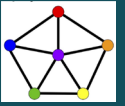


Equity and Access in Discrete Mathematics

“I learned how to be a voice”

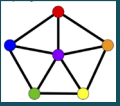
An approach to equitable collaboration

Plan



- Example Team Building Activity (~20 min)
- Seed Project Review (~10 min)
- Q&A (~10 min)

Checking-in



0



1



2



3

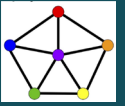


4



5

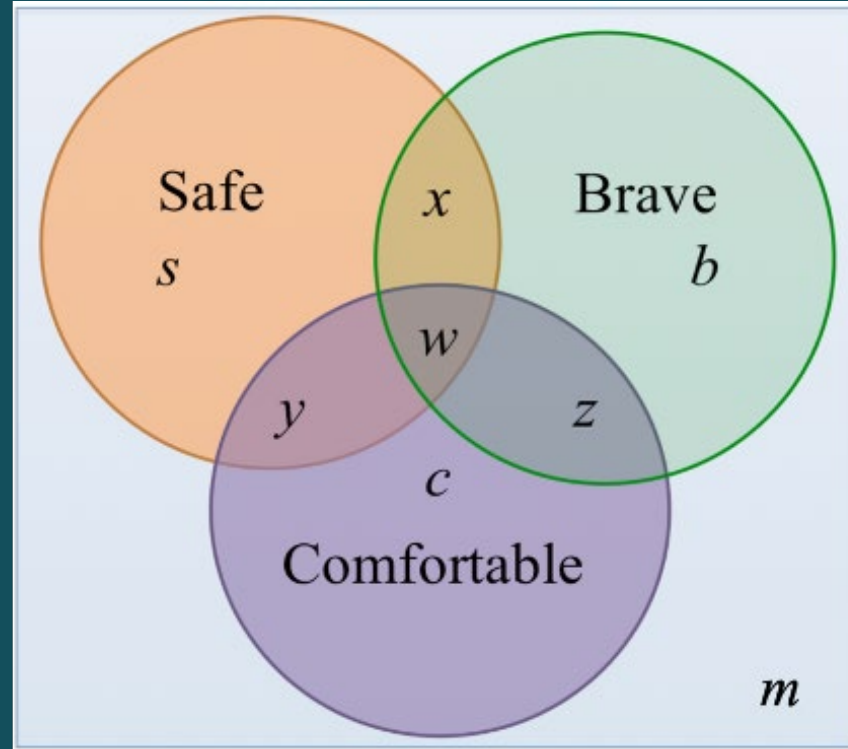
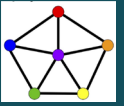
Norms



- (1) stay engaged,
- (2) expect to experience discomfort,
- (3) speak your truth & hear the truth of others,
- (4) expect and accept a lack of closure.

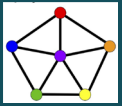
Singleton, G. E., & Linton, C. (2006). *A field guide for achieving equity in schools*. Thousand Oaks, CA: Corwin.

Safe, Comfortable, Brave



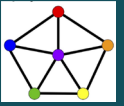
U = Personal experience of an interaction

Change Theory



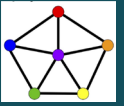
- Structures
- People
- Power
- Symbols

Change Theory



- **Structures:** rules, policies, procedures, management, interaction
- **People:** characteristics, experiences, needs
- **Power:** resource allocation, formal and informal seats/sources/sinks of power
- **Symbols:** meaning and culture, rituals and habits, stories, sensemaking

Change Theory



- **Structures:** rules, policies, procedures, management, interaction
- People
- Power
- Symbols

Change Theory – Structures

- How do people interact?
- What policies, procedures, processes are bottlenecks or levers for change?
- What committees or bodies are influential?
- How are resources and spaces allocated?

