reference page of the websites or books you used to write your essay. Spelling and grammar count! Any papers that are simply copied from a source will receive zero points.

Part 3 – Create your own Tessellation

The appearance of your tessellation should be neat! I am looking for a strong, vibrant design that is **original**. You may not recreate one that you saw in your research. Your tessellation (pattern) should cover the ENTIRE poster (no gaps or unintentional white spaces). You are to turn in the template figure you used to create your tessellation. Coloring should be in between the lines, and no wrinkled or torn projects will be accepted. Your project will also be based on creativity and difficulty. The more difficult and complex the tessellation is, then the higher the grade. You may not simply take a polygon and slide, rotate, or reflect it over and over again to create your tessellation. You **must** use a template created with one of the nibbling methods (described on pages 3 and 4).

What to do

1. Begin by creating a "template" using at least 1 of the nibbling methods. Be sure to label all the pieces. See me if you're not sure if your template will work. Index cards work best.
2. Once the template has been created, place your template at any of the four corners of your poster board and trace your first figure. Since it will no longer have square edges, you will need to let it hang off the edges of the poster board to get it started.
3. Once your figure has been traced, translate it or rotate it and trace your next figure (whether you translate it or rotate it depends on the nibbling technique you used).
4. Continue step 3 until the entire page is covered. All your figures on the paper should fit together so that it looks like a puzzle. Figures at the edge will only be partial images
5. Once you have the page covered in your tessellation, begin to add color in the figure. The figured can be animated as well, meaning you created a familiar image rather than just a design.
6. Be creative and have fun with the project!

**Remember the more creative your tessellation is the more points! Further instructions and advanced methods can be found at www.tessellations.org.

<u>WHAT TO TURN IN</u>

- ✓ Cover page (with Title, Name, Period)
- ✓ Portfolio items
- ✓ Escher Essay (1-2 pages typed)
- ✓ Tessellation Creation with template
- ✓ Scoring sheet (at the end of this packet – fill in top part)

This project is due **<u>Thursday February 16th.</u>**

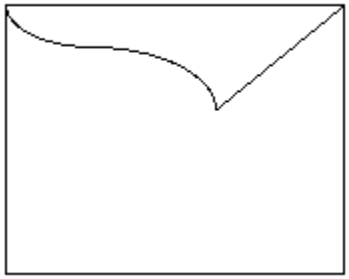
***All late projects will be deducted 5 points for each day that it is late. <u>No project will be accepted after Thursday February 23th, unless specific arrangements are made.</u> ***

CREATING YOUR TEMPLATE

METHOD 1: *The translation nibbling technique for geometric transformations:*

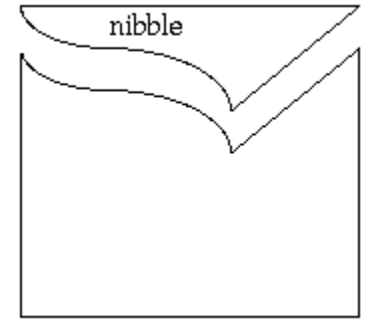
1. Begin with a square and design from one corner of the square to an adjacent corner. (Do not draw diagonally). Do not stop halfway across!

1



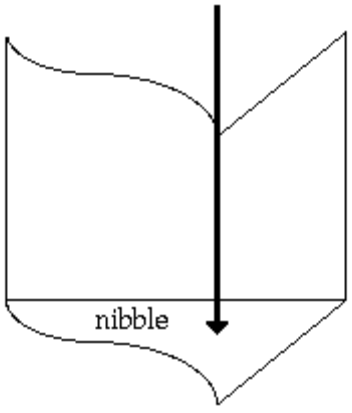
2. Cut on the design line, being sure to have 2 pieces when done -the nibble and the rest of the sheet. There should be no other pieces laying around. **This is very important! No trimming allowed.**

2



3. Slide the nibble across the sheet to the opposite side and tape the straight edges together. (Do not attach it to an adjacent edge. Do not flip the nibble around. Do not overlap the edges when taping.) The corners of the piece and the nibble should match perfectly.

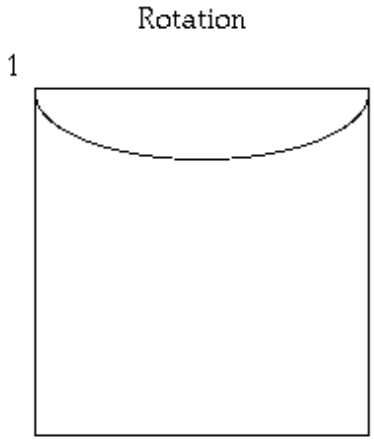
3



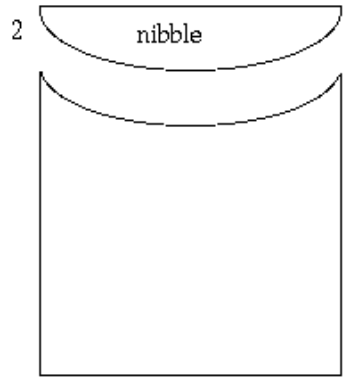
4. Repeat the procedure for the other sides.

METHOD 2: *The rotation nibbling technique for geometric transformations:*

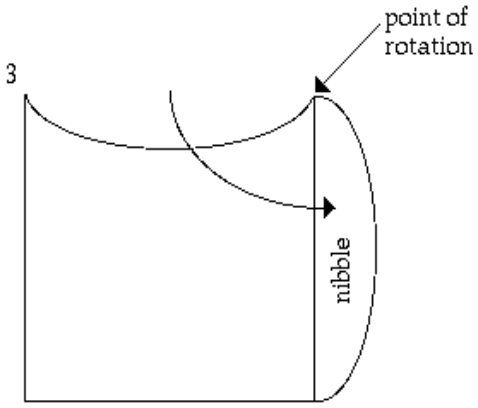
1. Begin with a rectangle and design from one corner of the rectangle to an adjacent corner. (Do not draw diagonally). Do not stop halfway across!



2. Cut on the design line, being sure to have 2 pieces when done -the nibble and the rest of the sheet. There should be no other pieces laying around. **This is very important! No trimming allowed.**



3. Instead of sliding the nibble, rotate the nibble at its end point to an adjacent side of their square (not an opposite side). Mark your point of rotation and tape the straight edges together. (Do not overlap the edges when taping.) The corners of the piece and the nibble should match perfectly.



4. Repeat the procedure for the other sides

Scoring Guide

Name _____ Period _____

Portfolio:

Four examples of man-made tessellations are included	_____/4
Three examples of tessellations in nature are included	_____/3
Three examples of Escher tessellations are included	_____/3
Escher essay:	
Background	_____/5
Contributions to art and mathematics	_____/5
Spelling, grammar, guidelines followed	_____/3
Reference page	_____/2

Tessellation Creation:

Pattern tessellates the entire poster	_____/5
Template with modifications turned in	_____/5
Appearance, neatness, guidelines followed	_____/5
Creativity, originality, complexity	_____/10

Total _____/50