



# Discrete Math Partnership

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# Overview and Pedagogical Approach

The goal of mathematical instruction is for students to **acquire mathematical ways of thinking, habits of mind or standards for mathematical practice.**

A goal of this project is to introduce students to **foster curiosity.**

Treat learners as *partners* in knowledge construction.

**Problem solving and productive struggle** are essential for mathematical knowledge construction. Learners should experience **phenomena before labels** are introduced.

Positions **students** as **responsible** for generalizing, conjecturing and justifying.

# Program Features: Sweetwater Union High School District Schools

- Districtwide **pilot** implementation (2017-18)
- 1 course buy-out
- Teaching in pairs
- On-site and off-site PD

# Course Overview

## Why Discrete Math?

- “Eclectic” content with **focus on ways of thinking** as much as specific skills
- low floor / high ceiling problems that allow embedded practice
- Strong potential connections to computer science



# Course Overview

## Why Discrete Math Here?

- Remediation is major problem in California universities
- Discrete math is taught at Sweetwater, Southwestern, and SDSU
- Build on existing infrastructure, including Compact for Success



# Course Overview

What's in *our* Discrete Math Course?

- Combinatorial Game Theory  
(games for short)
- Graph Theory
- Iteration/Recursion
- Combinatorics
- Cryptography



# Major Units

## 1. Combinatorial Game Theory (games for short)

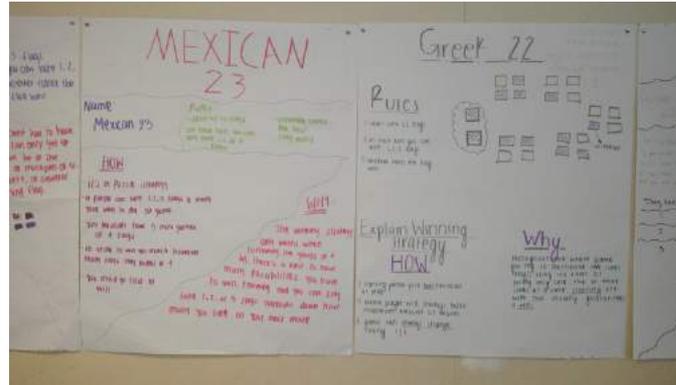
## 2. Graph Theory

## 3. Iteration/Recursion

## 4. Combinatorics

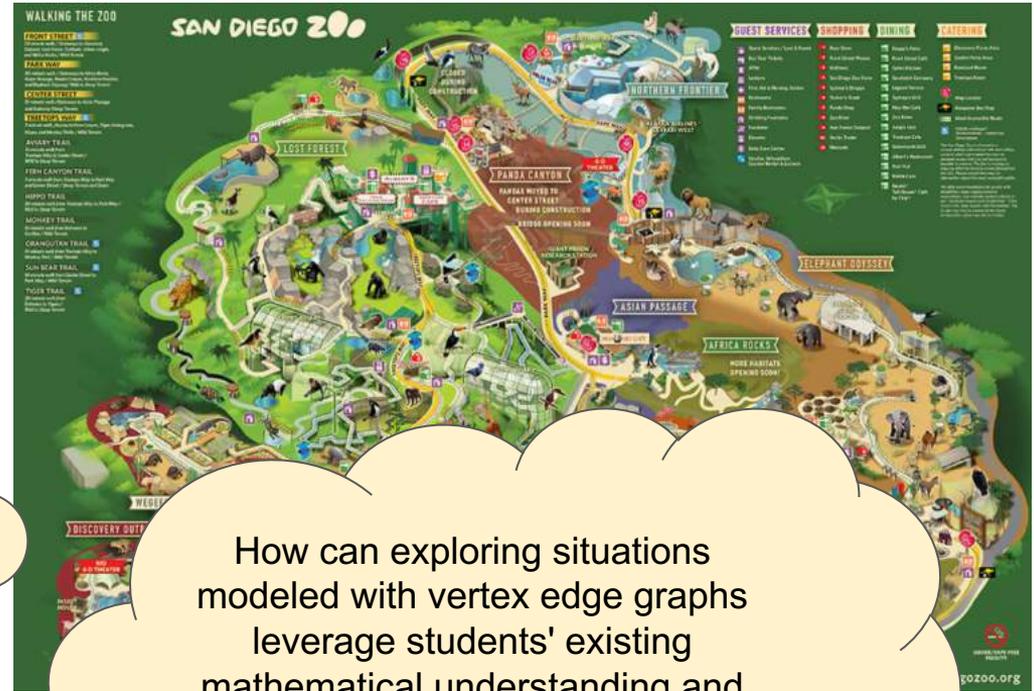
