

MA110 – Mathematical Explorations – Spring 2013 Pattern Poster Assignment

What is a poster? Poster Sessions are used to publicize, announce, and/or present the results of research investigations. They are widely used in professional conferences (including virtually all conferences for mathematicians and scientists), college and university courses, and meetings of all kinds. They are useful because many posters can be displayed without the time and space limitations that traditional presentations impose. Additionally, it makes it easier for participants to browse and find research of interest.

What are our posters about? We will be studying patterns for much of this course. I have shared several different types of patterns with you already and will continue to throughout the course. But we need to have a more detailed, permanent collection of patterns: we need to create a library of patterns which will serve in many ways as a text for the course. We will build this library together with the help of our posters. For your poster you are to choose one particular pattern that you are interested in. For this pattern you must:

- ∞ Describe the pattern in detail, using a variety of different representations as appropriate.
- ∞ You must describe, precisely, what makes the object you have chosen to study a pattern, describe what type of pattern it is, etc.
- ∞ You must describe why this pattern is of interest to you and may be of interest to others.
- ∞ You must describe the importance of this pattern – why it appears, what it signifies, how it evolves, etc.
- ∞ You must describe how this pattern can be analyzed, represented, applied, adapted, and/or related to other patterns of interest. You are free to choose topics whose mathematical analysis is much more sophisticated than you and I can currently understand – this is a survey poster. Indeed, I would encourage you to choose a topic vivaciously – the more interesting the better.
- ∞ You must give several references where the interested reader can find more information about this pattern. This should include not only print and Internet references, but also interactive online programs, methods and/or tools for constructing this pattern physically, museums where the patterns can be observed, etc.
- ∞ A history of the development and/or genesis of this pattern.

Library of Patterns: This course is a course about patterns. We are building a library or museum of patterns that will help enrich our study of patterns.

Purpose of the posters. There is little debate that patterns play a central role in all of mathematics. Despite this, the role of patterns is often overlooked. Our purpose in making these posters is to celebrate both the centrality and diversity of mathematical patterns in the world around us. We would like to create a museum of patterns that will inspire our analysis of patterns in this course and will help others to see the fundamental role of patterns in our world.

Throughout this course we will have a variety of quotes from famous mathematicians and educators about patterns. Keith Devlin's is perhaps the most pointed: "Mathematics is the science of patterns."

Critical policy documents from the The National Council of Teachers of Mathematics, the largest organization of mathematics teachers in the world, makes patterns a central part of their curricular recommendations. They say:

There is no area in which the study of patterns is as fundamental as it is in mathematics. Mathematicians observe patterns; they conjecture, test, discuss, verbalize, and generalize these patterns. Through this process they *discover* the salient features of the pattern, *construct* understandings of the concepts and relationships, *develop* a language to talk about the pattern, *integrate*, and *discriminate* between the pattern and other patterns. When relationships between

quantities in a pattern are studied, knowledge about important mathematical relationships and functions emerges.

Patterns and Functions: Addenda Series 5 – 8 of the Curriculum and Evaluation Standards,. NCTM, 1991, p. 1.

Mathematics can be characterized as the science of patterns... Patterns should be part of every mathematics course at all grade levels. The study of patterns provides both motivation and relevance to the elementary school child's involvement with mathematics.

Patterns: Addenda Series K – 6 of the Curriculum and Evaluation Standards,. NCTM, 1993, p. 1.

Patterns are central to any study of mathematics. Our posters will help us see this in vivid detail.

Poster presentations. All posters will be hung in the 4th floor hallways of Wilson Hall. All posters are due on Wednesday and will be displayed at least until Friday afternoon. You must either meet with me or make arrangements so your poster is displayed appropriately prior to the beginning of Wednesday's class. The posters will be hung from two screws that are exactly two feet apart using clips that I will provide for your posters. All posters must include the author's name on the front.

Poster Subject. Your topic must be original. Resubmitting somebody else's work as your own is a violation of college policies on academic honesty and will be dealt with severely. Moreover, I want a diversity of subjects. No more than a single posters on a given topic area (e.g. Fibonacci numbers, fractals, tessellations) will be accepted.

Damage disclaimer. Because of the public nature of the display of the posters, they are vulnerable to vandalism. Students who are not willing to take the small risk that the suggested means of display of their posters entail must contact me well in advance about alternative arrangements.

Requirements. The due date for your poster will be announced early in the course.