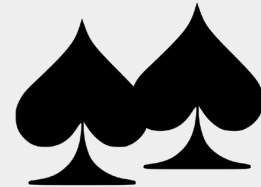
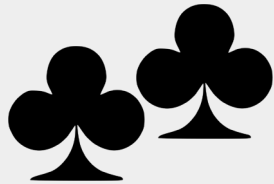
Change Theory – Structures

- How do people interact?
- What policies, procedures, processes are bottlenecks or levers for change?
- What committees or bodies are influential?
- How are resources and spaces allocated?

Part 1: Reflect

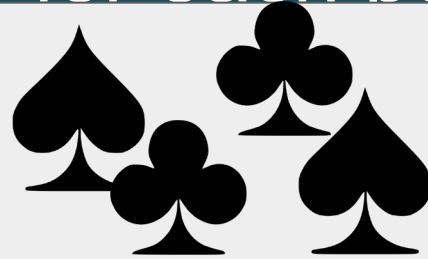
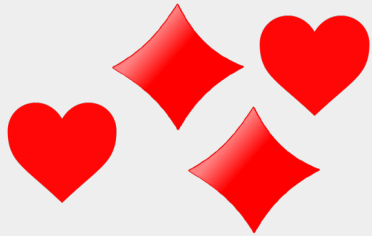
Pair up. Each person makes small notes:

- How do people interact?
- What, policies, procedures, processes are bottlenecks or levers for change?




Part 2: Similarities and Differences

Pair pairs. Find at least one group similarity and at least one uniqueness for each person.



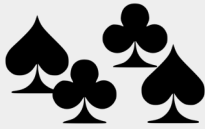
 = Liaison (visual)

 = Liaison (visual)

 = Reporter (verbal)

 = Reporter (verbal)

Group: Magic Eight Ball



A

C

y

y

W

W

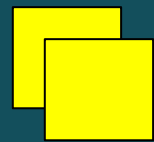
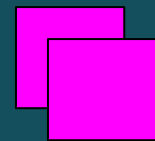
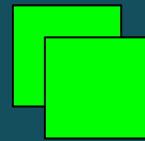
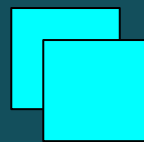
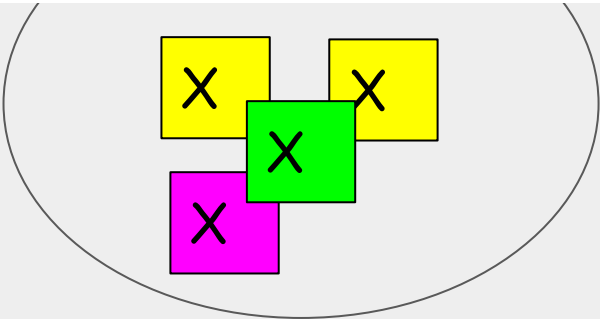
W

B

D

Uniquenesses (e.g., online, off-campus, on-campus, asynchronous)

Common to Group: We all see a need for X



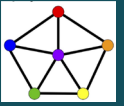
Part 3: Next Steps

- Identify one idea from someone else that you want to learn more about.
- Make a note to send yourself a reminder email about it that will arrive next Tuesday.

