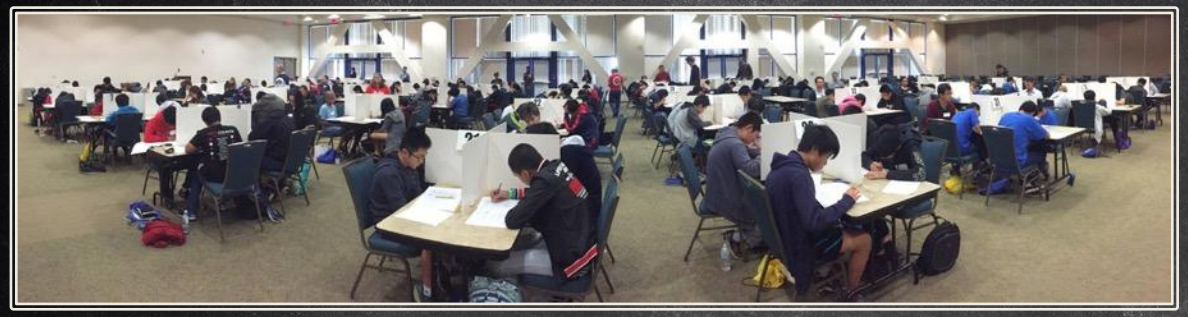
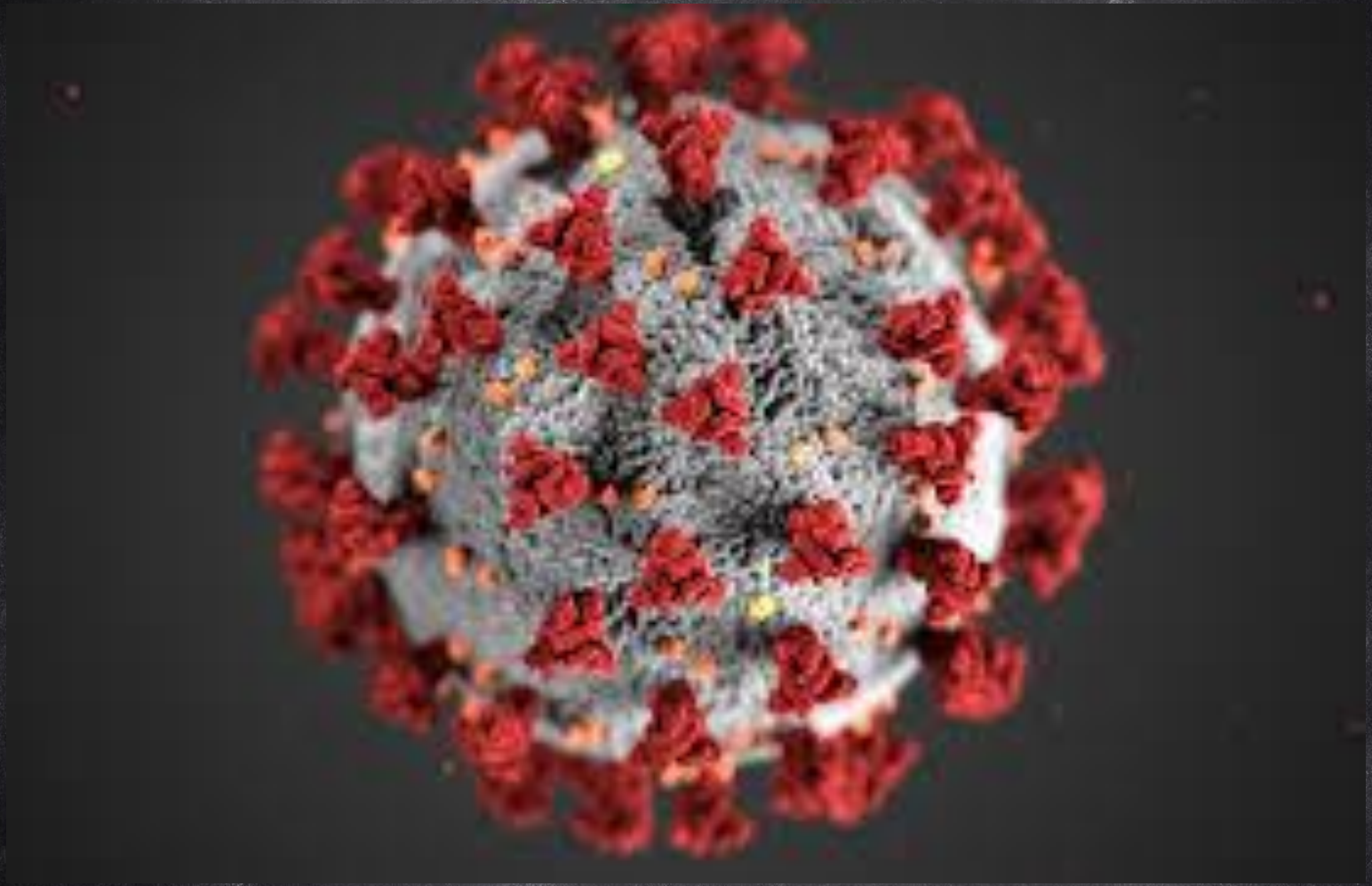
"MATH-OUTREACH"
TO HELP OUR COMMUNITY

MATHCOUNTS

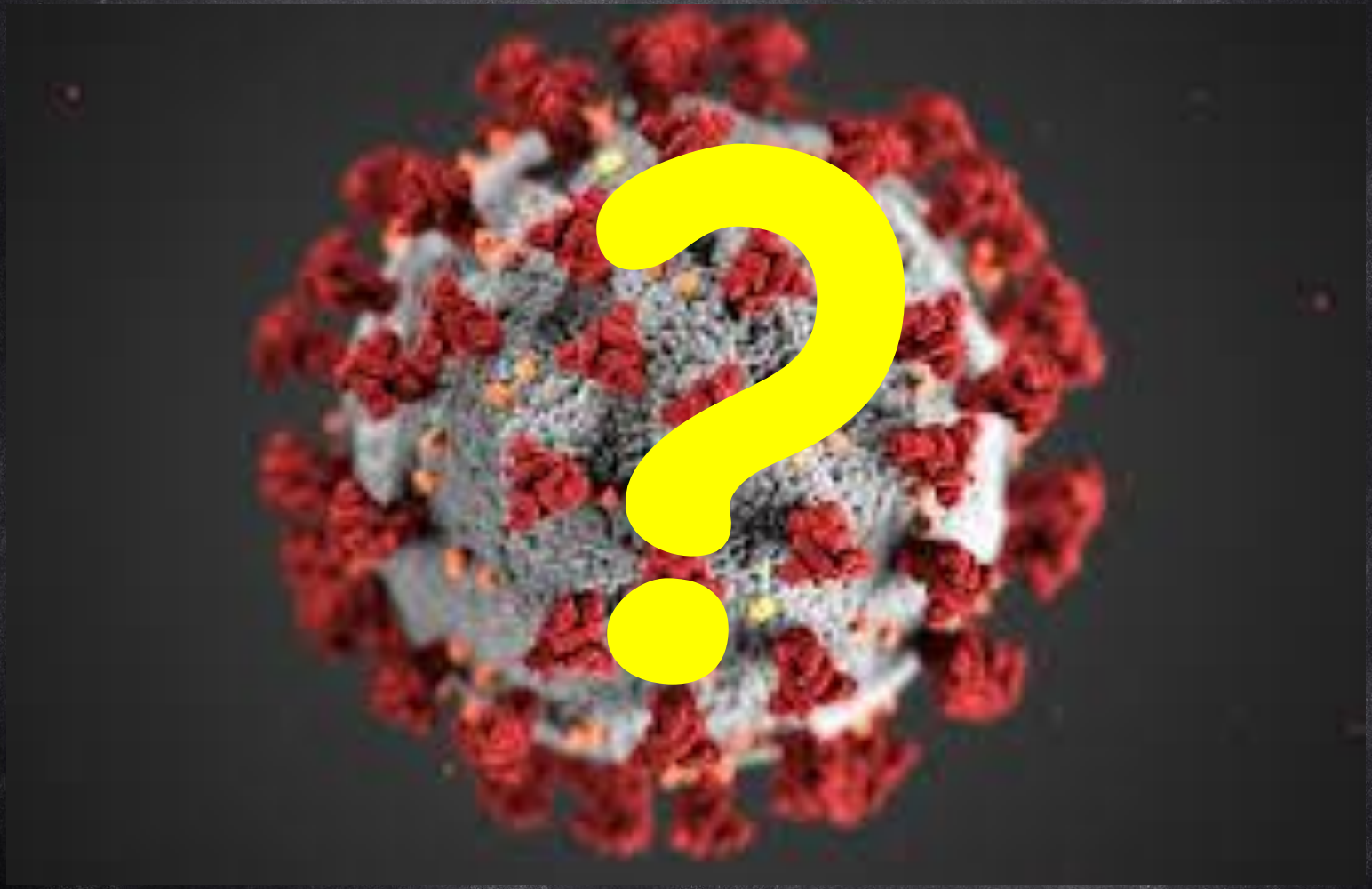


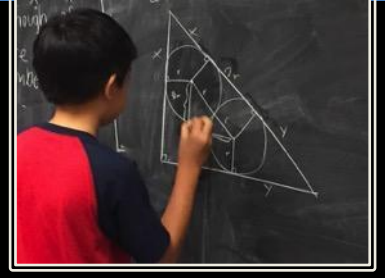
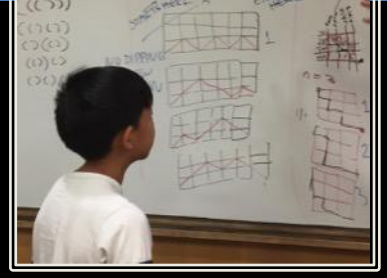
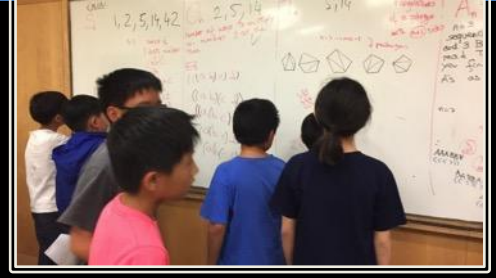
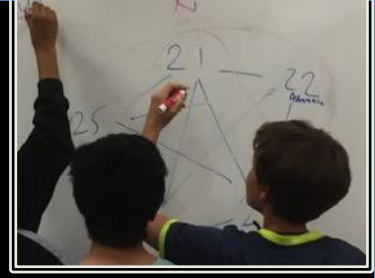
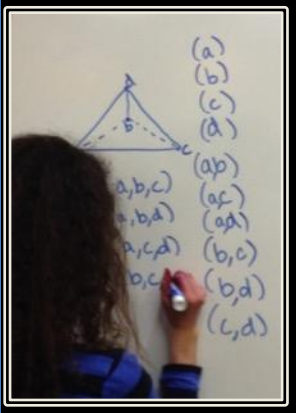
The UCI Department of Mathematics (and earlier, the School of I&CS) has hosted MathCounts Competitions since 1992.

