



**T H E A P P L I E D M A T H E M A T I C S
M E N T O R S H I P P R O G R A M :**

*A university-school-industry collaboration
to impact student affect and success*

2024 International Congress on Mathematics Education, Sydney Australia

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A recent analysis of 8th grade textbooks across 19 countries showed that higher-order real world application tasks were “almost nonexistent, averaging less than six exercises per 8th grade textbook” (Schmidt, et.al., 2022).

In the seminal Third International Mathematics Video Study, researchers found that U.S. students spent 0.7% of classroom seatwork time on tasks characterized as “invent new solutions think as compared to 44.1% for Japanese students (Stigler, J. & Hiebert, J., 1999).

Approximately four out of every ten Americans say they disliked their K-12 mathematics classes (Pew Research Center, 2018).

It is difficult to have a positive affect in a field which you find to be irrelevant and have no agency.



“World Class
K-12 Mathematics
For All.”



15th International Congress on
Mathematical Education
7-14 July 2024 • ICC Sydney, Australia
Come and be counted

AMMP is a community response to these challenges that aims to study the hypothesis that involving students in doing and creating applied mathematics relevant to them and their community will improve their affect and result in increased success in mathematics.



SpaceX Engineers

BILL & MELINDA GATES foundation



The MycoFluidics Lab



conservify



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3 SEMESTER - LONG INVESTIGATIONS



Introduction Heat Islands Investigation

Part I

Statisticians often use samples of a large population to create generalizations (make conclusions about the entire population). This process is known as statistical inference. A **representative** part of a population that closely reflects the whole population. If a sample is not representative, the conclusions made about the larger population based on the sample may be incorrect. Researchers generate representative samples through random sampling.

Today, your research team will analyze the average annual high temperature of a Los Angeles community by generating a representative sample of 12 random zip codes.

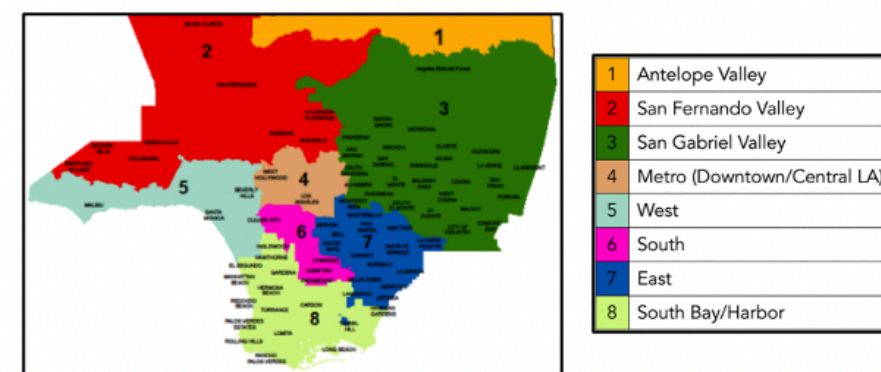


Photo from [LA County Website](#)

Go to <https://bit.ly/LAzipcodes>. This *Los Angeles County Zip Codes Document* has links to data for different zip codes in the communities shown above (excluding the Antelope Valley).

- Which community does your team want to investigate? What is the number of zip codes listed for this community?

Community: _____ Number of zip codes: _____

- With your team, create a representative sample of 12 random zip codes from your community.