Team-Building & Changing Discrete Mathematics

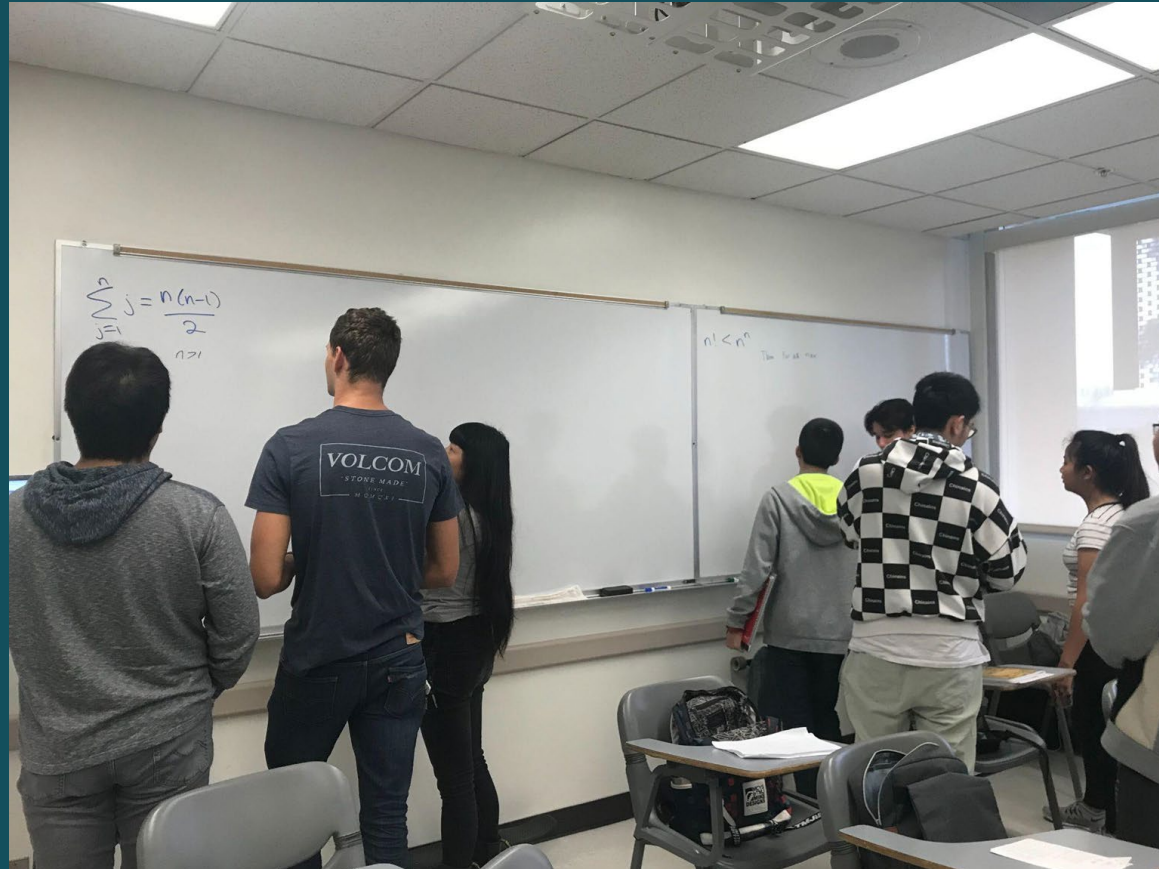
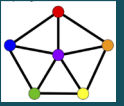
- Regular check-ins
- Activity rooted in aspects of change with
 - Learning for acknowledgement
 - Planning for action
 - Documenting for accountability

Team members say...



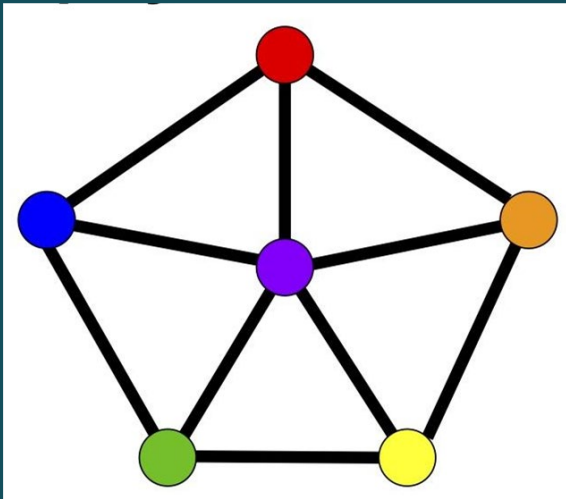
- Everyone's input contributed something positive to the project. **I learned how to be a voice.**
- As a team, we each had our own individual contribution that was significant, challenging, and fulfilling. **Each group learned from the others'** and we eventually came up with a common structure.
- Open and **constructive dialogues** right from the inauguration of the project.

Active Classroom



What is Discrete Mathematics?