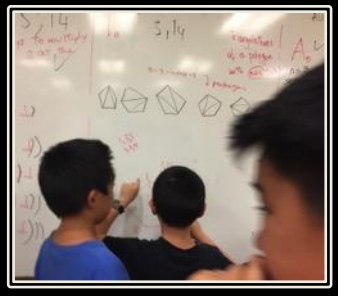
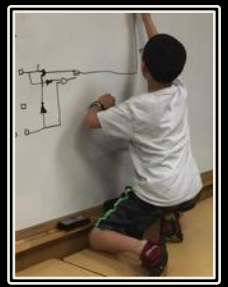

1

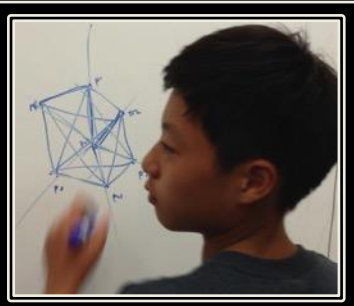


MATHCOUNTS

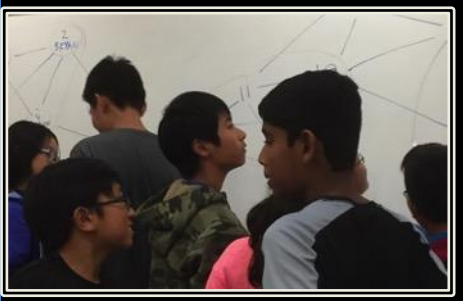


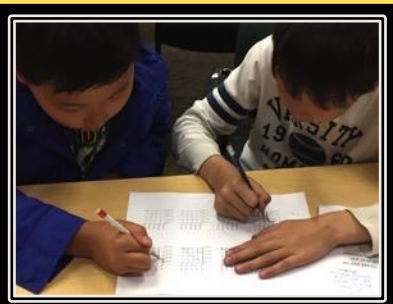







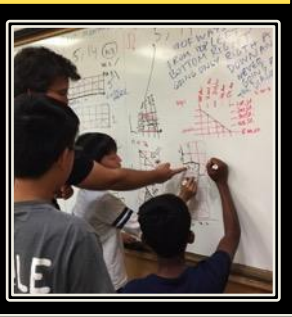
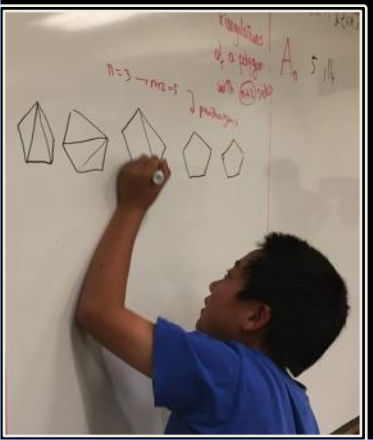
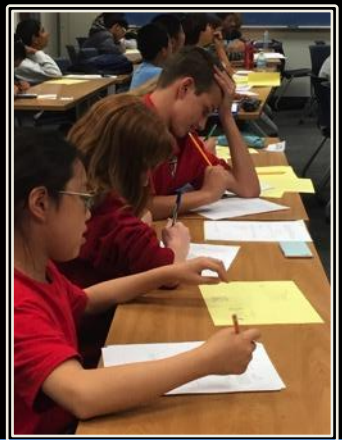
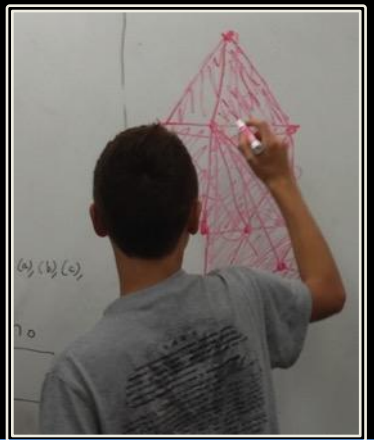
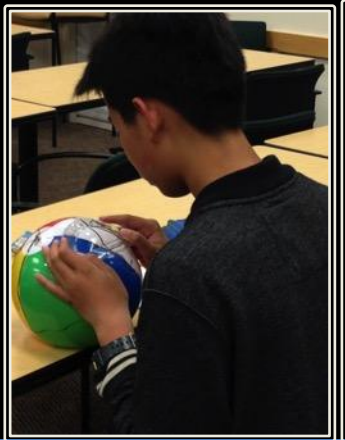





