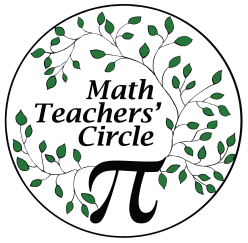
Triangles, Squares, & Segregation

Tara T. Craig & Anne M. Ho

Joint Math Meetings 2017



Who We Are

Motivation

"During the second week of summer vacation, **Michael** practiced his guitar for 10 minutes less than twice the amount of time he practiced the first week. If he practiced *m* minutes the first week, what is an expression that represents the number of minutes that **Michael** practiced during the second week?"

Motivation

"During the second week of summer vacation, **Miguel** practiced his guitar for 10 minutes less than twice the amount of time he practiced the first week. If he practiced m minutes the first week, what is an expression that represents the number of minutes that **Miguel** practiced during the second week?"

Social Justice Standards

Diversity:

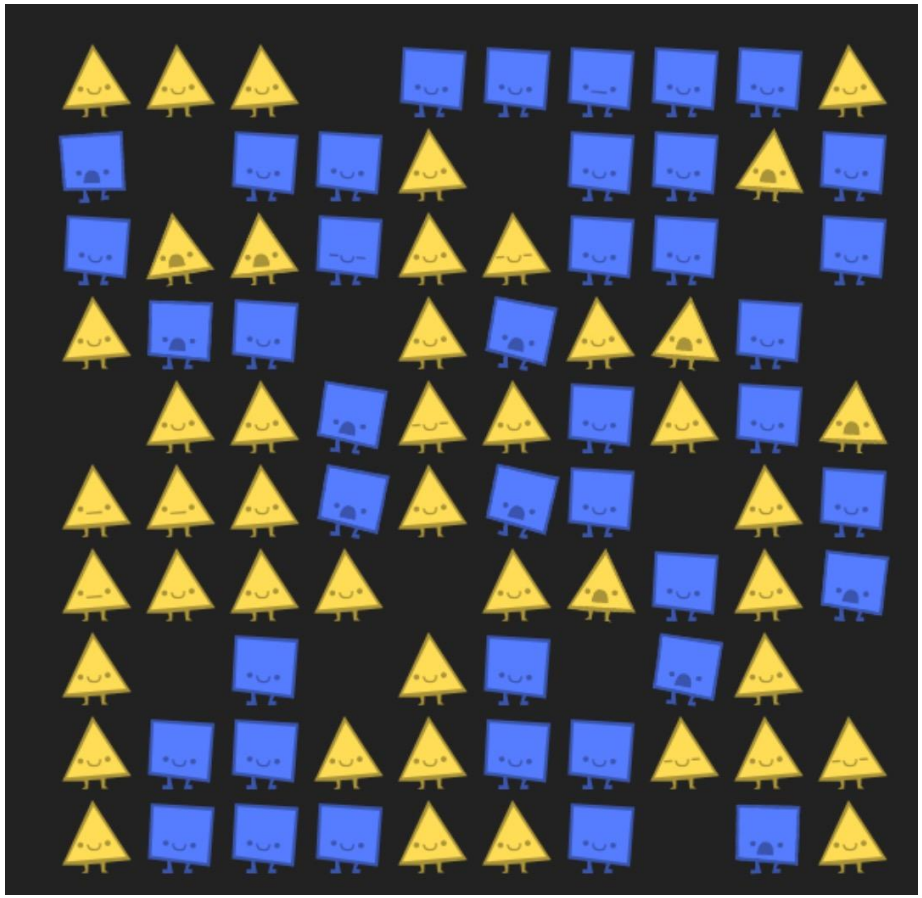
I interact with people who are similar to and different from me, and I show respect to all people.

Justice:

I can recognize and describe unfairness and injustice in many forms including attitudes, speech, behaviors, practices and laws.

