**PROJECT OPTIONS**

**Mathematical Poems**

**Topic:** Sequences

**Directions:**
Create a total of 5 poems.

Have one of the poems be a Fibonacci Poems. A Fibonacci poem is a poem that is similar to a haiku but where the number of syllables on each line of the poem equals the total number of syllables in the preceding two lines (ie: 1, 1, 2, 3, 5, 8, ...).

Create two numerical sequences. Create a poem for each of these sequences in the same manor that a Fibonacci poem is created from the Fibonacci sequence.

Let one of the poems be a poem about a mathematical topic, such as a rhyme to help you remember a specific math rule or a poem just mentioning a math topic.

For the last poem, choose which type of math poem you would like to write, whether it is a poem with a mathematical structure, like the Fibonacci poem, or whether you want to write a poem about a mathematical topic.

**References:**
- Definition of Fibonacci Poems: [http://whatis.techtarget.com/definition/0,,sid9_gci1182708,00.html](http://whatis.techtarget.com/definition/0,,sid9_gci1182708,00.html)

**Examples:**

**Math as you like it**

Do you yearn for multiplication  
You can do without frustration?  
Does it please you not to carry in your head?  
Do you wish some court decision  
Would abolish long division?  
Do you look upon remainders with some dread?

**Zero Factorial**

Man has pondered  
Since time inmemorial  
Why one is the value  
Of zero-factorial.

**The Mobius Strip**

A mathematician confided  
That a Mobius band is one-sided.  
And you'll get quite a laugh  
If you cut it in half,  
For it stays in one piece when divided.
PROJECT OPTIONS

Tessellations & Mosaics

**Topic:** Geometry & Tessellations

**Directions:**

A hotel franchise is building a new hotel. The owner is a huge fan of M.C. Escher. He has hired you to design the look for the lobby of the hotel, the hallways, and rooms. Since he loves Escher designs, he wants to tile the lobby floor with a semi-regular tessellation, and he wants the walls to have tessellation(s) on them.

While he would love to have actual Escher tessellations on all the surfaces, due to costs, he has asked you to design the tessellations. To keep in line with the rest of the franchise, he needs to have either a sea theme throughout his hotel. Also, to make sure that his customers will come back to his hotel, he needs the tessellations to coordinate and not clash in color or design.

So what you will need to do is to come up with at least 3 tessellations: a semi-regular tessellation (for the lobby floor) and two which are artistic tessellations (for the walls). Note: you can create more tessellations and/or more design features. Bottom line is that you are designing the look for a hotel lobby, what the hallway should look like, and what a model room would look like.

**References:**

Our class website
http://math.uncc.edu/~sjbirdso/problemsolving/
There is a long list of resources at the bottom of the Geometry & Tessellations page.
North Carolina License Plates

**Topic:** Probability & Problem Solving

**Directions:**

Standard, non-specialty North Carolina license plates have the following layout: 3 letters, a dash, and then 4 digits.

How many standard license plates can the DMV offices distribute? Assuming that a license plate can hold at a max of 9 characters, how many specialty plates are possible? What is the approximate population of NC? Approximately, how many cars in NC need license plates? How did you come up with this number?

What should the state of NC do once we reach the max number of plates available? Have other states been in this situation? If so, what have they done? Using the currently population as a guideline, when do you expect NC to need to implement your plan.

Is your plan feasible? (ie: Who will enforce it? How much will it cost? Where will the funding/labor come from? What is your timeline?)

**References:**

US Census Bureau (for population information)
http://www.census.gov/
NC DMV
http://www.ncdot.org/dmv/
Obituaries

**Topic:** Probability & Statistics

**Directions:**

Record the deaths in Charlotte, New York City, and Washington DC from this week as recorded in the newspapers listed below. For each person, list their gender, age, type of death, the weather of the day, and any other info you consider pertinent. Do not record their name.

Using the data you recovered, do you notice any trends in the data? Which of the 3 cities has the highest death rate (notice you’ll need each city’s population to answer this question). Does weather seem to have any effect on how many people die? Is it more likely for a woman between 45 and 50 to die or a man between 35 and 40? In which city are people between 20 and 30 more likely to die? What is the expected age for a person to die in each of the 3 cities? What is the expected age of person to die who lives in any of the 3 cities?

**References:**

The Charlotte Observer
The NY Times
The Washington Post
Stock Market Trends

**Topic:** Probability & Problem Solving

**Directions:**

Track the Stock Market for the next week. Track what happens to the New York Stock Exchange as a whole (overview/composite). Also, track what happens to the Dow Jones, S&P 500, and Euronext 100.

For each day, what is the index with the most increase? With the most decrease? For the week, what is the index with the most increase? With the most decrease? Is there an index that seems the most stable? The most unstable? Are there any spikes or plummets in the data? What is the expected value for the market?

Using the data you collected, would you say that the stock market is going up or going down?

**References:**

New York Stock Exchange
PROJECT OPTIONS

Horoscopes

**Topic:** Probability & Problem Solving

**Directions:**

Record the horoscopes for the next week from the Charlotte Observer. For each day, make up your own horoscopes.

Each day survey at least 10 people (the more people you can survey, the better your data will be). You will need to survey several types of people: people who don’t know the horoscopes of the day, people who do the horoscopes of the day, and people who know the horoscopes that you made.

Do any of the horoscopes accurately predict what happened to the people you surveyed? If the people knew what the horoscopes were at the beginning of the day, was it more likely that the predictions would be accurate? even the horoscopes you created? If the people surveyed didn’t know you made the horoscopes were they more likely to believe those horoscopes? Which type of horoscopes do people like better: vague ones or specific ones? The ones from the Charlotte Observer or the ones you made up?

**References:**

The Charlotte Observer  
http://www.charlotteobserver.com/entertainment/horoscopes/
Mind Puzzlers

**Topic:** Problem Solving

**Directions:**

Create your own Mind Benders puzzle.

Have 6 people (first & last names). Pick 3 things about these people, such as a favorite color, favorite food, what job they have, what pet they have, what type of house they live in, etc.

Decide these people’s first and last names and the specific items which go with each person. Now, create clues that will let others solve your puzzle. Be careful to make enough clues so that your puzzle is solvable, but not too many clues so that the puzzle is solved too quickly.

**References:**

Class website:  
[http://math.uncc.edu/~sjbirdso/problemsolving/](http://math.uncc.edu/~sjbirdso/problemsolving/)

Problem Solving section:  
Mind Benders & Math Mind Benders
Toll Roads

**Topic:** Problem Solving

**Directions:**

A number of states don’t have a road tax (or at least not a high road tax) to pay for new highways and road repairs; but instead, some of their highways are toll roads where the collected toll is then used to pay for the roads.

What are the advantages to having toll roads instead of a separate road tax? What are the disadvantages? In NC, where is the road tax collected? How much is it?

Would having toll roads in NC be a good idea? Why or why not? How and where would the state put the toll roads? Would having toll roads save local residents money in the long run?

Is there an alternative to the current road tax situation and to toll roads? What would your plan be? Is your plan feasible? (ie: Who will enforce it? How much will it cost? Where will the funding/labor come from? What is your timeline?)

**References:**

The NC Department of Transit
http://www.ncdot.org/