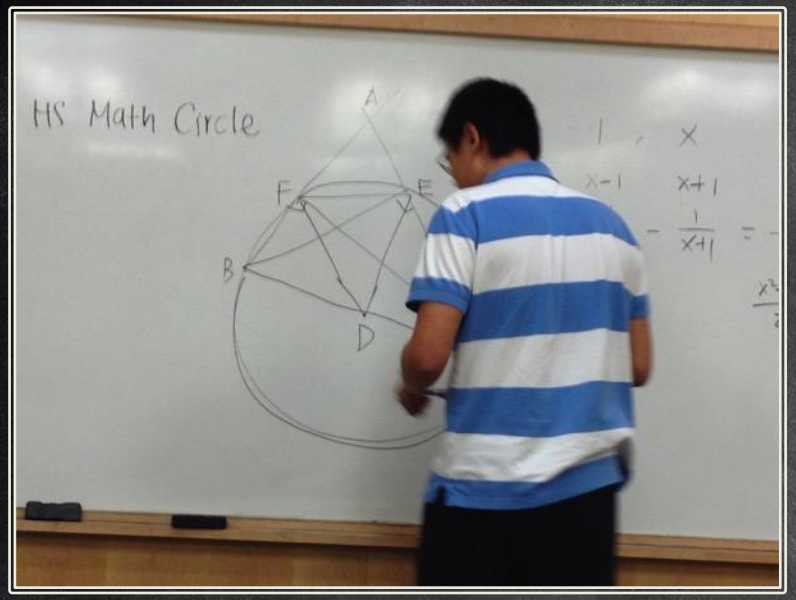
The UCI Math Circle

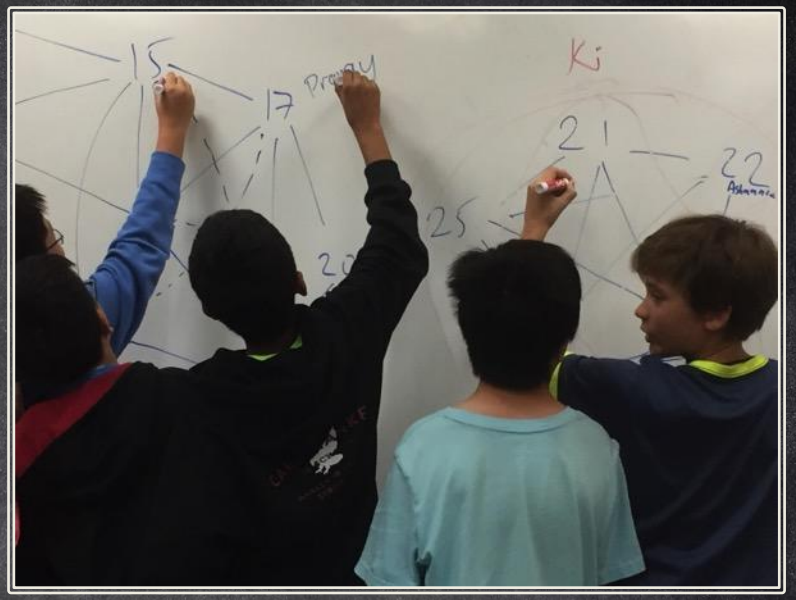


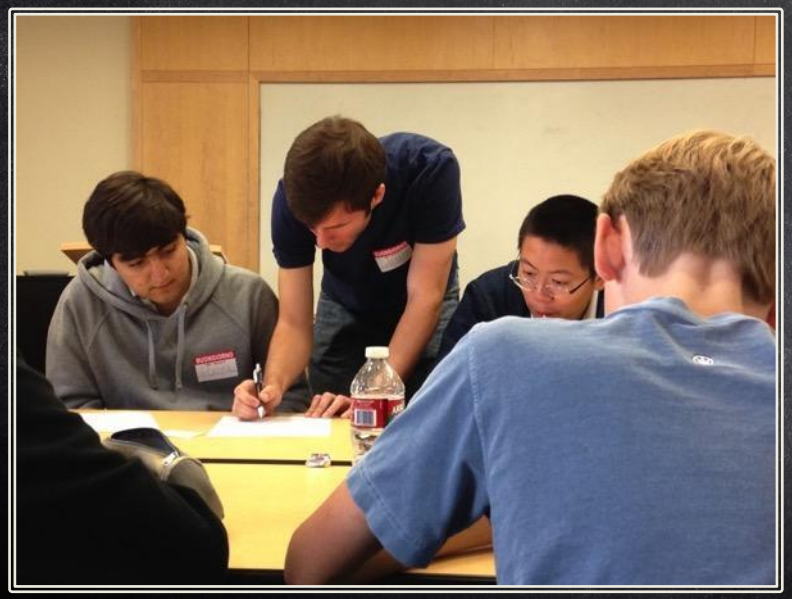


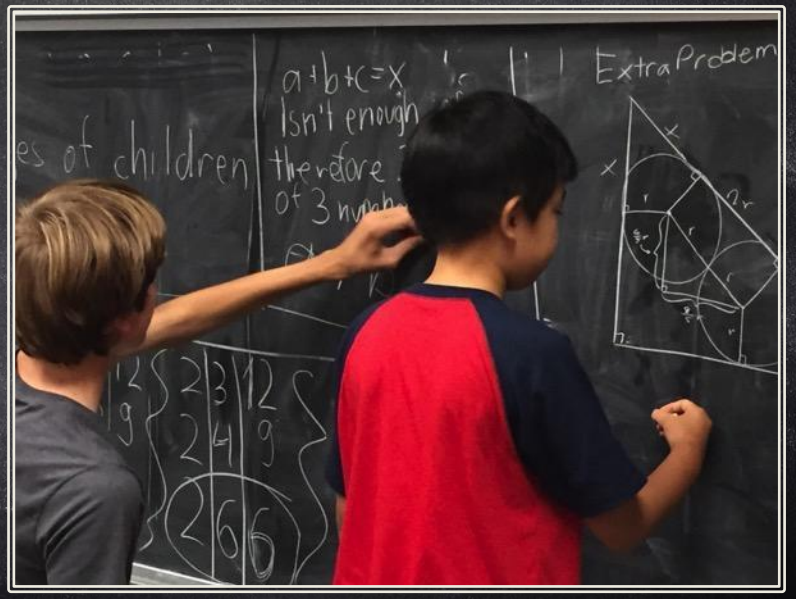







To provide enrichment to mathematically talented students

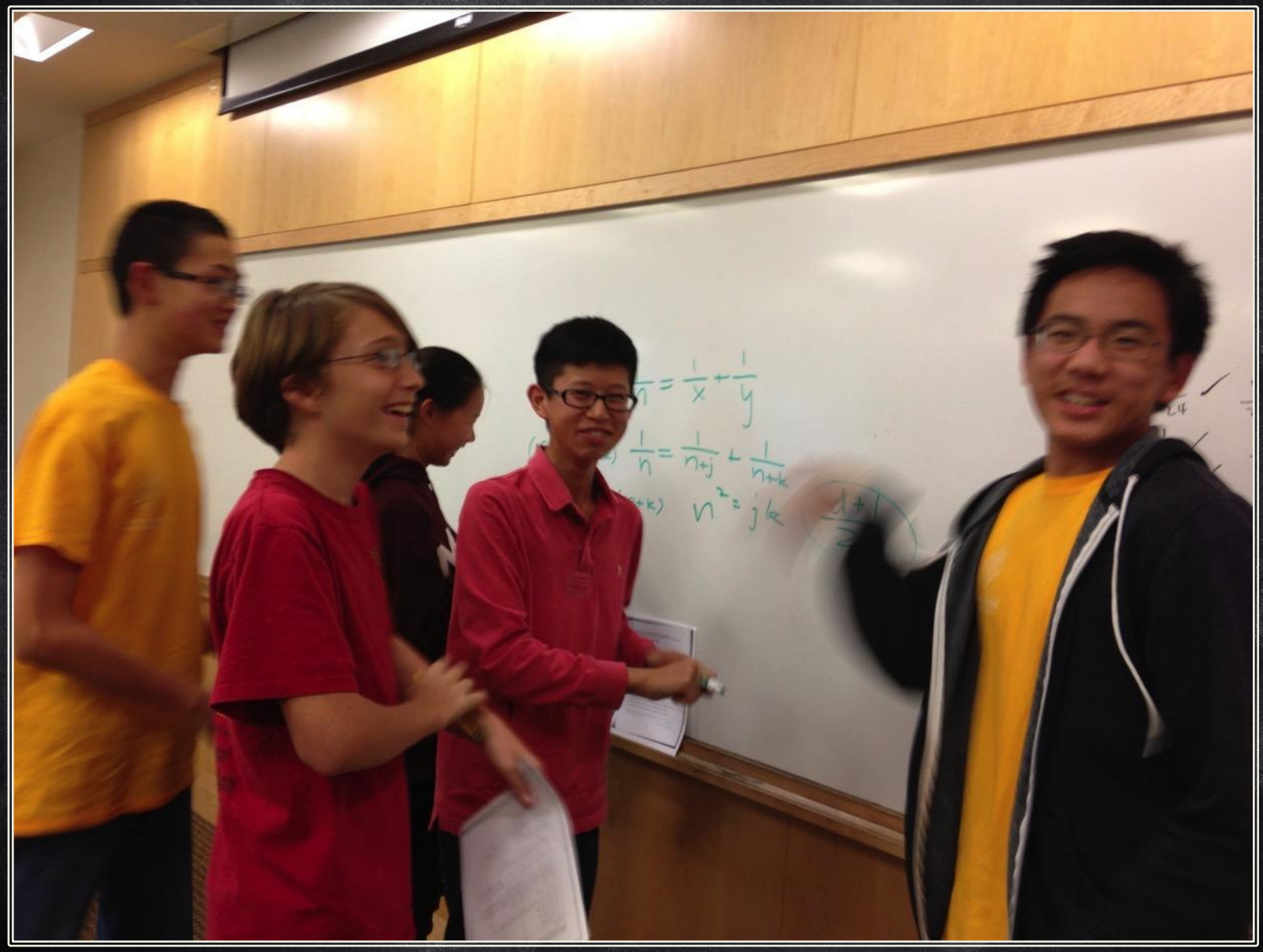






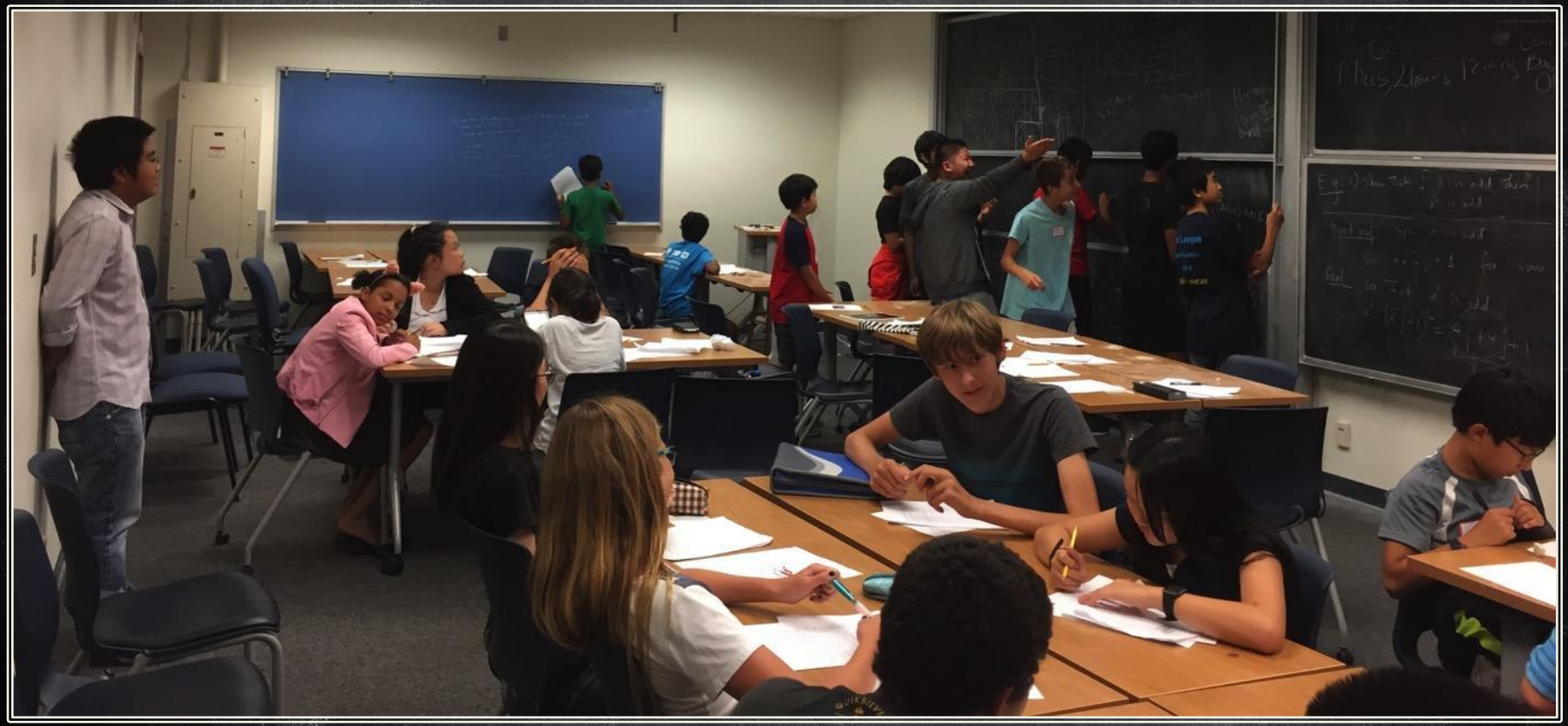


and promote the joy of mathematics



Offers an open environment…

- Math faculty or graduate students lead the investigations
- Students explore interesting mathematics in groups



UCI Math Circle: Polynomials

Problem 1

Polynomial $ax^2 + bx + c$ has no roots, and $a + b + c > 0$. What is the sign of c?

Problem 2

For which natural a and b the roots of the equation $x^2 - abx + a + b = 0$ are integers?

Problem 3

Consider all lines that meet the graph of $y = 2x^4 + 7x^3 + 3x - 5$ in four distinct points. $(x_1, y_1), (x_2, y_2), (x_3, y_3), (x_4, y_4)$. Show that

$$\frac{x_1 + x_2 + x_3 + x_4}{4}$$

UCI

Problem 1

For which values of a

$$x^2 - ax + 1 = 0 \quad \text{and} \quad x^2 - x + a = 0$$

have a common root? The same question for equations

$$x^2 + ax + 1 = 0 \quad \text{and} \quad x^2 + x + a = 0$$

Problem 2

Draw the set of points (x, y) on the coordinate plane such that $(|x| - 1)^2 + (|y| - 2)^2 = 16$