From Teaching Tolerance

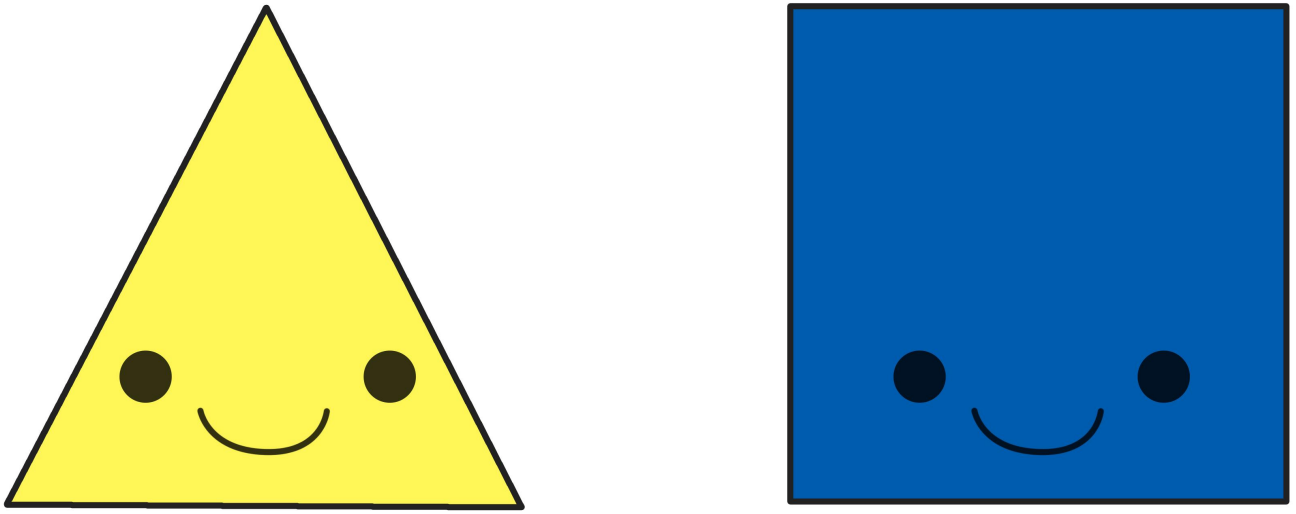
The Game



From Vi Hart and Nicky Case's Parable of the Polygons

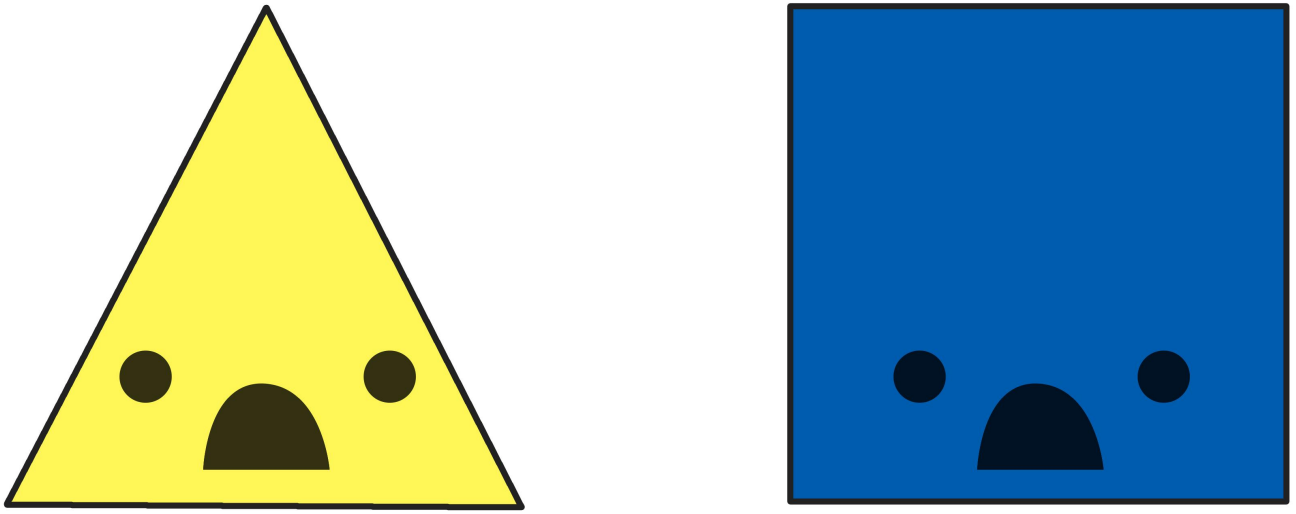
Population of Polygons

This is a population of Polygons including Triangles and Squares. Sometimes the Polygons are happy...



