

# 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.

Instructor: Vibha Mane

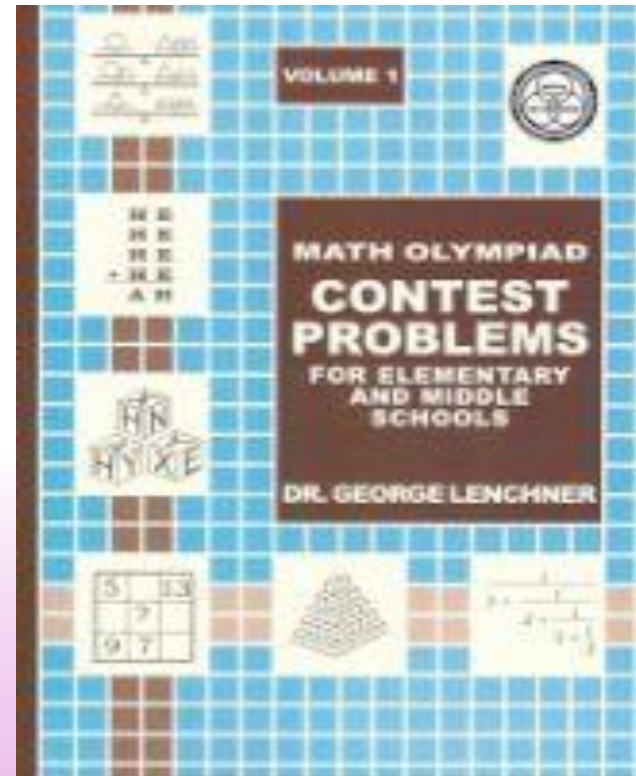
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# MOEMS Math Olympiad

- ▶ 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

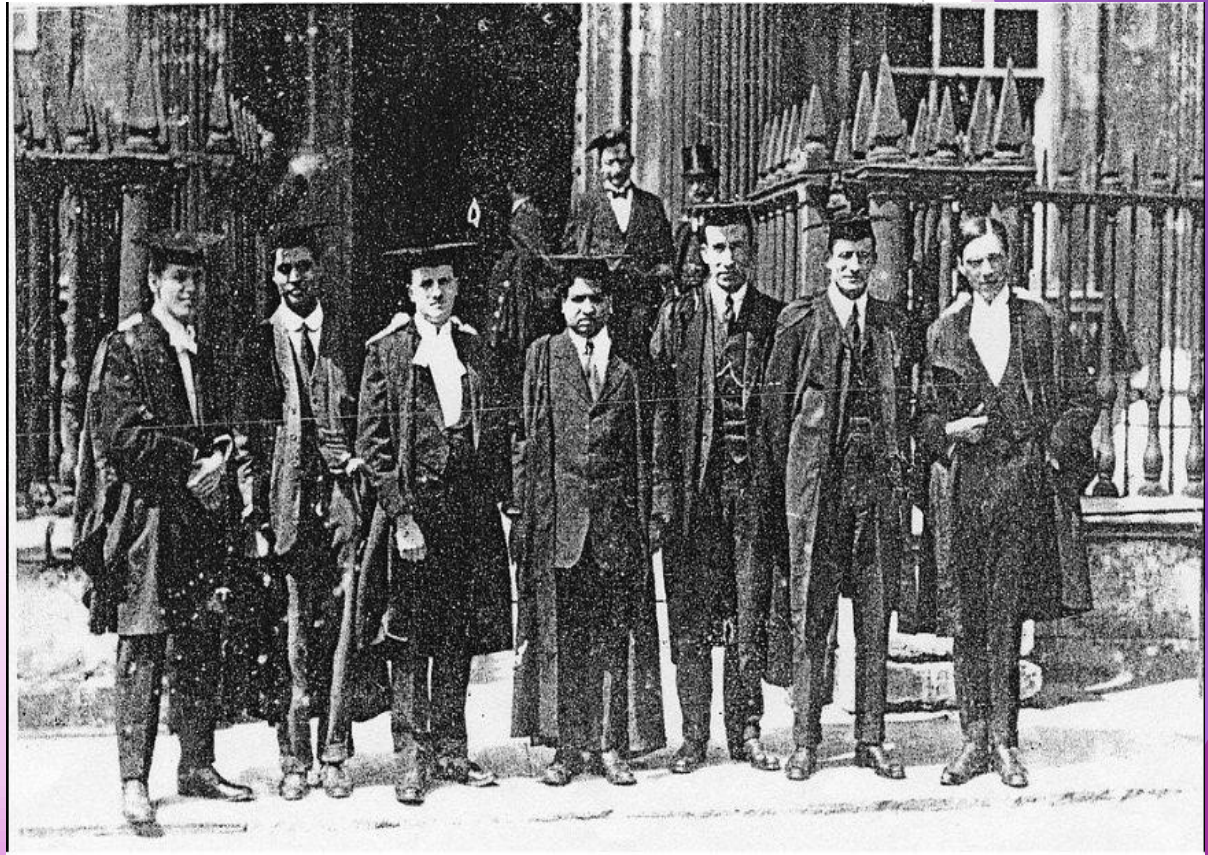
- ▶ Counting principles, permutations, combinations, partitioning.
- ▶ Basic probability concepts.
- ▶ Bernoulli and binomial trials.
- ▶ Experiments with dice and coins.
- ▶ Experiments illustrating law of large numbers.
- ▶ Story of Jacob Bernoulli.