Problem 3

The polynomial $x^2 + px + q$ has roots x_1 and x_2. Find a polynomial that has

UCI Math

Problem 1

Find the

Problem

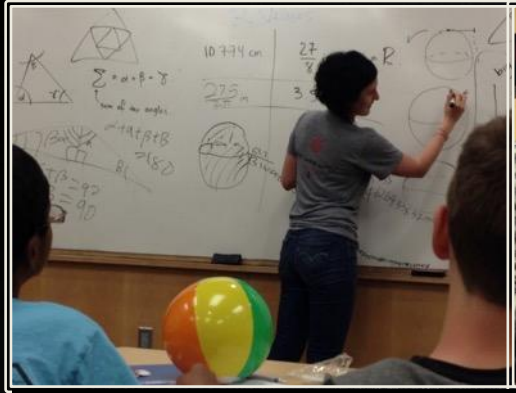
a) Show
same poi

b) Is it
the same

Problem

Draw the

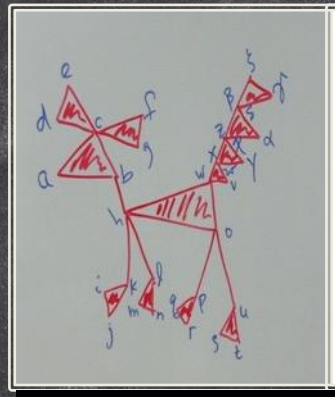
LEVEL 2



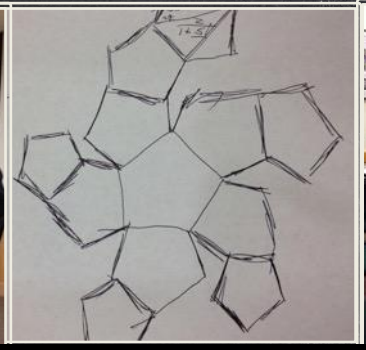
SPHERICAL GEOMETRY ON BEACH BALLS

PAPER MOEBIUS BANDS

ORIGAMI

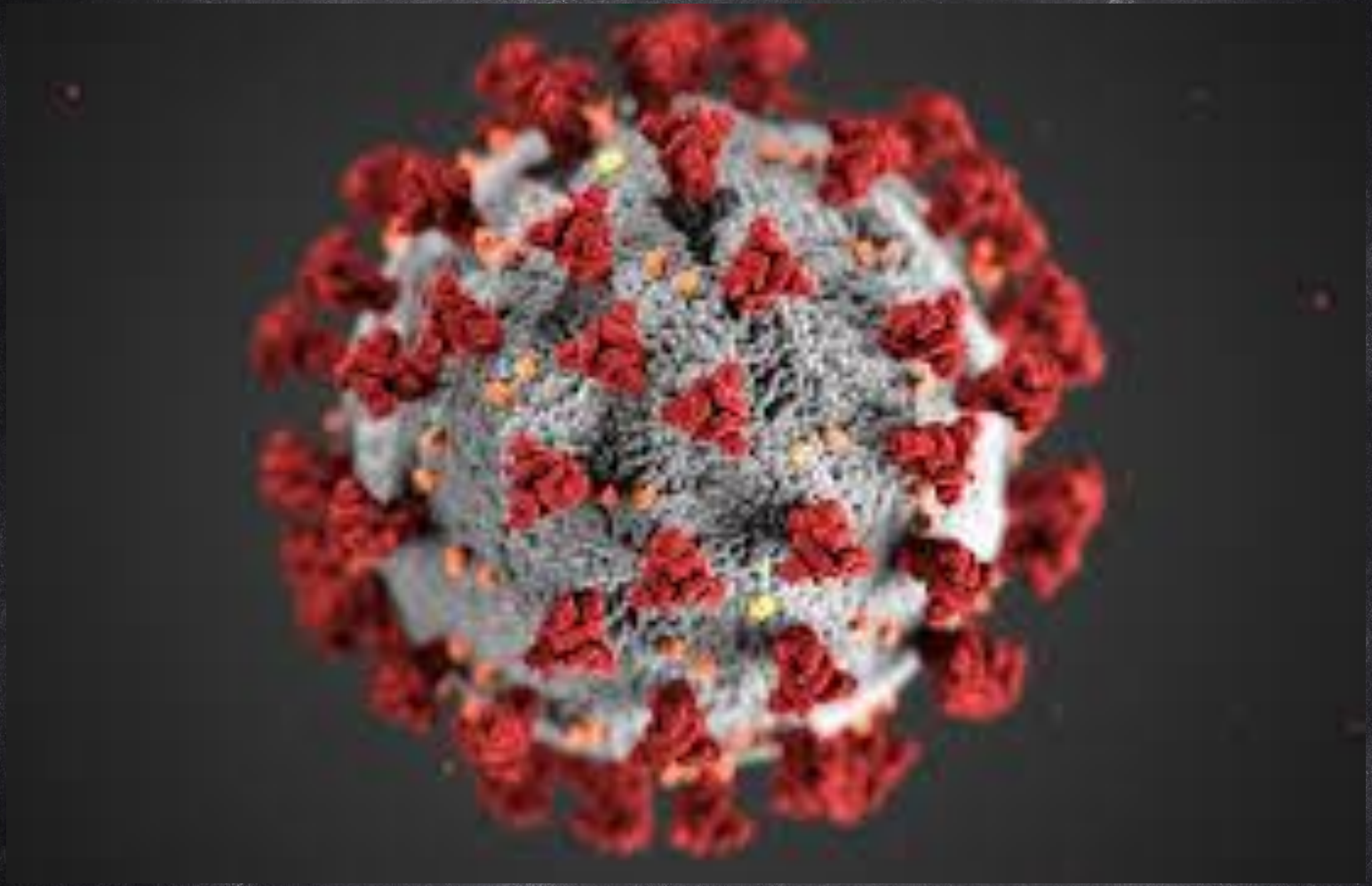


SIMPLICIAL COMPLEXES WITH MAGNETIC BLOCKS



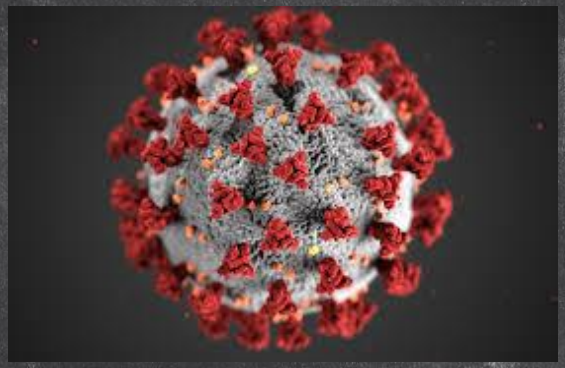
POLIHEDRA WITH STRAWS

LEVEL I



UCI MATH CIRCLE

Each quarter From Fall 2012 To Winter 2020 +



= No Math Circle In Spring 2020

UCI MATH CIRCLE

Fall 2020

+

= Online Math Circle

UCI MATH CIRCLE

Welcome to Math Circle!

Before we start today's activity, think about how you could solve the following problem…

Six positive integers are picked between 1 and 2020 at random. What is the probability that some pair of these integers has a difference that is a multiple of 5?

Did you know? The Pigeonhole Principle can be used to solve all kinds of interesting problems, and it often appears in solutions to competition math problems. One famous application argues that there must be two people in London who have the same number of hairs on their heads.

UCI MATH CIRCLE

Last Week's Challenge Question

Pool Testing Challenge Question:

Suppose that a pool test that is positive for an infected person is only 90% accurate, and a pool test that is negative for a non-infected person is only 80% accurate. How would this change your strategy when considering the scenarios in the activity? How about if the number of infected people is unknown? How would you adjust your strategy?

Julia Robinson Math Festival

Julia Robinson Mathematics Festival

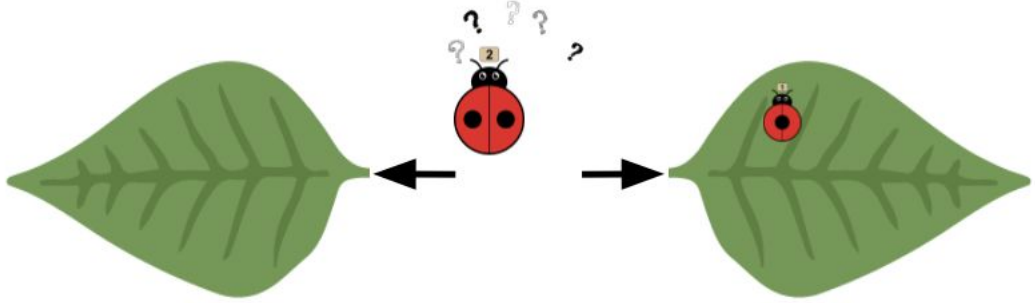
Sum Free Ladybugs

Setup:

The game starts with two empty leaves, a **Left Leaf** and a **Right Leaf,** and ladybugs each with a different number of dots on their back wings.

Rules:

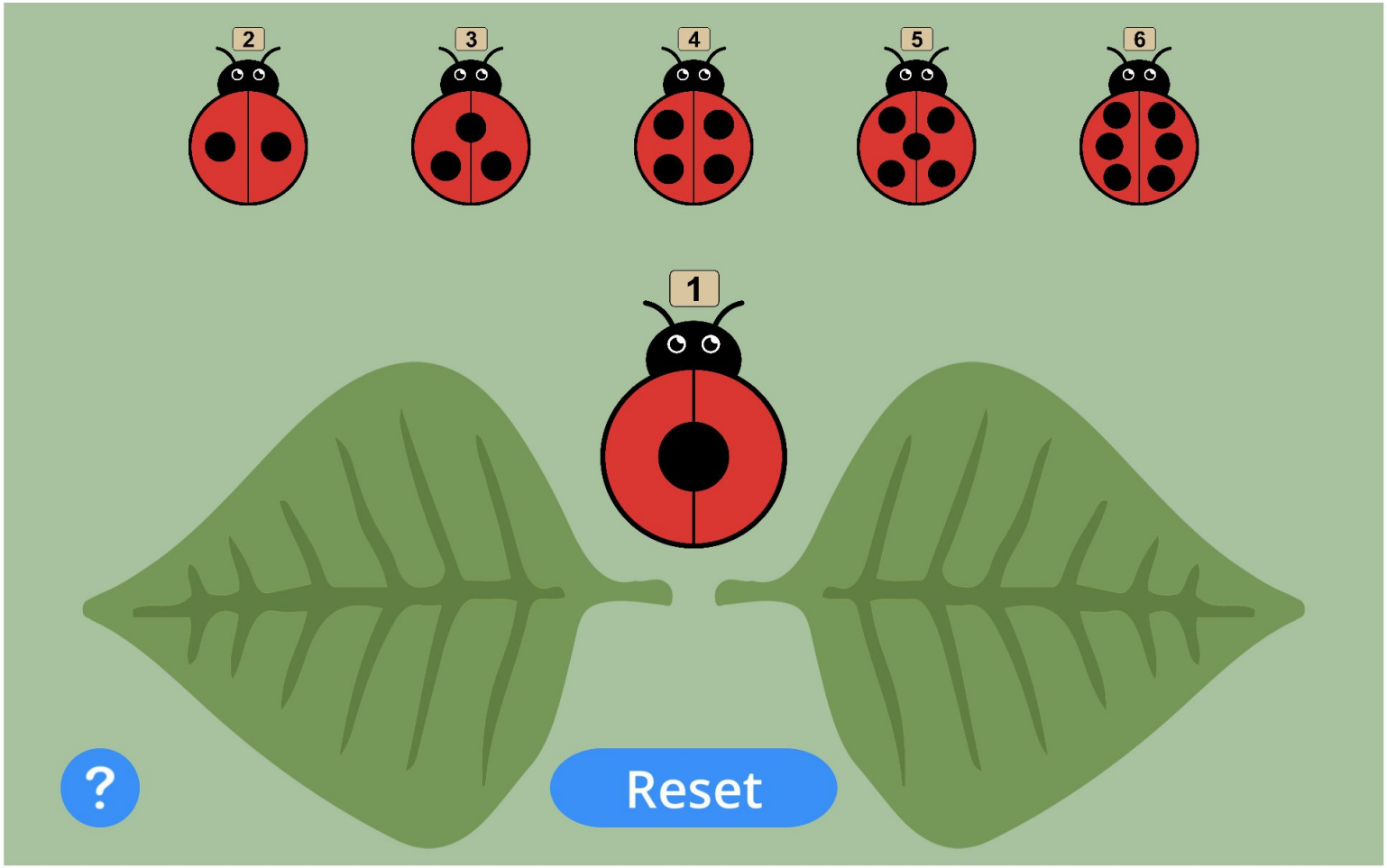
1. The First Player starts the game by placing **Ladybug One** on one of the two leaves. The Second Player places **Ladybug Two** on one of the two leaves. The game continues by placing **Ladybug Three, Ladybug Four,** and so on, in order.