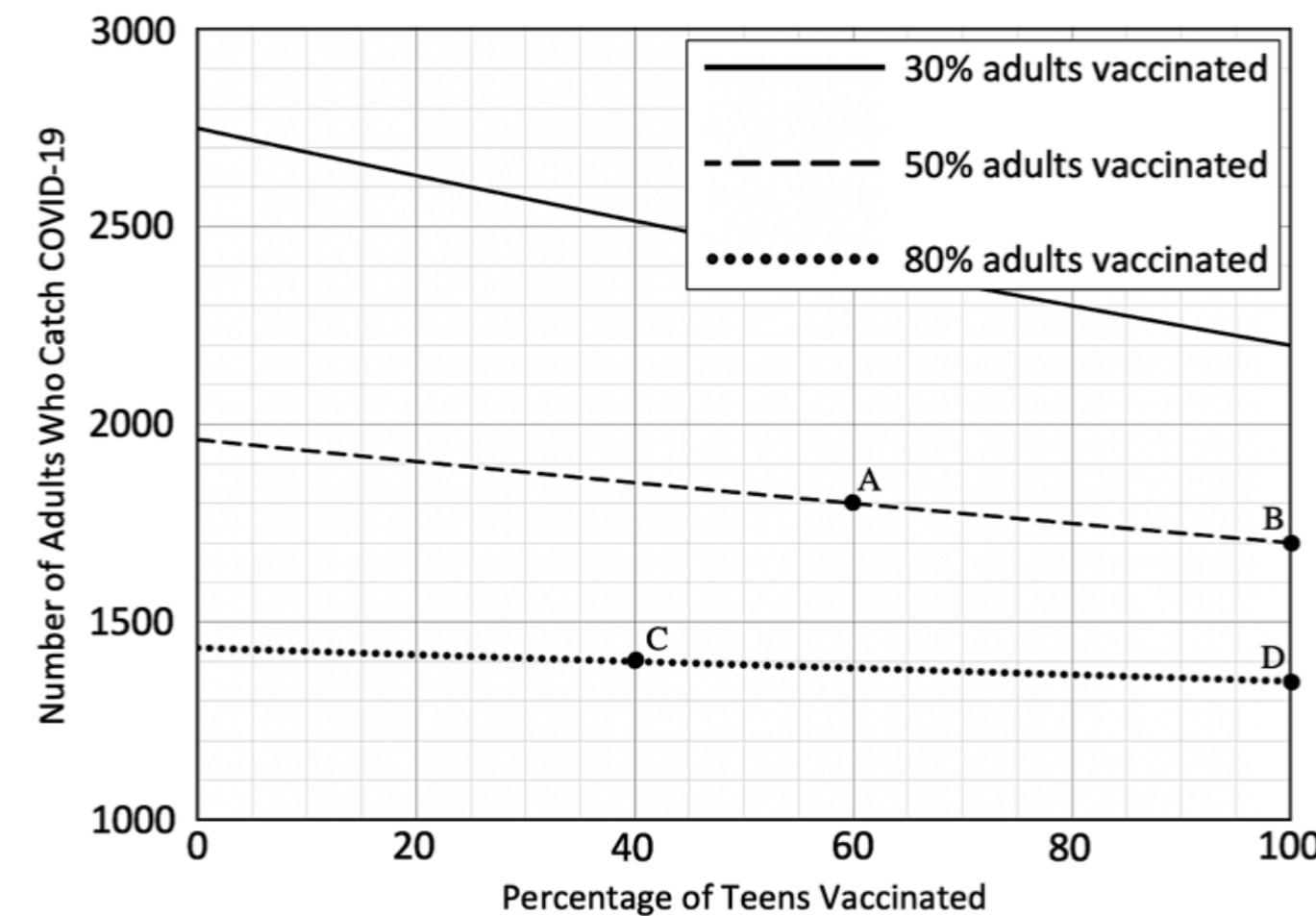
- Open a new tab and go to <https://www.google.com/>. Type “random number generator” into the search bar and press enter. You should see this:



Activity 5: Should There Be a Teen Vaccine Mandate? Part 1

Today, research teams will look at Covid-19 infection curves that predict how the number of infected persons might be affected by vaccination rates.

- Here are three graphs that attempt to predict how **adult infections** in the Crenshaw Los Angeles neighborhood would be affected by **teenage vaccinations**.



- What does Point A tell you about adults, teenagers, vaccinations and catching Covid?

Point A tells me that _____ are predicted to become

infected with Covid if _____



Activity 13: Parachute Back to Earth

On August 2, 2020, South Los Angeles engineer, [Dynamite Obinna](#), held his breath as he watched the SpaceX Crew Dragon capsule open its parachutes, slow down, and safely splash down off the coast of Pensacola, Florida.



The splashdown marked the end of the first manned mission by a private company to the International Space Station, and Dynamite played a major role in designing the parachutes so they would slow down the capsule to a safe landing speed. You can watch the splashdown [here](#).

In this activity, research teams will experiment with parachutes of different dimensions to figure out: *How does a parachute's size affect the speed of the object attached to it?*

INVESTIGATE:

- Have your Resource Coordinator gather the following supplies:

- 1 plastic cup
- 1 plastic grocery bag
- A long piece of string
- 4 coins
- Scissors
- Rulers
- Stopwatch (or smartphone)
- Clipboard
- Clear tape

- Have your Data Manager cut your parachute with the dimensions assigned to your research team as shown below:

Research Team #	Dimensions
1	6 inches x 6 inches
2	8 inches x 8 inches
3	10 inches x 10 inches
4	12 inches x 12 inches
5	14 inches x 14 inches

COMMUNITY SHOWCASE

Professor Edray Goins, SpaceX Astrophysicist
Amani Garvin, Professor Silvia Fernandez



UCLA Dean of Physical Sciences
Miguel García-Garibay



S T U D Y D E S I G N

Goal: measure impact of AMMP on student mathematical growth + affect

* 3 schools

* 7 instructors

* 207 treatment

* 19 undergrads

* 8 AMMP elective courses

* 600 control



Quasi-Experimental Match Comparison Design: each AMMP student matched to a non-AMMP student with similar baseline mathematics performance and same core mathematics instructor. Results pooled across 7th, 8th, and 9th grade participants.

Instrumentation: pre- and post- student and teacher surveys; teacher, administrator, and student focus groups; interim and end-of-year summative student mathematics assessment data; and teacher and undergraduate mentor logs during both professional development and the student program. Full report expected Fall 2024.

World Class K-12 Mathematics For All



link to paper. full report to be posted here.