# 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 the life of a famous mathematician.
- ▶ Study early life, struggles, famous work and fun facts.
- ▶ Students work in teams of three.

## Investigative Projects - II

# EDUCATION

- Newton went to Cambridge, but he left Cambridge because of an outbreak of Bubonic Plague.
- Newton was a bad student when he was young.
- His original parents sent him to the Clark's family to go to school.

- ## EWTON'S 3 LAWS

Every object that is in motion stays in motion unless acted on by an outside force.

Every action has an equal and opposite reaction.

Sir Isaac Newton

a mathematician

- Newton was not a very good student.
- Newton was so involved in one thing that he forgot about all his priorities.
- He was involved in politics, even if he didn't like controversy.

6 Sir Isaac Newton discovered gravity when an apple fell on his head (according to myth). He also created the famous Newton's Law of Motion.

## Newton's Struggles

A drawing of a barn and trees. The barn is a simple structure with a gabled roof and a single window. To the left of the barn are several trees with green foliage and brown trunks. A fence is visible in the foreground.

- Newton was a did lectures on such as optics
- He invented a also explained worked.
- He also showed light could be into many a prism
- His ideas that many but that
- He developed and cal



# Investigative Projects - III

## Origin

Pierre De Fermat was born in 1607. He was born in a commune, Beaumont-de-Lomagne, France. His mother's name is Claire De Long, his father's name is Dominique Fermat. Pierre de Fermat was a French lawyer at the Parlement of Toulouse, France, and a mathematician who is given credit for early developments that led to infinitesimal calculus, including his technique of adequality. He studied in the fields of Mathematics and Law.

## Early Life Con't..

Meanwhile, Descartes had observed the same basic principle of analytic geometry: that equations in two variable quantities define plane curves. Because Fermat's *Introduction to Geometry* was published in late 1679, the exploitation of their discovery, initiated in Descartes's *Geometrie* of 1637, has since been known as Cartesian geometry. In 1631 Fermat received a bachelor in law from the University of Orléans. He served in the local parliament at Toulouse, becoming councillor in 1634. Sometime before 1638 he became known as Pierre de Fermat. Though the authority for this designation is uncertain, in 1638 he was named to the Criminal Court.

## Achievements

He single-handedly founded modern number theory as well as made fundamental contributions in areas such as probability theory, infinitesimal calculus, analytic geometry, and optics. Some of his contributions include Fermat's last theorem and Fermat's little theorem, Fermat's principle, Fermat's little theorem, and Fermat's last theorem.

$$\begin{aligned} E &= h\nu \\ \Phi_e &= \frac{L}{4\pi r^2} \\ S &= \frac{W_{AB}}{L} \\ \mu &= \frac{M}{N_A} \\ \lambda &= \frac{h}{mv} \\ \mu &= \frac{M}{N_A} \\ \lambda &= \frac{h}{mv} \end{aligned}$$