2. If the number of dots on **two** of the ladybugs' backs **add** up to the number of dots on a third ladybug's back on the same leaf, then the current player loses and all of the ladybugs fly away!

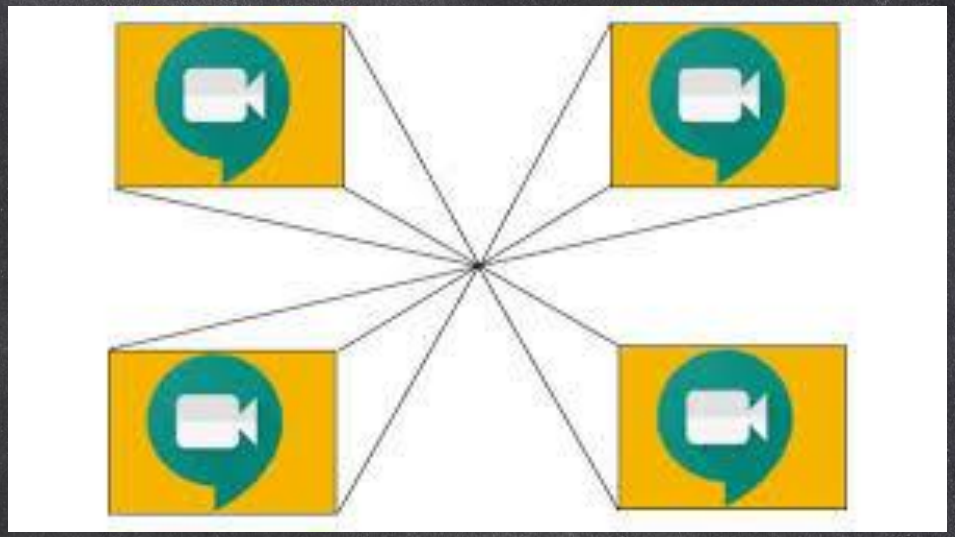
3. The winner is the player that places the last ladybug.

Digital App



Breakout rooms

~ 50 students (grade 4- 13)



Volunteer List:

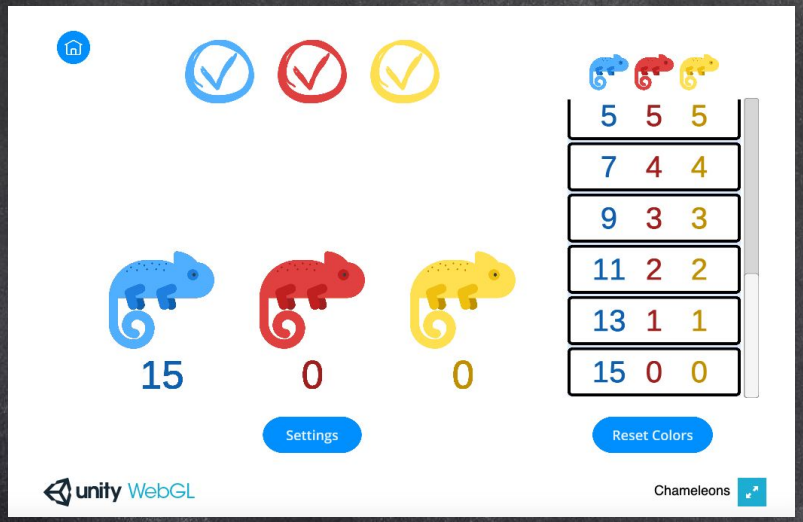
- **Yasmeen Baki**
- **Nick Treuer**
- Dong Yan
- **Jennifer Pi**
- Lili Yan
- Deborah Patricia Tonne
- Irene Gao (UG)
- Zhiqin Lu (Prof)

We need more volunteers!!