$\{\dots, -2, -1, 0, 1, 2, \dots\}$



Example of GPA disparity

Recall: $4.0 = A$, $3.0 = B$, $2.0 = C$

Example of GPA disparity

Recall: 4.0 = A, 3.0 = B, 2.0 = C

↙ lowest passing grade

Example of GPA disparity

Recall: 4.0 = A, 3.0 = B, 2.0 = C

↳ lowest passing grade

- historically privileged: 2.28 ← doorway

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- historically marginalized: 1.72 ← wall

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Calculus reform took 40 years ↳ (2.02)

Example of GPA disparity

Recall: $4.0 = A$, $3.0 = B$, $2.0 = C$

↙ lowest passing grade

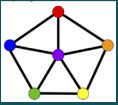
- historically privileged: $2.28 \leftarrow$ doorway
- historically marginalized: $1.72 \leftarrow$ wall

Calculus reform took 40 years.

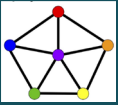
We aim to reform discrete math, faster.



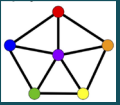
- **Goal:**
- **Products:**
- **Outcomes:**



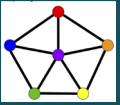
- **Goal:** provide access for each student to the intellectual work of collaborative discrete mathematics
- **Products:**
- **Outcomes:**



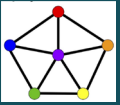
- **Goal:** provide access for each student to the intellectual work of collaborative discrete mathematics
- **Products:**
 - classroom materials with instructor guides
- **Outcomes:**



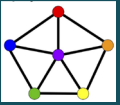
- **Goal:** provide access for each student to the intellectual work of collaborative discrete mathematics
- **Products:**
 - classroom materials with instructor guides
 - map for policy revision
- **Outcomes:**



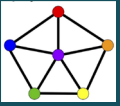
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- **Products:**
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- **Outcomes:**
 - increased belonging in discrete mathematics



- **Goal:** provide access for each student to the intellectual work of collaborative discrete mathematics
- **Products:**
 - classroom materials with instructor guides
 - map for policy revision
- **Outcomes:**
 - increased belonging in discrete mathematics
 - shifted instructor views of self & students' abilities