By: Anish Rytte, Ishanika Shukla and Anish Torpedaddy

## Early Life

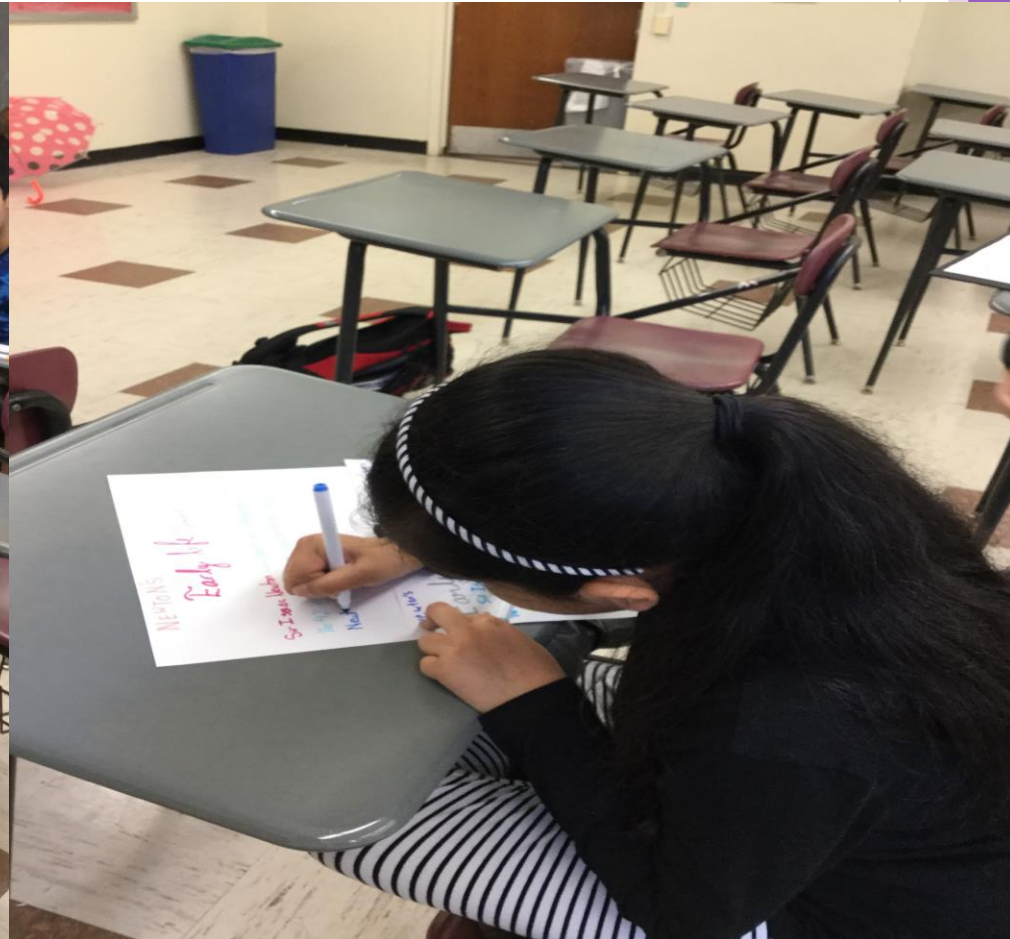
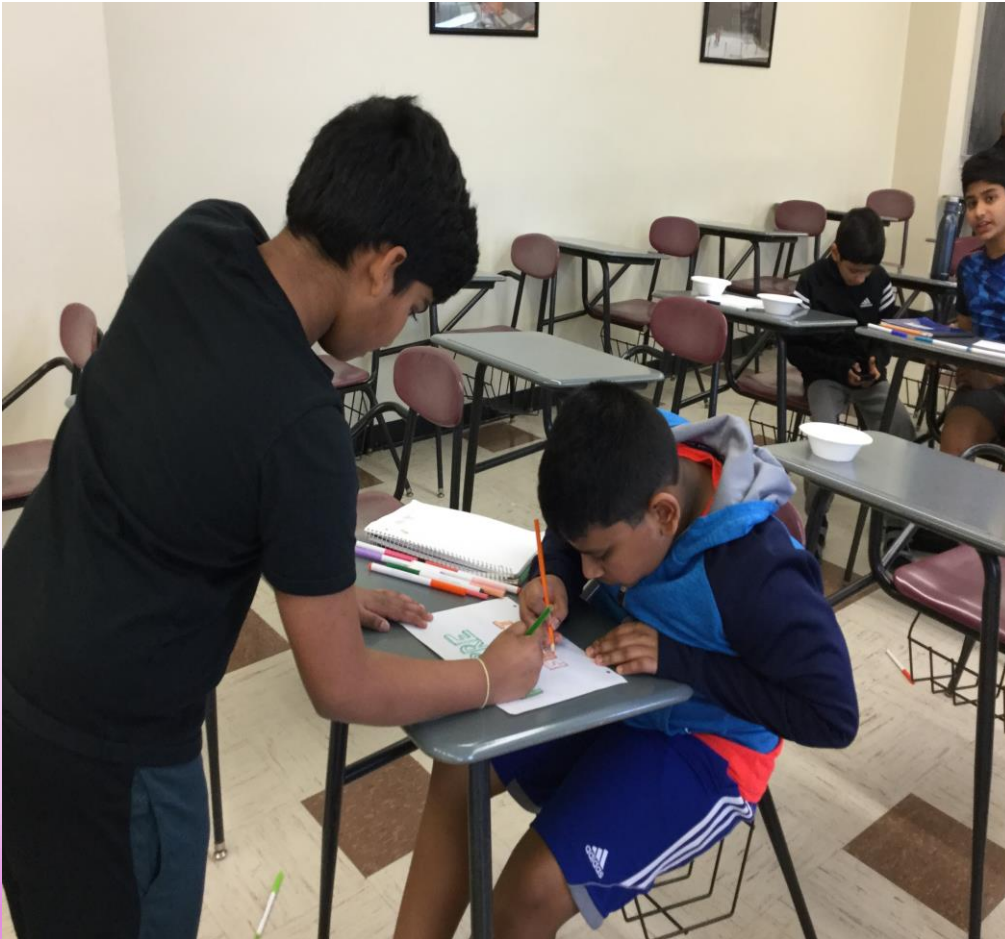
Very little is known about Fermat's early life and education. He was of French origin and received his primary education in a French school. He studied law at Toulouse and worked also in Bordeaux. Fermat started to like foreign languages, classical literature, and natural science and mathematics. Fermat followed the custom of his day in composing conjectures "recreations" at last words of antiquity. By 1629 he began rebuilding the long-lost *Plane Loci* of Apollonius, the Greek geometer of the 3rd century B.C. He soon found out that the study of loci or sets of points with certain characteristics could be facilitated by the application of algebra to geometry through a coordinate system.