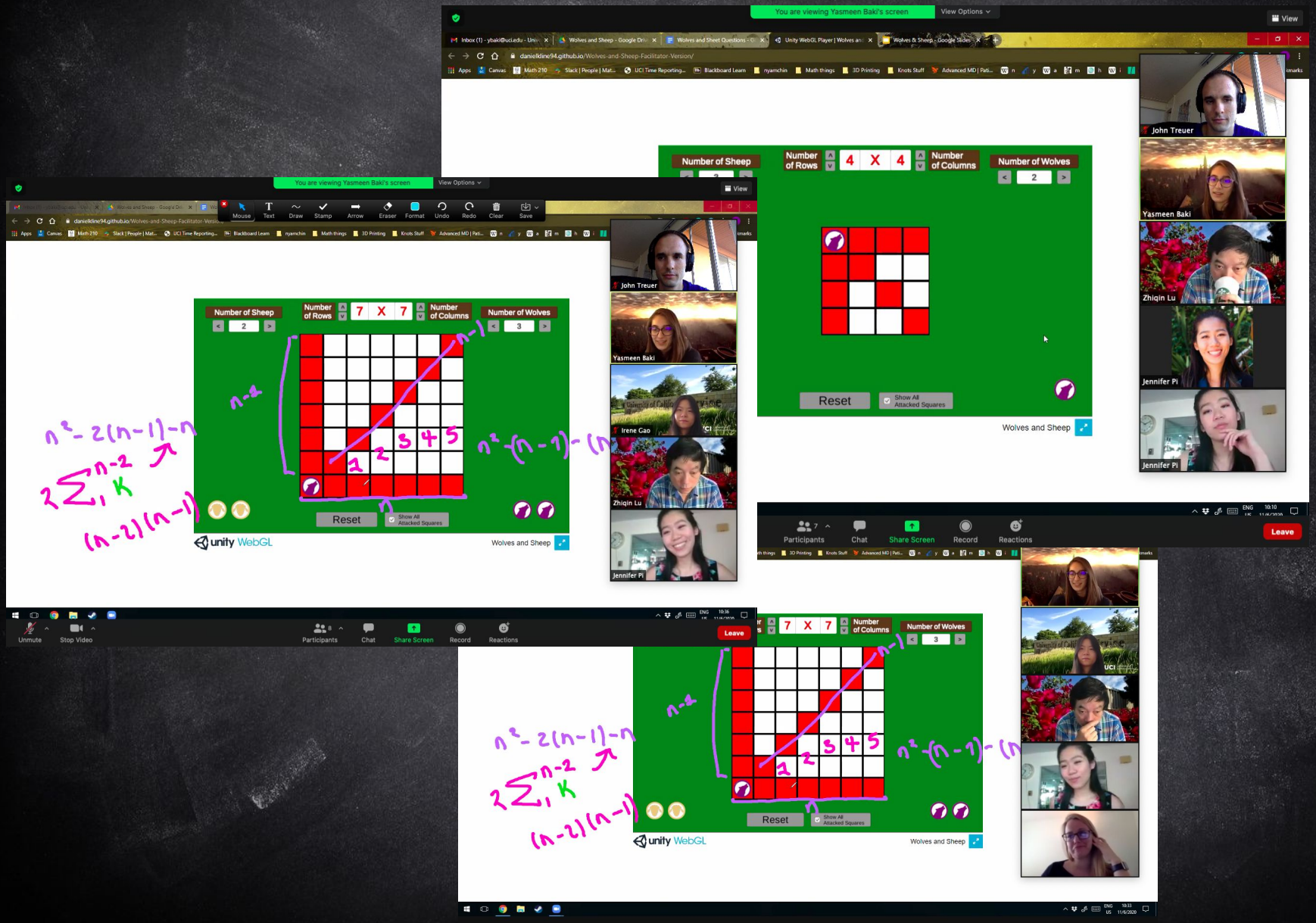
VOLUNTEERING FOR THE MATH CIRCLE

MEETING WITH STUDENTS
Monday 6:30-7:30

TRAINING
Friday 10-11am



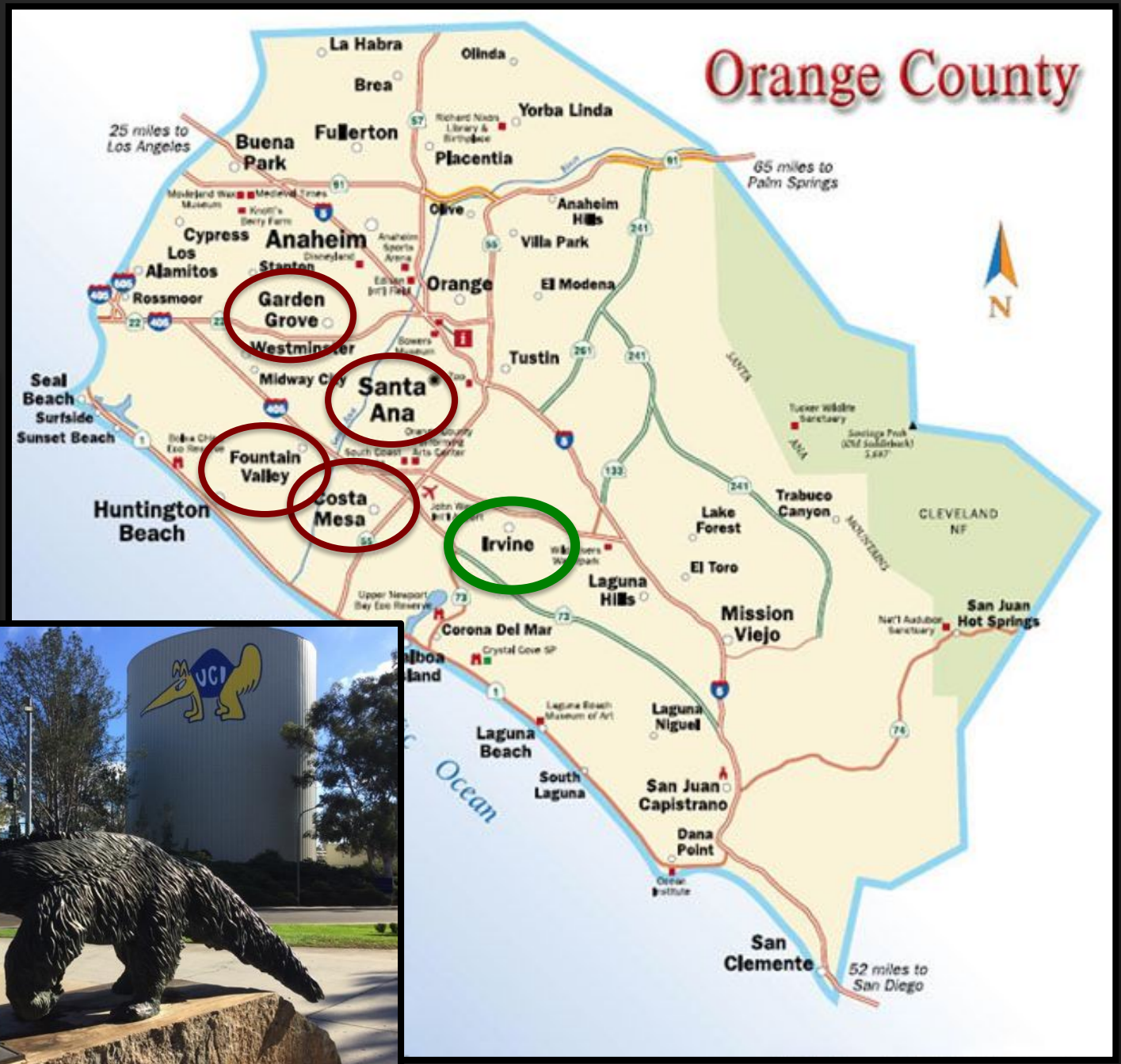
Weekly training for mentors

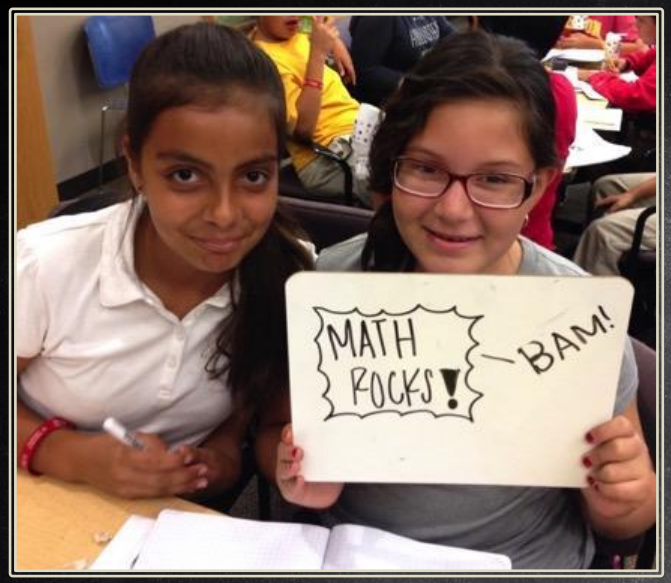


UCI Math CEO (2014)
Community Educational Outreach

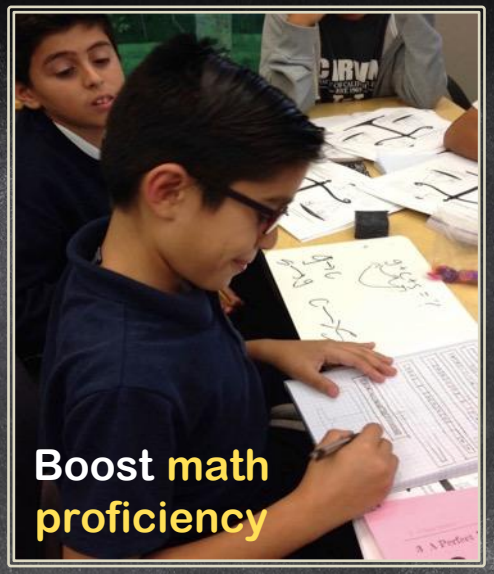
To provide **authentic mathematical experiences**
to underserved youth in our community

BROADENING THE REACH

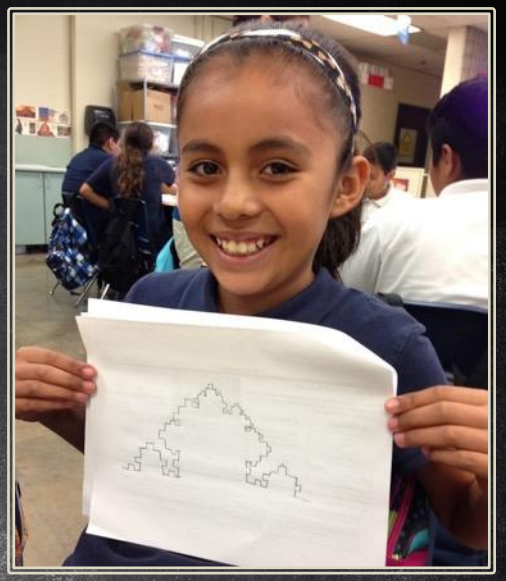




Inspire love for learning (math)

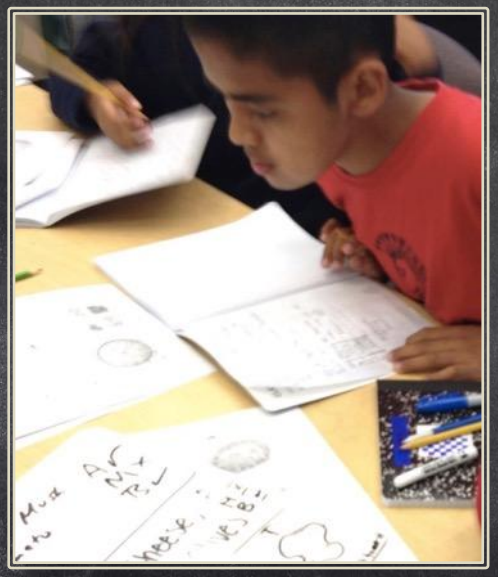


Boost math proficiency



Communicate the beauty of mathematics

Train students to persevere on hard tasks



Promote critical thinking

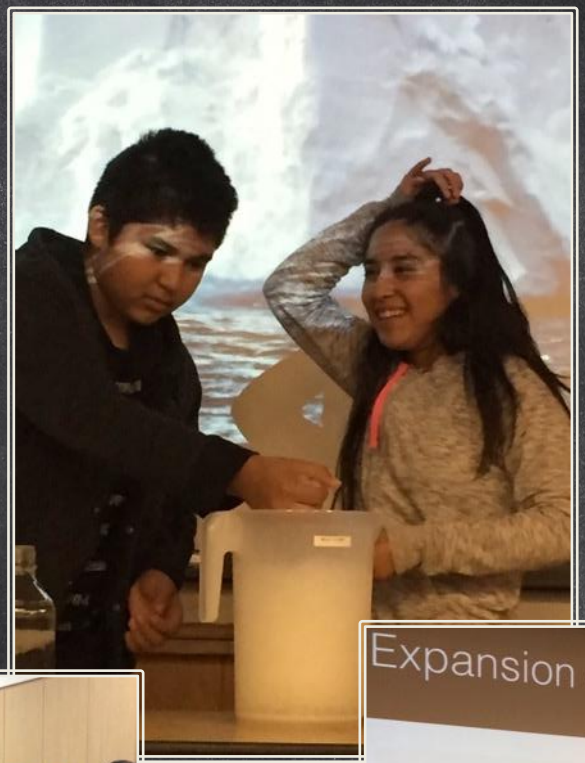
Inspire students to reach for more (pursue college and STEM careers)

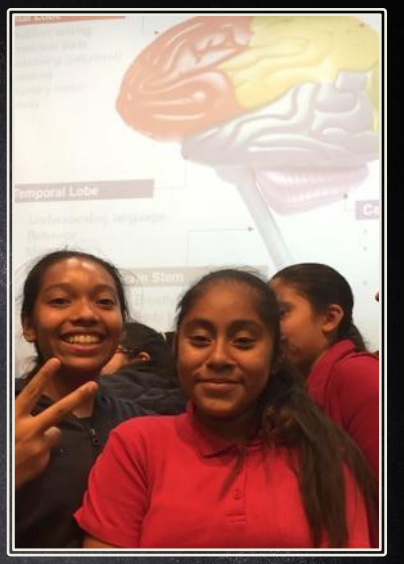
FIELD TRIPS TO UCI

For the kids, the fieldtrip is the true highlight of the program

Chemistry Lab

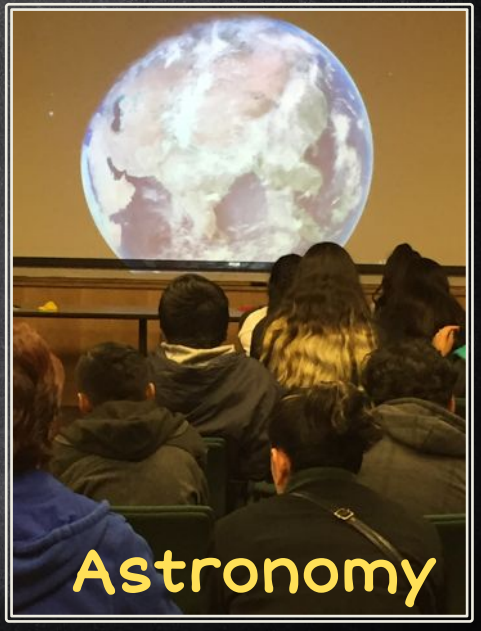
Climate Change





The Brain

Physiology Lab



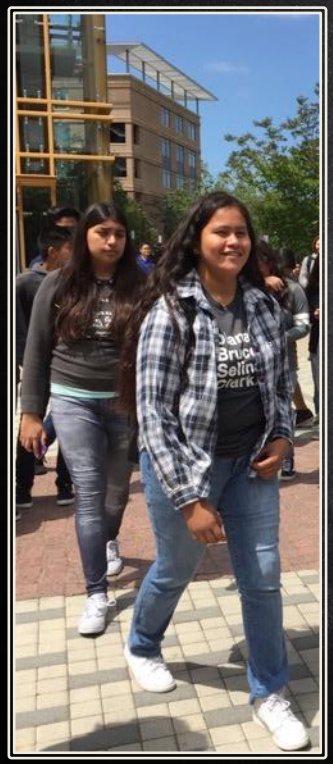
Astronomy

Lunch with Mentors

How much does college cost?