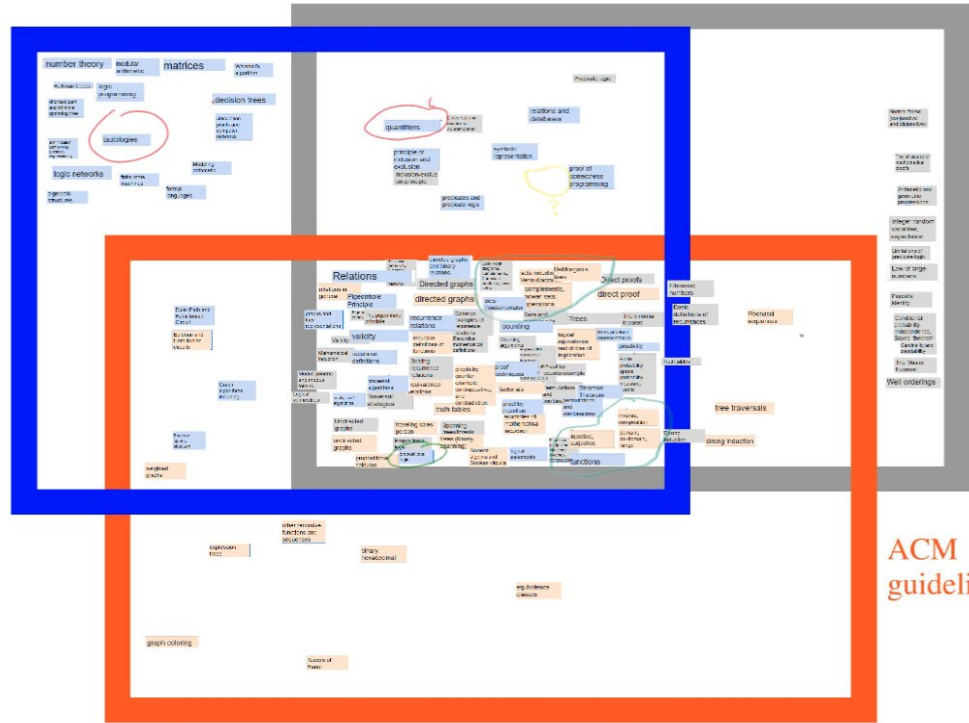


- **Goal:** provide access for each student to the intellectual work of collaborative discrete mathematics
- **Products:**
 - classroom materials with instructor guides
 - map for policy revision
- **Outcomes:**
 - increased belonging in discrete mathematics
 - shifted instructor views of self & students' abilities
 - policy map reverberated with instructor reports



Analyzed existing C-IDs & client discipline standards.

Discrete math C-ID



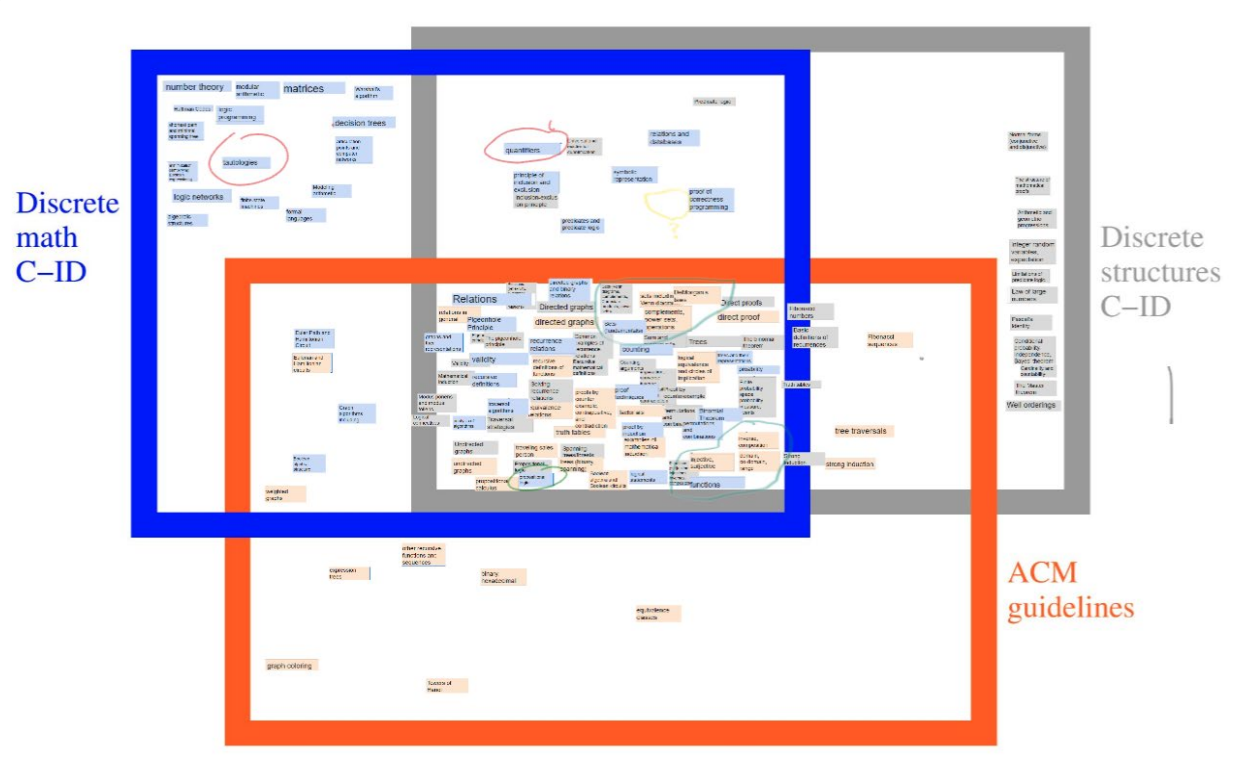
Discrete structures C-ID

ACM guidelines



Analyzed existing C-IDs & client discipline standards.