$$\begin{aligned} g^2 \alpha + 1 &= \frac{g^2}{\alpha} \\ \sin x &= a; x = (-1)^n \arcsin a \\ \sin x &= a; x = (-1)^n \arcsin a \end{aligned}$$

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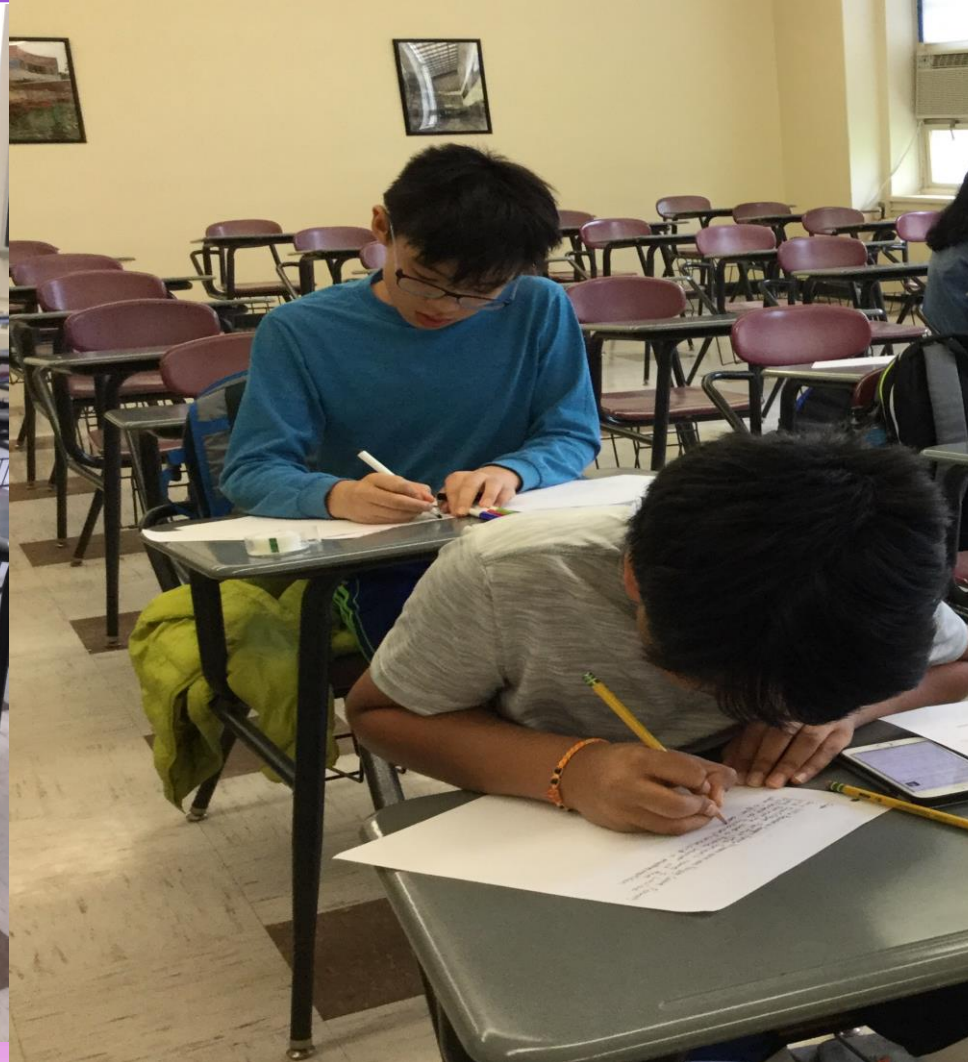
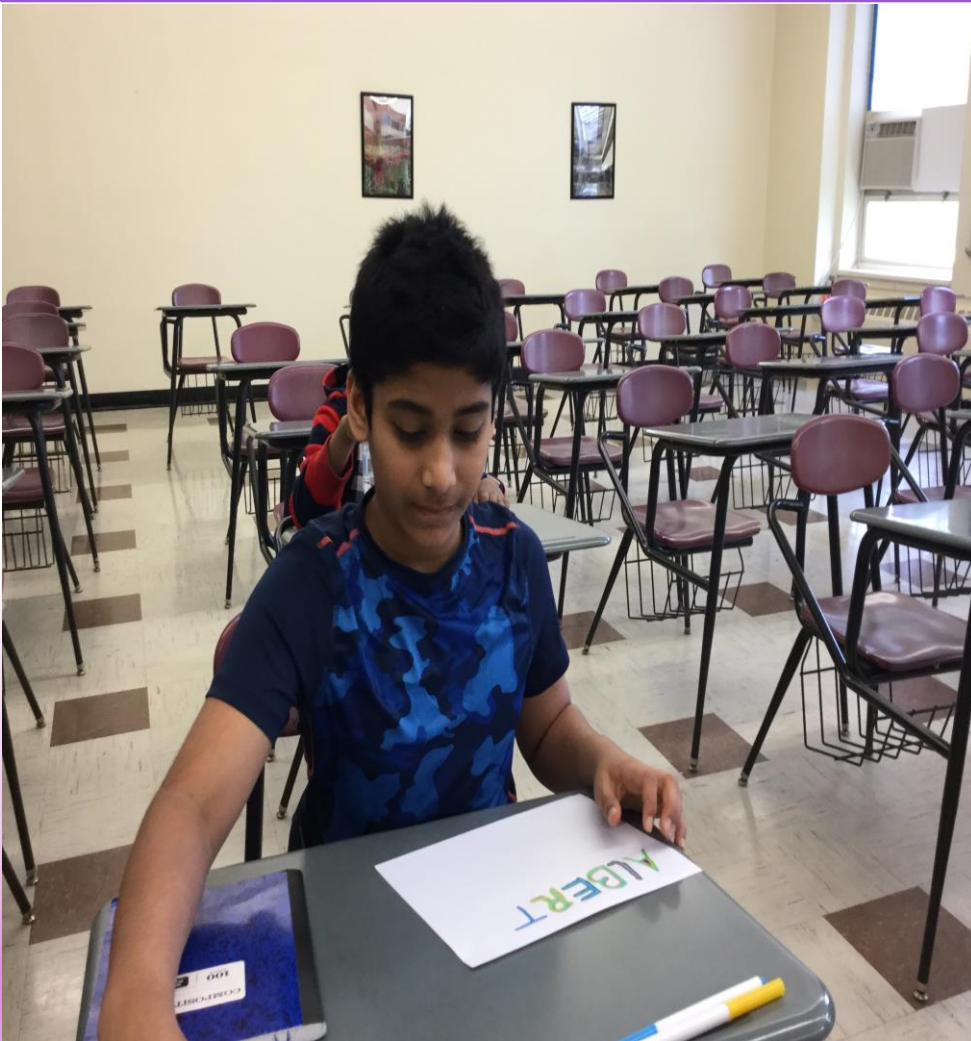