Campus tour

College panel



What kind of classes do ya take if your undecided?

Bilingual college workshops for parents

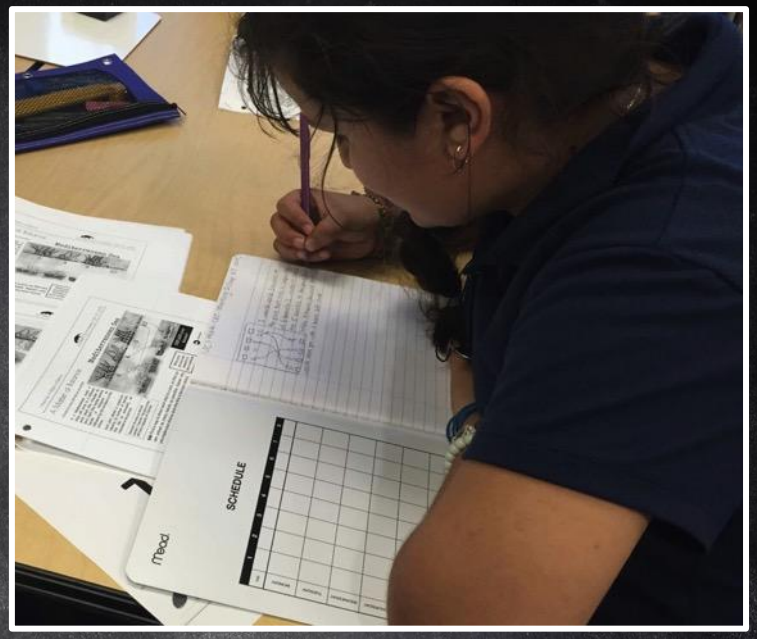
"It resonated with me that their parents are from Mexico and they still continued with their studies."

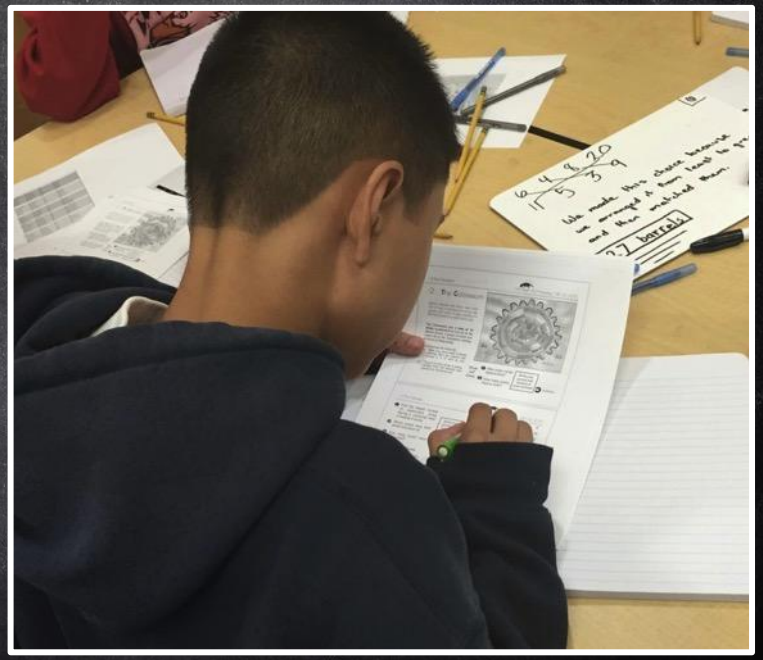
Weekly Math Circles

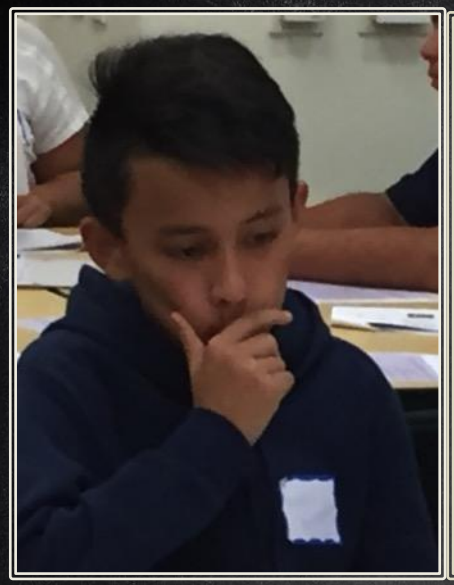
Every week, middle school and high school students meet with our team of UCI (graduate and undergraduate) mentors to work on fun and interesting mathematics problems

Amazing Mentors

During the math circles, students work hard







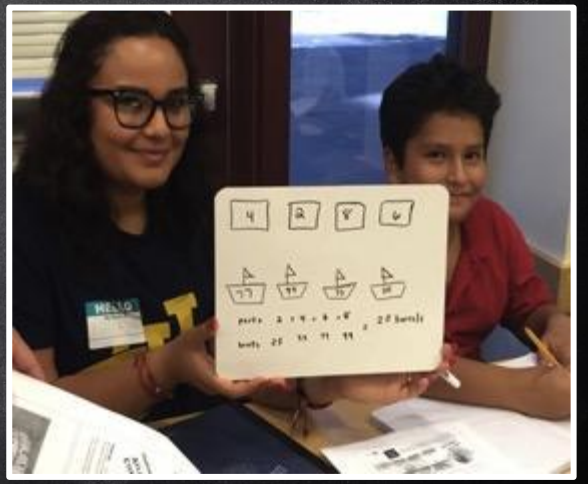
The math can be challenging....



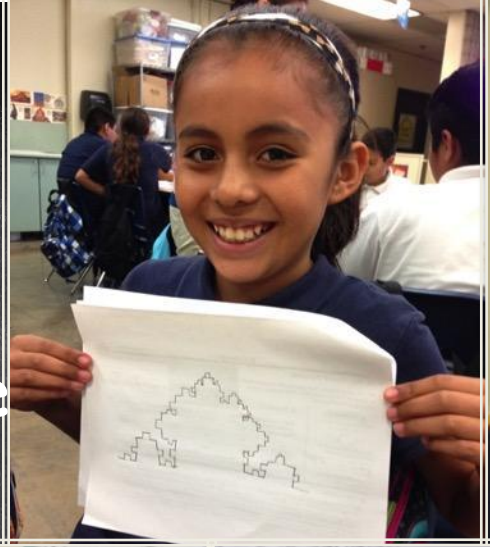


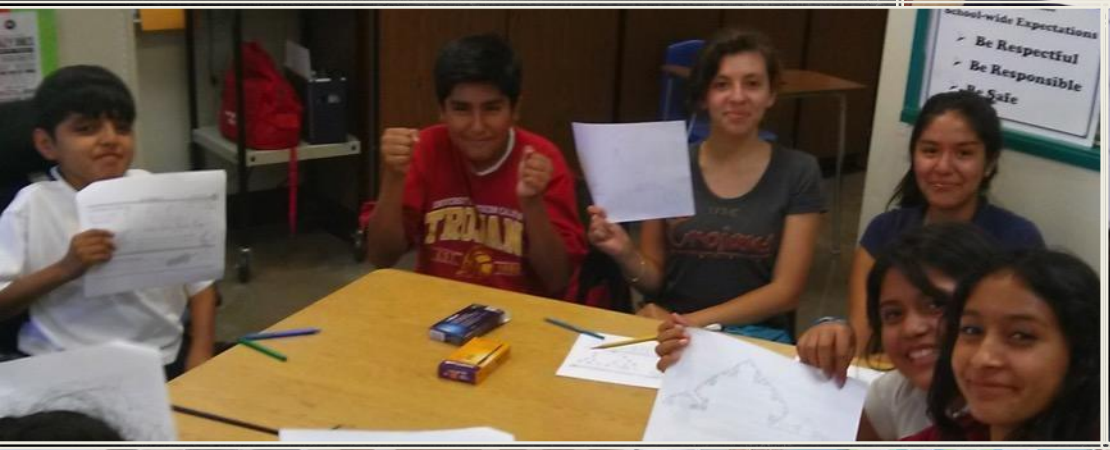

...but there's always someone to help

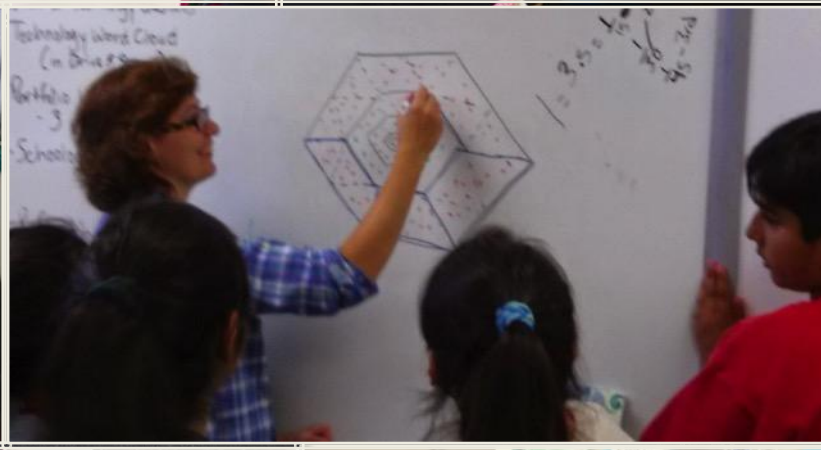


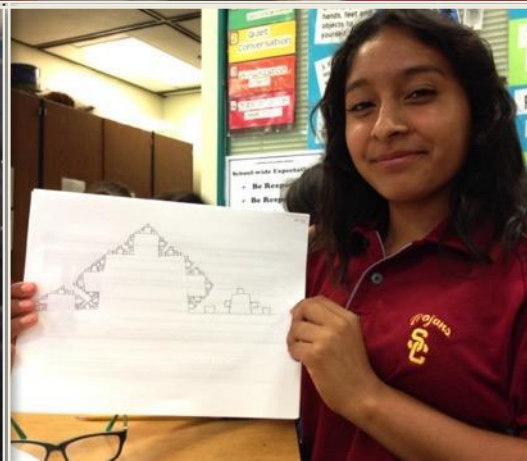


PILOT PROGRAM
2014
MATH CIRCLE
@ Lathrop Intermediate



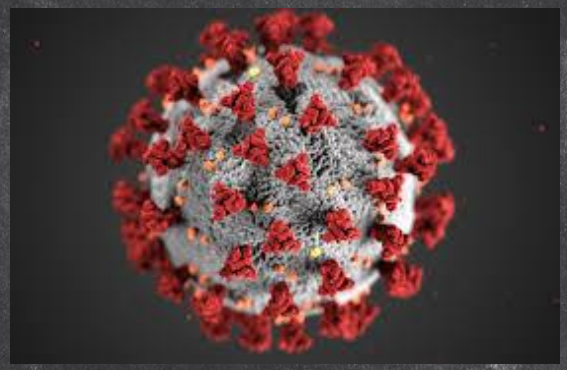






UCI MATH CEO

In Fall and winter 2020 we worked with ~350 students (5 MS + 1 HS) + 120 UCI mentors



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Online Math CEO In Spring 2020 (MS only)

What's next?