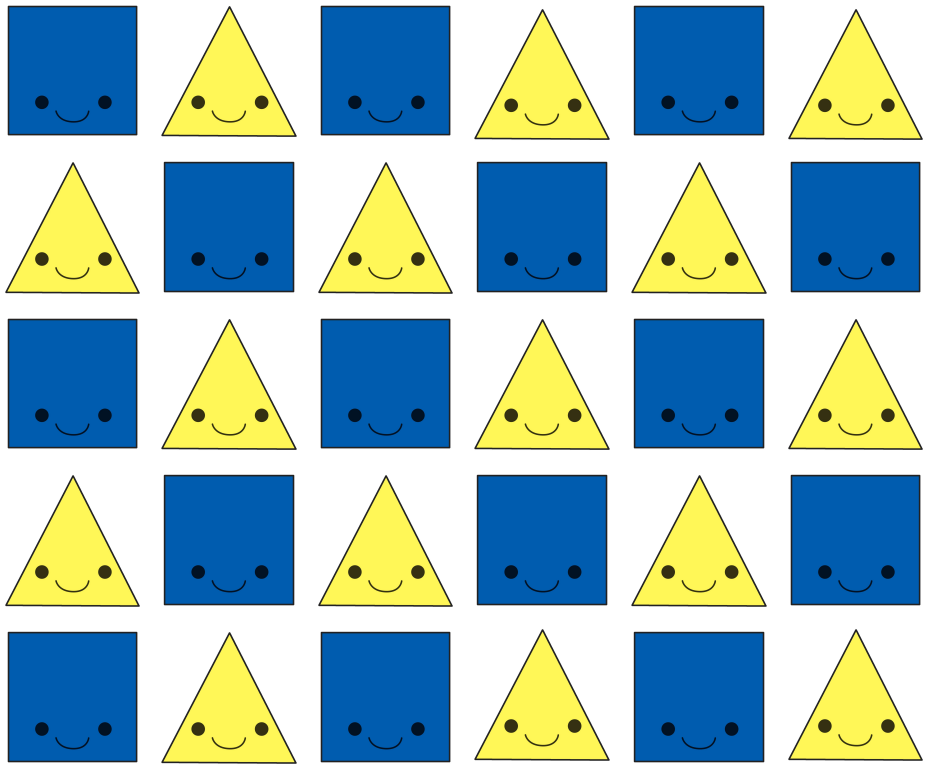
Population of Polygons

...and sometimes they are upset.



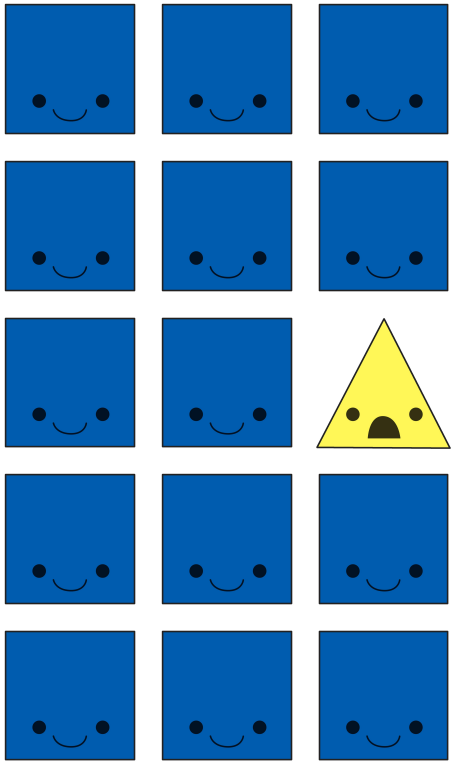
Population of Polygons

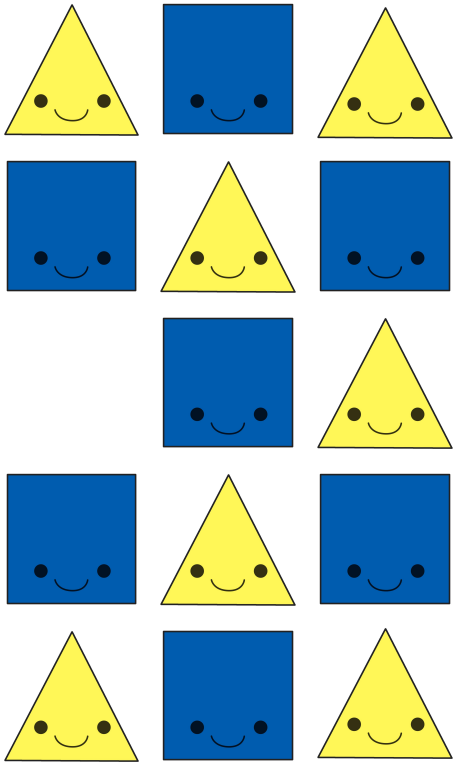
All the Polygons live together as neighbors.