# Investigative Projects - IV

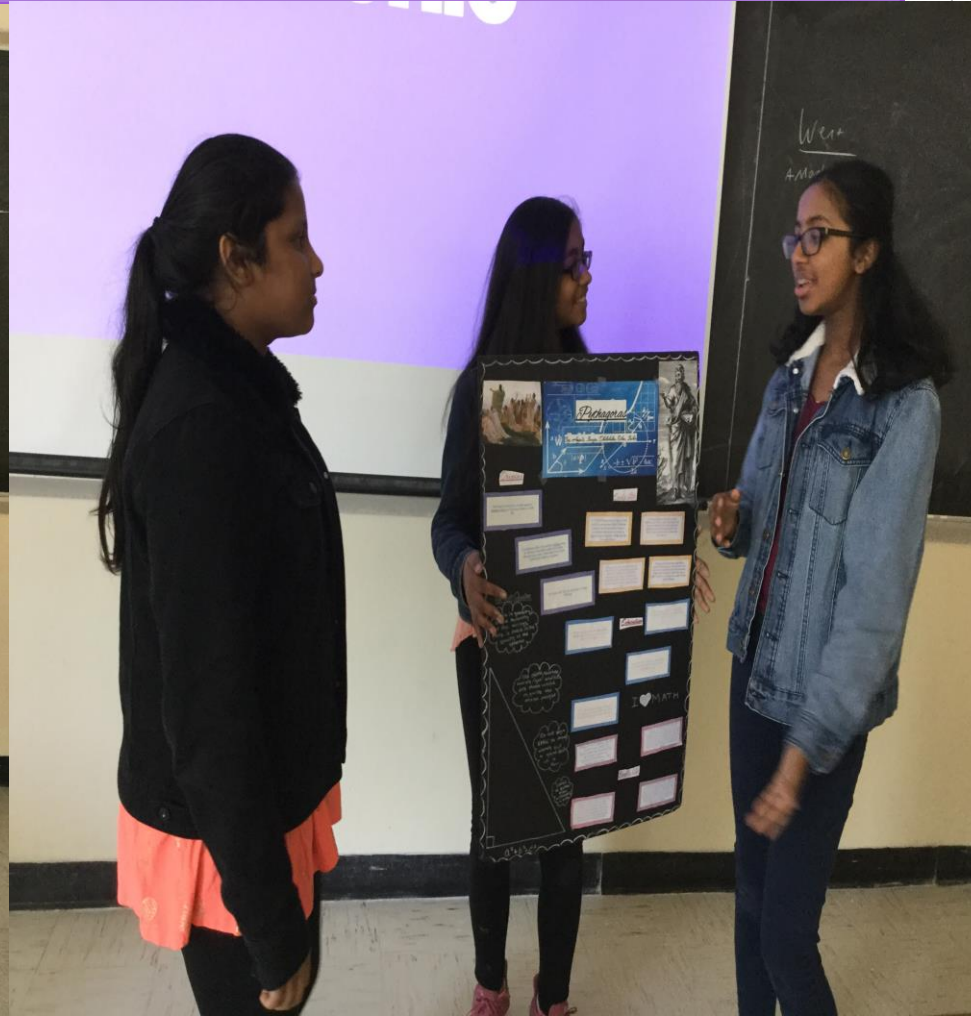
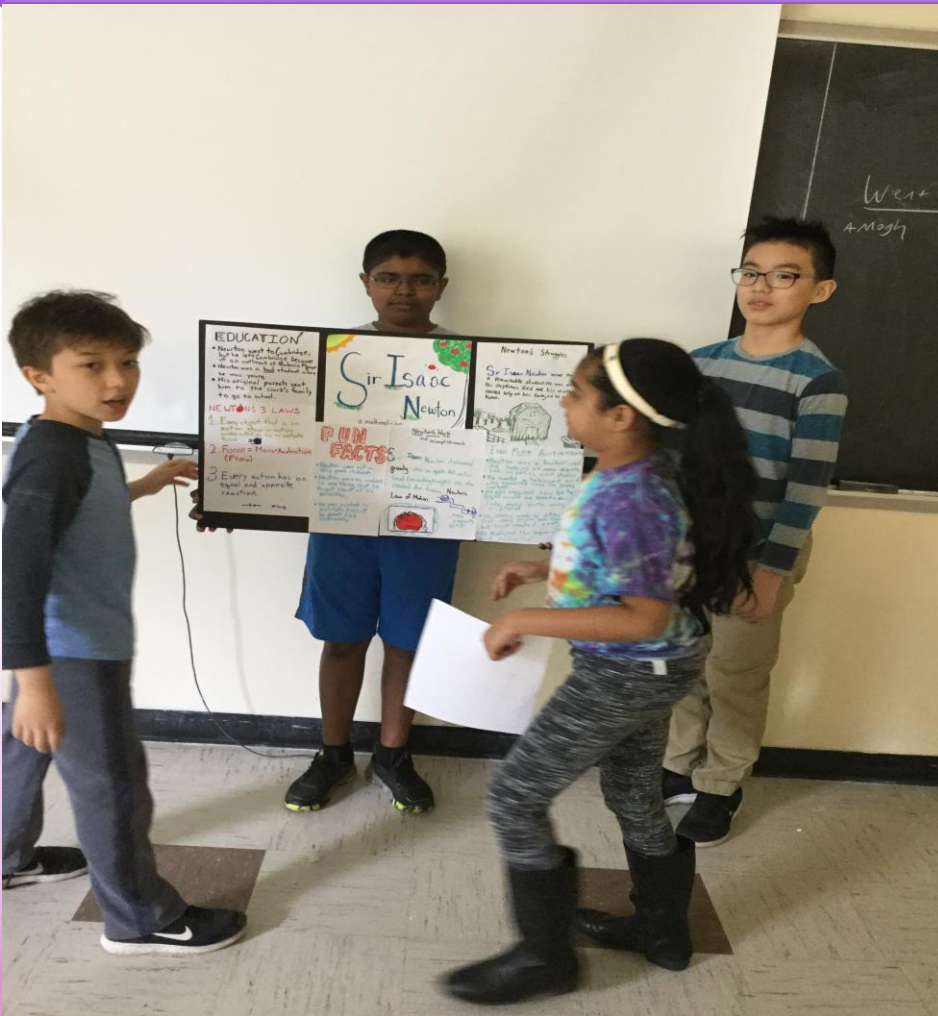




