## Math Club 5

- Math Club for Grades 4-6
- Develop creative problem-solving skills.
- Students participate in MOEMS Math Olympiads.
- Introduce advanced mathematical concepts in probability, combinatorics and codes and ciphers.
- Students immerse in mathematics by working on an investigative project.

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## MOEMS Math Olympiad

- Math Olympiads for Elementary and Middle School (MOEMS).
- Strengthen problem solving skills.
- Practice problems in-class.
- Olympiad packets for practice.
- Five contests, held once a month, from November through March.
- All Math Club students are invited to participate.



## Advanced Math Concepts - Probability

- Counting principles, permutations, combinations, partitioning.
- Basic probability concepts.
- Bernoulli and binomial trials.
- Experiments with dice and coins.
- Experiments illustrating law of large numbers.
- Story of Jacob Bernoulli.



## Advanced Math Concepts - Codes and Ciphers

- Reduce numbers modulo a positive integer.
- Convert numbers from decimal to base-26.
- Kids-RSA: middle school version of encryption and digital signature.
- Story of Ramanujan



## Investigative Projects - I

- Investigate and prepare a presentation on a mathematical concept or the life of a famous mathematician.
- Students work in teams of three.
- Students present their work to the class and the parents.


## Investigative Projects - II

## EDUCATION

- Newton went to Cambridge, but he let Cambridge because - Newton was a bad student when
- Newton was a ba

His original parents sent
him to the clark's family
to go to school.
EWTONS 3 LAWS
Every object that is in
Every
motion stays in motion
unless acted on by an outside
force.
Force $=$ Mass $*$ Acceleration ( $F=m a$ )

Every action has an qual and opposite reaction.


## Investigative Projects - III



## Investigative Projects - IV



## Investigative Projects - V



## Investigative Projects - VI



## Investigative Projects - VII

## Complete Graphs - K3

In a $k_{3}$ complete graph, there are three vertices. Each point is connected by an edge to every other vertex. The graph to the right has a complete graph and a monochromatic triangle. A monochromatic triangle is a triangle that is created in the same color. The rightmost triangle is a monochromatic triangle and was created using red, only one color. The left triangle is not a monochromatic triangle and is created in both red and bue. In $k_{3}$ graphs, it is possible to avoid a triangle in one color-monochromatic triangle.


## Investigative Projects - VIII

## History of Cipher

Cryptography and Cipher.
The earliest known records of cryptography is around 1900 BC. The Egyptians carved hieroglyphs onto a wall of a tomb.

Around 486 BC in Ancient Greece, Spartan warriors would carry scytales to send messages in the battlefield so their enemies wouldn't know what there were doing or saying.


## Fun Stuff - Games



## Fun Stuff - Movies



