G-TEAMS: St. Michael's Parish Day School

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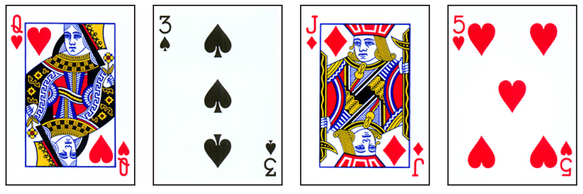
Our Goals

Jennifer and Matt are hoping to introduce concepts and lessons that will challenge mathematically inclined students, pique the curiosity of students that were previously uninterested in mathematics, and expand the students overall idea of what mathematics is.

Problems of the Week

Every Monday students are given a problem of the week that they have until the following Monday to solve. These problems are designed to be fun and interesting, while pushing the students problem solving and reasoning skills. Below was one of their favorites:

At lunch time Mrs. Gould asks if you and four of your friends would like to play a card game. You and your friends agree and she deals one card from a 52 card deck of playing cards to each of you face down. Mrs. Gould tells you and your friends to pick up the card without looking at it and hold out so that you cannot see your own card, but you can see everyone else's. You see that your friends have the following four cards:



Mrs. Gould then proposes a bet, "If any of you can tell me if your card is red or black, you will get an A in my class. However, if you are incorrect, you get an F."

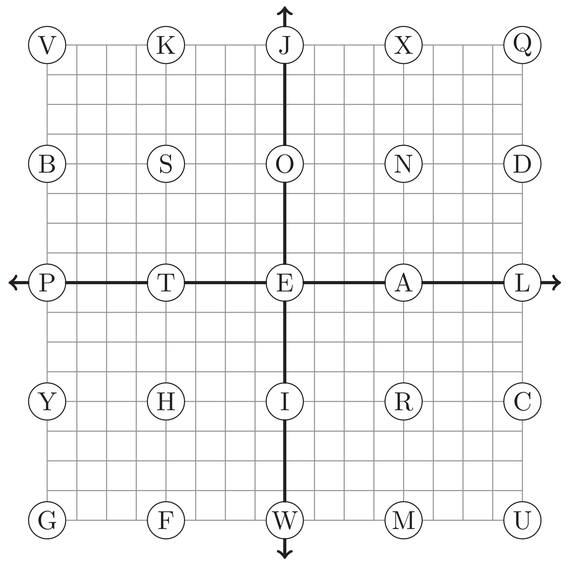
You and your friends have no idea, so you remain silent...

After a few seconds of silence Mrs. Gould asks, "What if I told you that one of you has a black card. Now can any of you tell me what color your card is?"

Even with this hint, your friends remain silent. ***What color is your card***?

The Coding Theory Game

Jennifer and Matt created the "**Coding Theory Game**" where students use the coordinate plane to encode and decode secret messages in a way analogous to that used by algebraic coding theorists in modern day digital communications.



Introducing Carl Gauss

Students were told the story of how a 10-year-old Carl Gauss was able to sum the first 100 integers in only a few seconds. They were then asked to find their own clever way of summing the first 100 integers.

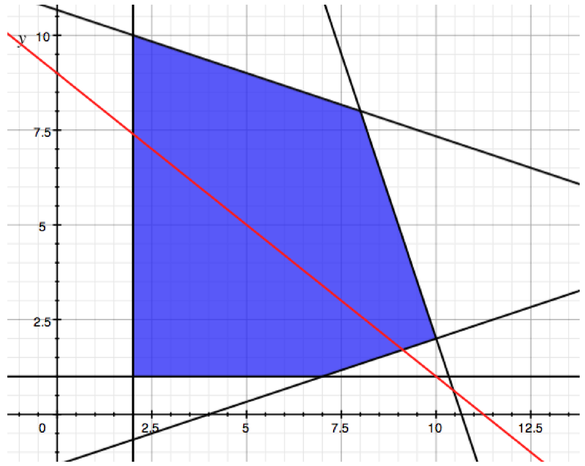
Finding a clever solution to a problem is now referred to as "**Gaussing it**".

Operations Research

> "*You have just been hired by Sean Miller, the head basketball coach at the University of Arizona, he would like you to help him determine the best way to utilize his talented guards Momo Jones and Jordin Mayes...*"

Students were given one of three scenarios: a hedge fund manager trying to determine an optimal investment strategy, a baker at Beyond Bread trying to determine how many loaves of Focaccia and Ciabatta to bake, or an assistant to Sean Miller trying to determine how many minutes to play Momo Jones and Jordin Mayes.

Using their knowledge of linear equations as well as two variable inequalities and their graphs, the students were able to determine the solution to their scenarios. The method employed is a simplified version of the simplex algorithm, a powerful tool used by countless companies from a wide range of industries to optimize their resources.



Monday Math Mania!

Outside of the classroom Jennifer and Matt have created a non-competitive math club. This club, which meets every Monday after school is called "**Monday Math Mania**" and gives the students a chance to tackle additional challenging problems and explore any mathematical ideas they might come up with in a fun collaborative environment.

Jennifer and Matt have created a Monday Math Mania website containing fun and challenging math problems, an archive of the weekly newsletter, as well as profiles of famous mathematicians.

www.stmichaelsmathmania.net

Family Math Night

November 10th was Family Math Night at St. Michael's, with over 140 students and their parents participating. The night began with a talk on some of the ways in which math shows up in unexpected places in nature. After the talk the students and their parents rotated through six stations of mathematical activities.

Newsletters

Every two weeks a newsletter is distributed to Jennifer's math classes. The newsletter contains a math related article as well as several "**star problems**". Past newsletters have included articles on such topics as Fermat's Last Theorem, the Monty Hall problem, and the math behind cloaking devices.

Students that submit a correct solution to a star problem have their name printed in the next newsletter. Below is one of the more challenge star problems.

($\star\star\star$) If $x^2 + y^2 = 15$ and $xy = 5$, what is $x + y$?