- Two weeks prior to the due date you must submit, in writing, a brief proposal which identifies the subject of your pattern poster. You should keep a copy of your proposal.
- Prior to submitting this proposal you must check to insure that nobody else has the same subject, by looking on the lists on Prof. Fleron's door, and once the proposal is accepted you must add your subject to this same list. The list will be available Monday, 11 February at 8 a.m.
- You cannot do a topic that we have or will be covering in detail in this course. If you have questions, please be sure to ask.
- One week prior to the due date you must submit, in writing, a more detailed proposal about your project. It should contain several references, layout and content ideas.
- Your poster must include a list of references either on the front or the back. These references must be diverse, they cannot simply be a few obscure Internet sites. Internet sites should be reputable and you must include several references beyond the Internet.
- Normal rules regarding appropriate referencing and citation must be followed. I.e. every passage you use that you have not written must be quoted and appropriately cited.
- Your poster must be original. You cannot simply cut and paste passages from reference materials and glue them to posterboard.
- You must assess the posters of at least ten other students and these assessment reports must be submitted with your final report.
- Your final self-assessment report must include a tabulation of the scores you received and must conclude with a suggested letter grade (on the standard A+ - F scale) for your poster.

Assessment criteria. Assessment, on a scale of 1 - 5, will be used to reflect how well each poster achieved each of the following:

- ∞ An interesting, engaging, and/or important choice of pattern which adds vitality and breadth to our Library of Patterns.

- ∞ An informative and accessible description of this pattern, discussion where the pattern arises, description of the importance of this pattern, why this pattern is of interest to you and others, the pattern's impact, applications of this pattern, and the genesis of this pattern.
- ∞ An accessible survey of the mathematical analysis of this pattern, including as many of its representations as appropriate. This is the more mathematical portion of your poster.
- ∞ An appropriate collection of additional information interested readers can use to pursue the topic in greater depth. These may include: book, journal, audio, video, and other media and multi-media citations; Internet resources; reviews; museum holdings; event dates; etc.
- ∞ A physical construction of a high quality poster, including: appropriate design, pleasing visual layout, effectiveness, appropriate mix of media and information, effort, etc.

Assessment. Using the criteria above, your poster will be assessed by peers in your class, by Prof. Fleron, and by yourself.

Peer Assessment – Each student is required to assess the posters of at least ten other students during the course of the semester. For each poster that you assess you must completely fill out an assessment form, including written comments. One copy of this assessment form is to be submitted to the author. Duplicate copies are to be kept by the assessor until the end of the semester when they will be turned in to Prof. Fleron. Peer reviews will be blind – the author of the poster will not know the identity of the reviewers.

Self Assessment – After your poster has been removed from the presentation you are to read all of the assessment forms and comments that have been submitted. You must tabulate all of the scores submitted on all of the assessment forms. Based on this feedback and your own evaluation of your work, you are then to write a brief one- to two-page report which critiques your poster, suggests a final grade for your poster (on the standard A+ - F scale), and provides rationale for your grade determination.

Assessment by Prof. Fleron – Based on peer feedback and your report, Prof. Fleron will assign a final grade for your poster. This grade will be included on your report when it is returned to you.

Peer assessment will not work unless everybody participates. Students who do not assess at least ten other posters and turn the corresponding assessment reports in to Prof. Fleron will receive a failing grade on their poster.

References and resources. There are many places to find information about posters in general. Some are listed below. In terms of topics for patterns, I am not aware of broad, accessible resources – that is one of the reasons we are doing the posters. I will continue to bring ideas and possible resources into class. As you find others, bring them into class and we will share them.

Information on Posters

For more information on posters, the following Internet sites may be useful:

<http://writing.colostate.edu/guides/speaking/poster/>

<http://www.awm-math.org/workshops/posters.html>

http://www.kumc.edu/SAH/OTEd/jradel/Poster_Presentations/PstrStart.html

Poster Checklist

- I know the due date of my poster.
- I checked that nobody else has chosen the same pattern topic that I have.
- I handed in my poster proposal two weeks prior to the due date.
- I handed in a more detailed proposal one week prior to the due date.
- My name is on my poster.
- I put a comment envelope on my poster.
- There is a bibliography of references I used on the front or back of my poster.
- I found Prof. Fleron on the due-date and helped him hang up my poster
- I reviewed at least ten other posters from our class.
- I submitted a poster report that included
 - Average scores in each of the five categories in my report.
 - A discussion of the feedback that I received on my poster.
 - A discussion of the grade that I believe I should receive on my poster.
 - A clear statement of the letter grade (A+ - F) that I should receive on my poster.
 - Both the 10 poster evaluations forms that I filled out and the 10 that were filled out by my peers for my poster.