UCI MATH CEO: FALL 2020

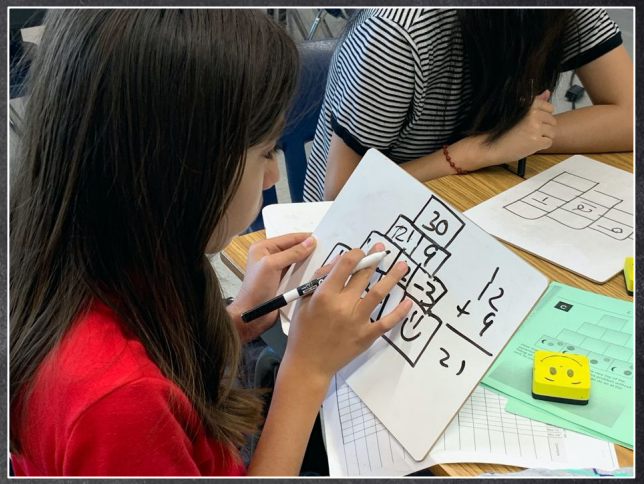
MS PROGRAM

- 4 schools
- Meetings: T 3:30-5pm

or: TH 3:30-5pm

- Training: M 3:00-4:00

or M 4:00-5:00

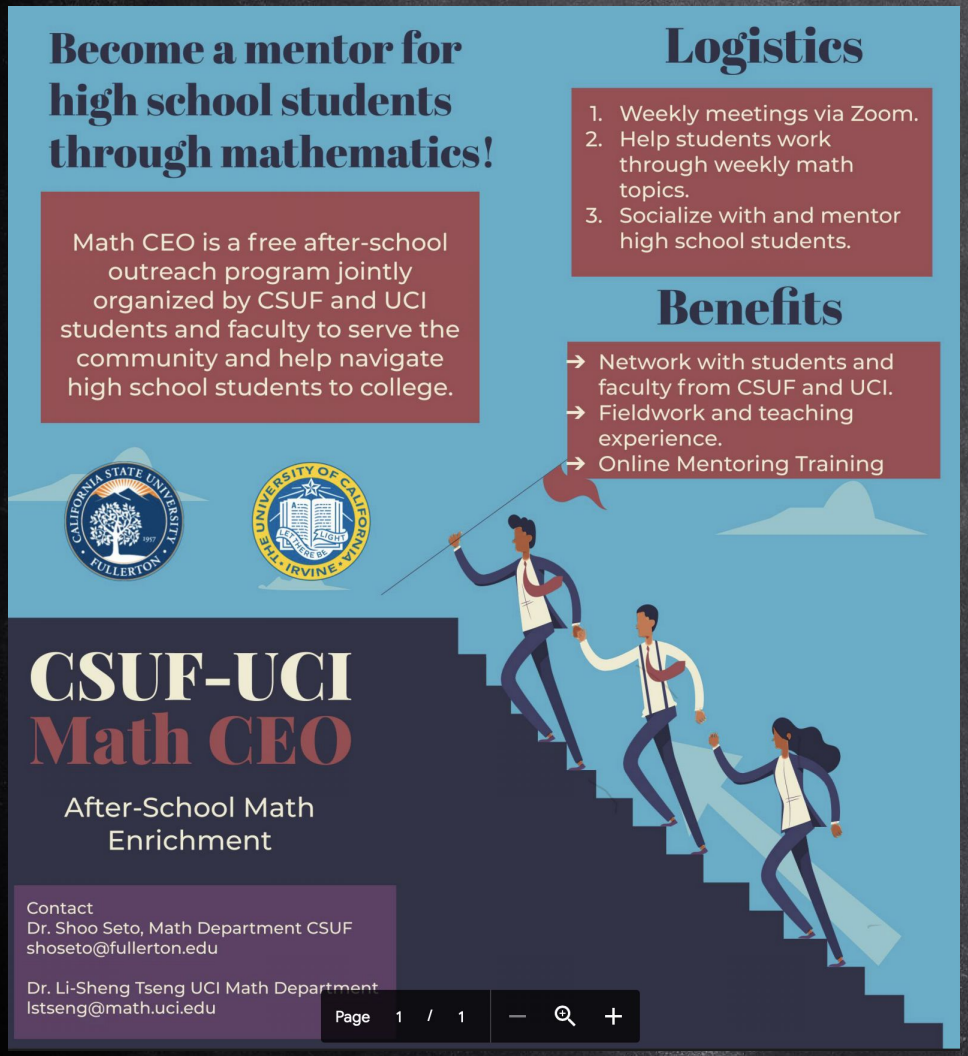


HS PROGRAM

- 2 schools
- Meetings: TH 3:30-5pm
- Training: T 3:30-5

We can use more help!!

UCI MATH CEO: HS PROGRAM



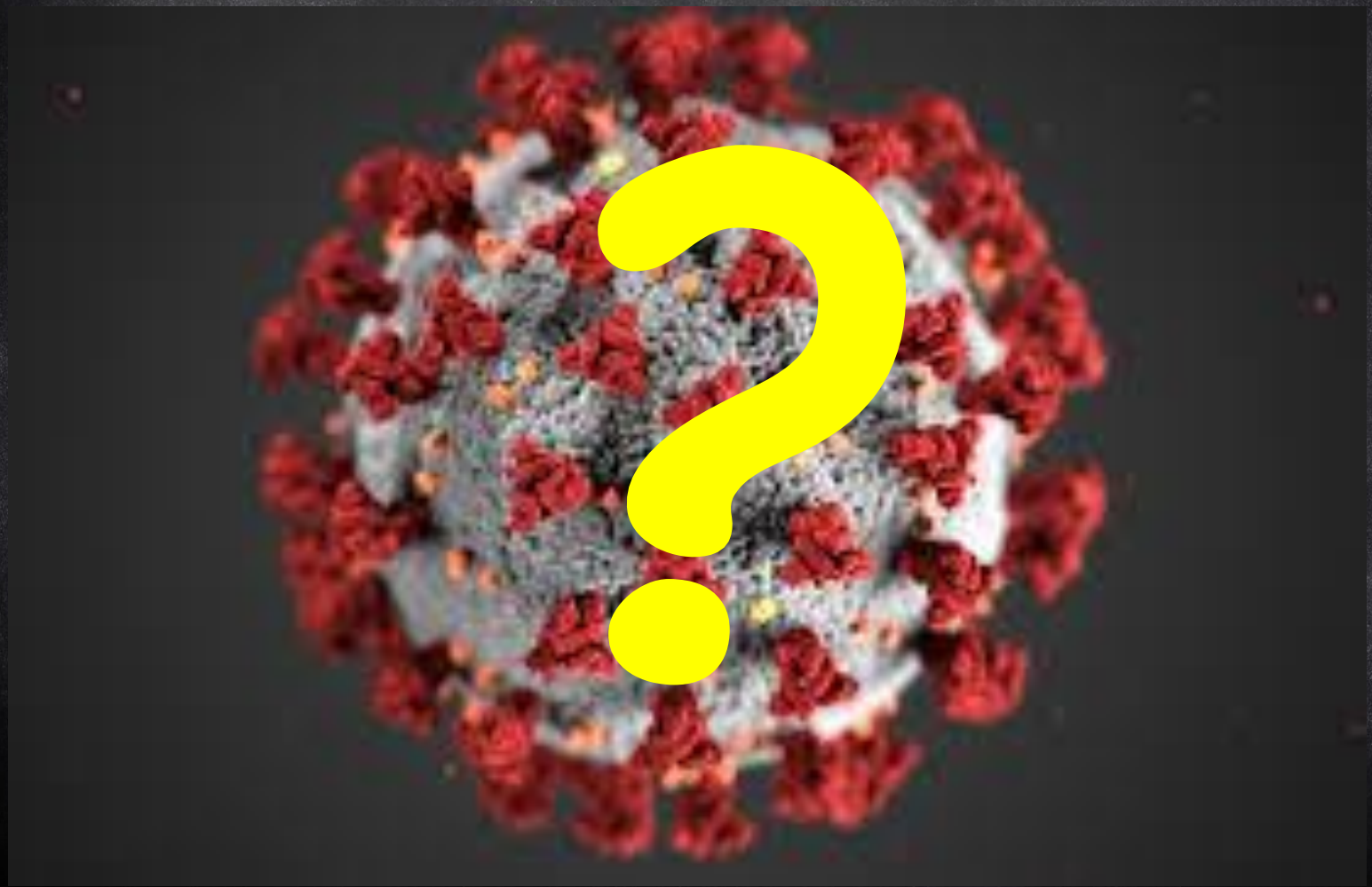
Need help developing curriculum:

math in context of real-world applications

"Math in Action"

MORE IDEAS

For outreach the community or to UGs?



To find out more...

https://sites.ps.uci.edu/mathceo/

- MS: Alessandra Pantano
- HS: Li-Sheng Tseng

https://www.math.uci.edu/~mathcircle/

- Alessandra Pantano
- Yasmeen Baki
- Nick Treuer