## 5. Cryptography

How can students systematically **explore** a game, **make conjectures** about winning positions, and **justify** explanations of strategy?



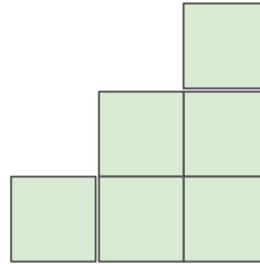
# Major Units

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- 2. Graph Theory**
3. Iteration/Recursion
4. Combinatorics
5. Cryptography



# Major Units

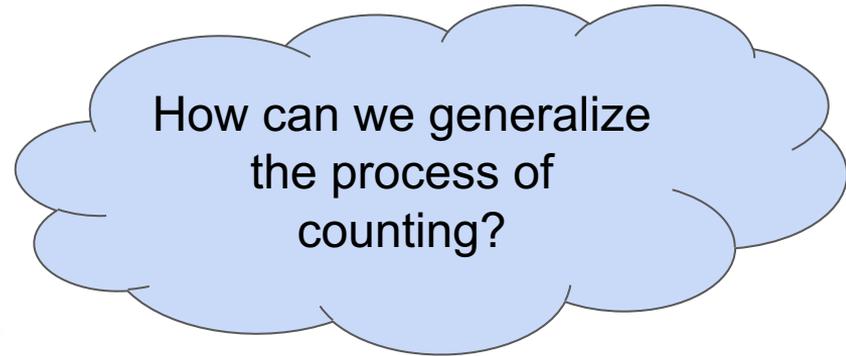
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2. Graph Theory
- 3. Iteration/Recursion**
4. Combinatorics
5. Cryptography



How can students make use of structure and repeated processes to make use of structure and repeated processes to make use of ....

# Major Units

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2. Graph Theory
3. Iteration/Recursion
- 4. Combinatorics**
5. Cryptography

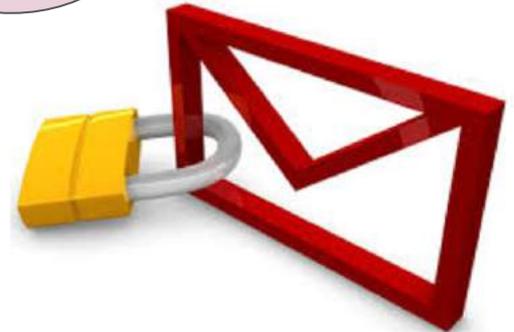


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# Major Units

1. Combinatorial Game Theory (games for short)
2. Graph Theory
3. Iteration/Recursion
4. Combinatorics
- 5. Cryptography**

How do people use mathematical tools to, create, and analyze algorithms for encrypting information?



# Early Feedback

“One of my students, who squeaked by both IM2 and IM3, said today:

‘I am thinking more than in any math class I’ve ever taken . . . and it’s fun!’

That felt like a touchdown must feel for a football player!

- Melody Morris, DMP Teacher Olympian High School

# Transition to College Courses

- Serious attention to meaning
- Focus on justification
- Targeting Standards for Mathematical Practice
- Southwestern and SDSU both offer DM
- Hopefully a change in mindset (increased enjoyment of) toward mathematics

1. How can new schools/districts get in on this curriculum/courses?
2. How can schools go see the courses in action?
3. Where are they being implemented in 2017-18?
4. Who should they contact?