

PreCalculus Final Project 2009: Mathematics in Nature

Is mathematics discovered or invented?

Choose a topic about how mathematics is evident in nature. Describe the mathematics that your topic illustrates. Why does your topic follow this pattern? Does anything else? Everyone must pick a different topic and sign up. First one signed up wins!

Potential Topics

Crystals and 3D geometry

Kaleidoscope patterns and diatoms

Honeybees

Starfish

Nautilus shells, pinecones, sunflowers and the Fibonacci series

The golden mean

Snowflakes, fractals

Sources

What Shape is a Snowflake? Magical Numbers in Nature, Ian Stewart, 2001. (Clemens and VandeWater have copies.)

The Parsimonious Universe, Shape and Form in the Natural World, Hildebrandt and Tromba, 1996. (SLU Science Library)

Math Forum, the best starting point for any mathematical searches www.mathforum.org

Gallery of Mathematics in Nature and Art

http://www.whitakercenter.org/science/exhibits/math_art.asp

Your task

Present an oral presentation to the class (10 minutes.) Make sure you use a visual aid, for example, a video or a Power Point presentation. [Power Point tip: use dark letters on light background – it shows up better on the computer projector.] If you have a physical object for your visual aid, you will be showing it with document camera—practice ahead of time to be sure everyone can see it. If you will be showing any internet resources, please talk with me about downloading resources prior to your presentation. If the internet is down, you still present! Be prepared! Have your computer files on a USB key so you can use my login.

Be sure to use the rubric as a checklist to prepare your presentation.

Hand in a 1 – 2 page summary paper that includes a bibliography at the beginning of your presentation.

PreCalculus Final Project 2009

Name _____

Score _____

Topic and Notes

0	-	√-	√	√+	+
Not done	Below standard on a major point or a major mistake	Below standard on a minor point or a small mistake	Meets standard, all areas correctly performed	Above standard on a minor point or in small way	Above standard on a major point or in an impressive way

Criteria	
Topic chosen is about a connection between mathematics and nature. Originality: everyone must choose a different topic or a different aspect of a topic (10 points)	
Quality visual aid(s): shows time, effort and creativity (10 points)	
Vocabulary use: correct terminology (new vocab is a plus) (10 points)	
Complexity: you should demonstrate that you learned something new about mathematics (MS math is a minus, HS math is a check, something we've never done in HS is a plus) (10 points)	
Mathematics: you need to explain/discuss/describe the mathematics that is involved in your topic. Why does your topic follow this pattern? Does anything else? (20 points)	
Expertise: learn enough about your topic to answer questions from your audience (your classmates and me) (10 points)	
Class Presentation: organized, clear, interesting voice and manner (do NOT read your paper) (10 points)	
Bibliography: list your print and web sources, use MLA format (see Ms Wilson in the LRC if you need help) (5 points)	
Paper: neat, clear, typed summary with equations as appropriate, includes images, watch spelling! Handed in before your presentation. (10 points)	
Timeliness: you will lose points if you are not prepared or absent (-10 points), including absent during class presentations by classmates (-5 points per period/ -10 points for a double period)	

95 is the baseline score—met the standard in each category. If you want a higher score, be prepared to impress me!