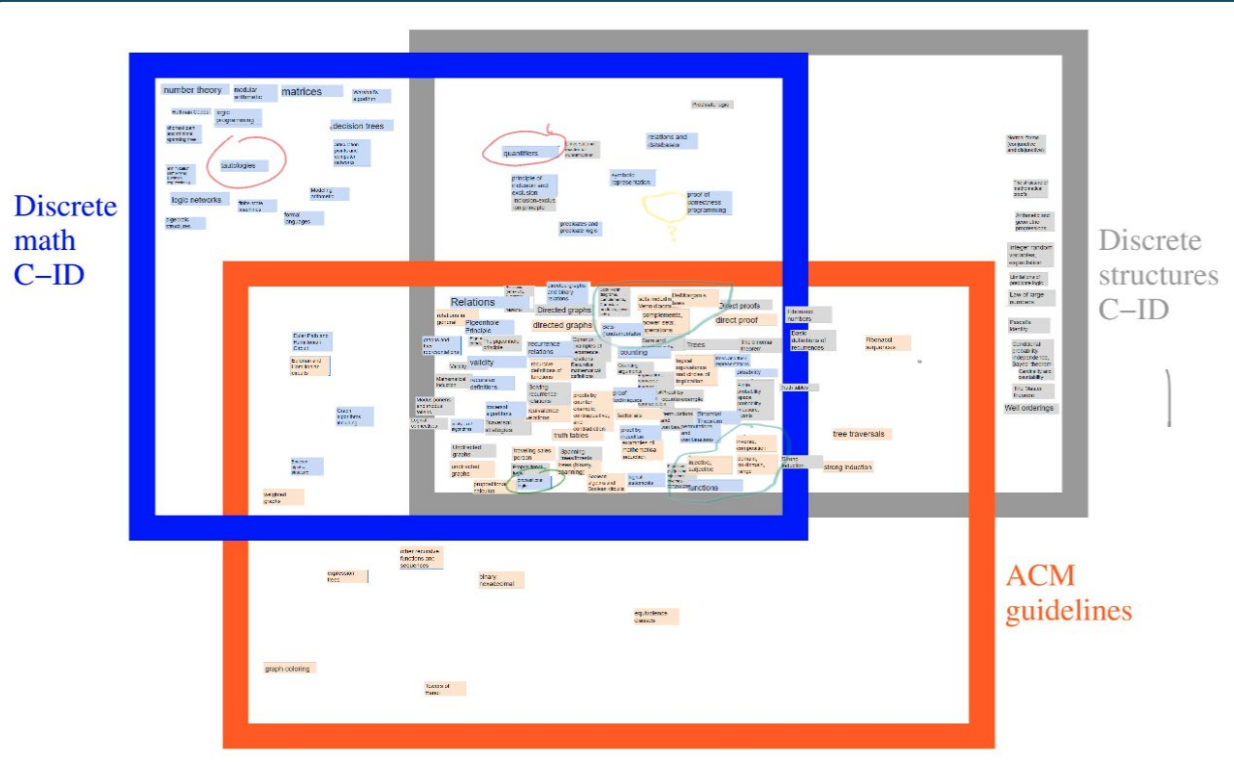
Identified overlaps in **essential content** (e.g., functions, graphs)

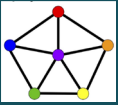




Analyzed existing C-IDs & client discipline standards.

Identified overlaps in **essential content** (e.g., functions, graphs) & **mathematical practices** (e.g., noticing patterns, abstracting, justifying, critiquing the reasoning of others).