# Investigative Projects - V

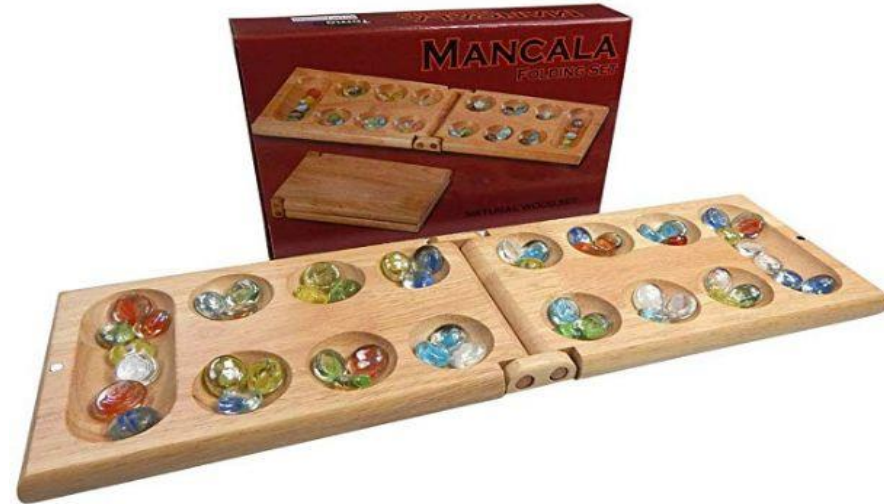
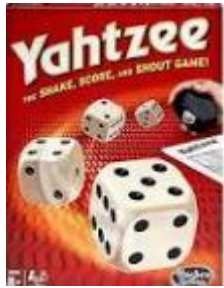


# Investigative Projects - VI





# Fun Stuff - Games





# Fun Stuff - Movies