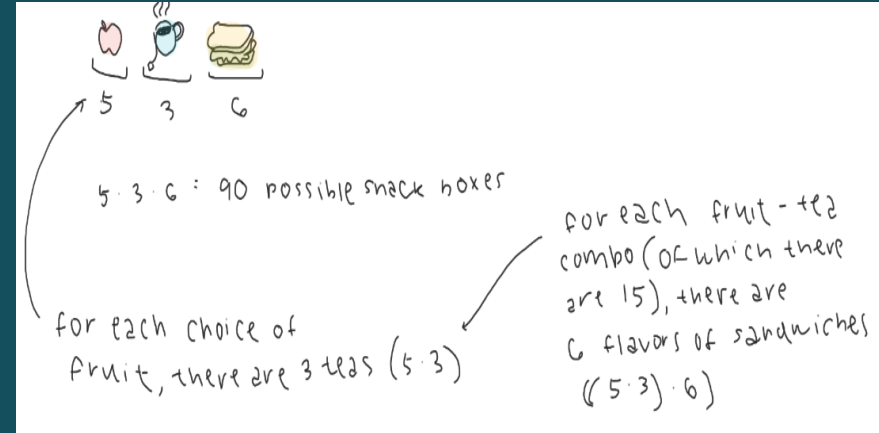
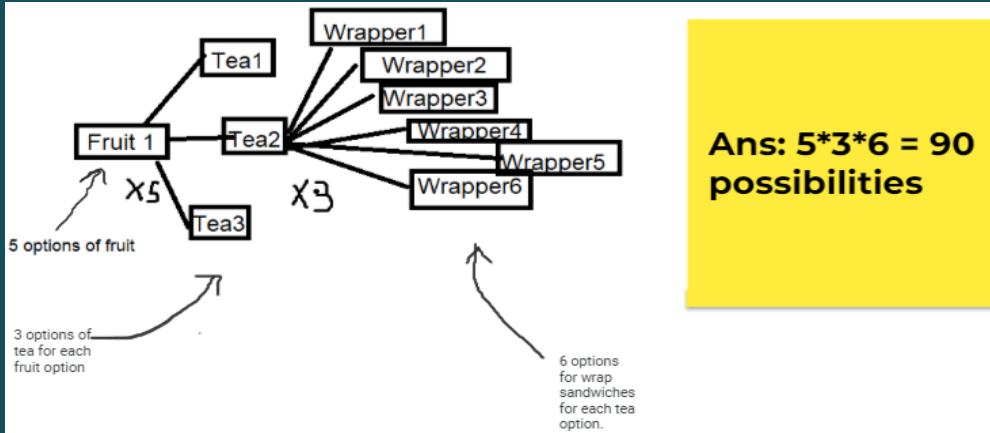




- Four lessons developed in the project.
 - Intro to team-worthy work
 - Binomial/number triangle
 - Handshake
 - Dot game/Ramsey theory



- **Purpose:** Students work with combinations & vocabulary to generate alternative ways to think about a problem.
- **Description:** Students explore and solve combinatorial problems. Teams present and explain work, discuss, and write reflections about vocabulary and approaches.



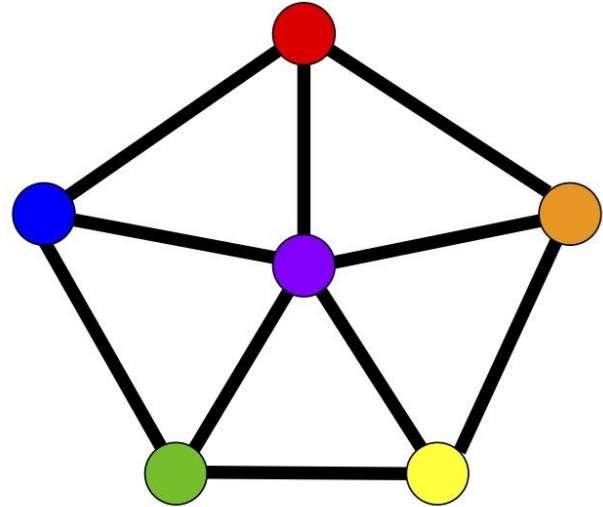
Thank You!

Tim Hsu

Shandy Hauk

Expanding

Equity and Access In



Discrete Mathematics