Population of Polygons

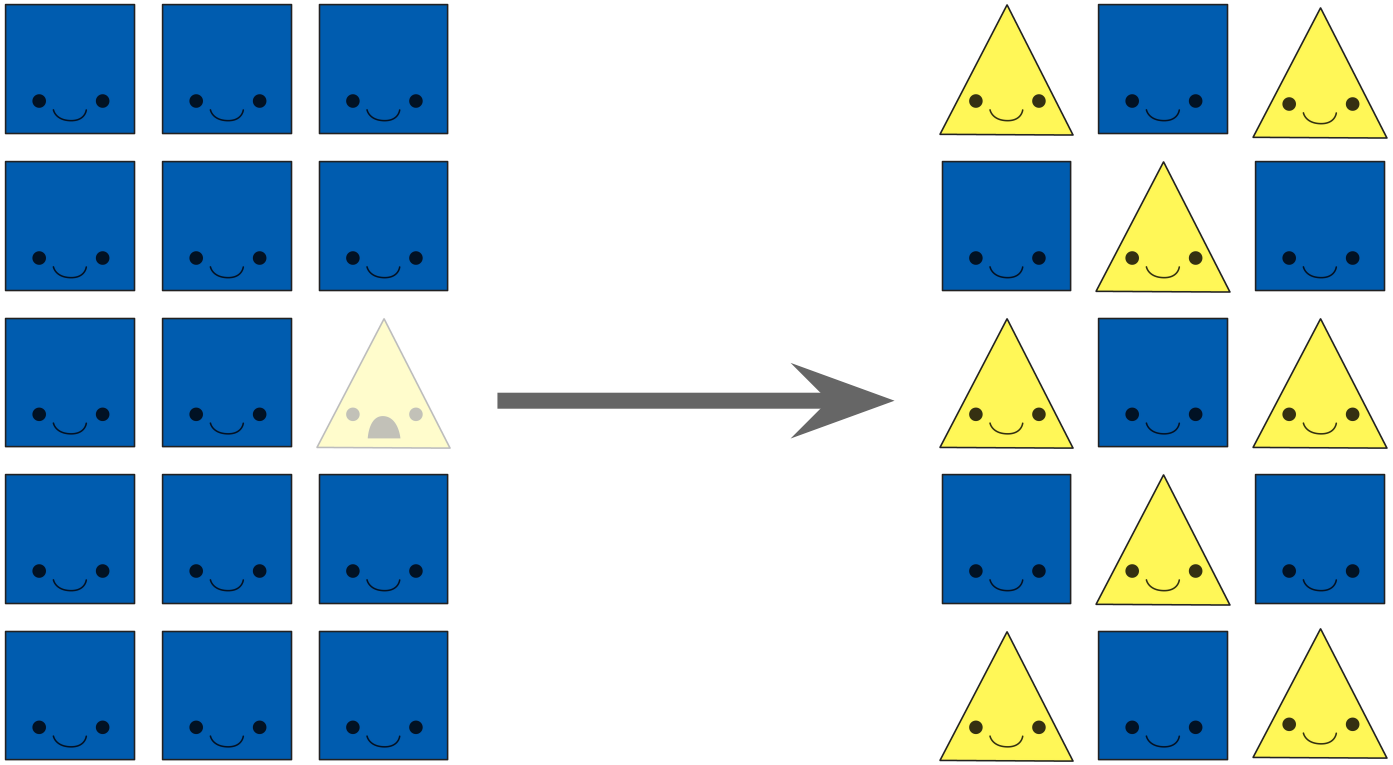
They get upset when not enough neighbors are similar to them.





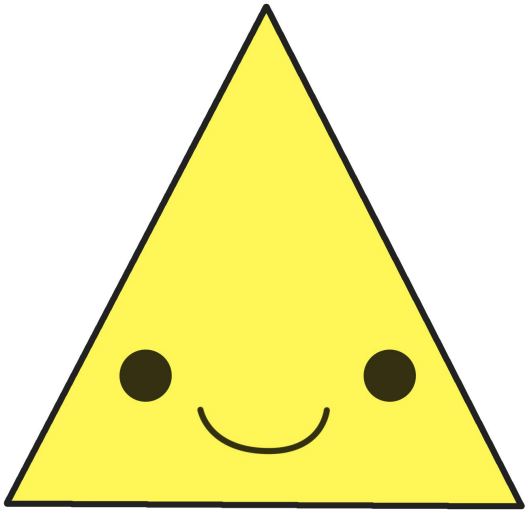
Population of Polygons

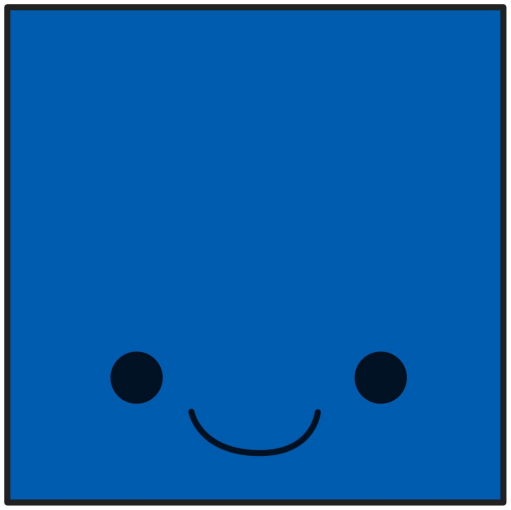
Every Polygon prefers to live with at least some neighbors that share similar traits.



Rules of the Game

- You will be given a board with Triangles and Squares.
- Your goal is to make all the Polygons happy.





Rules of the Game

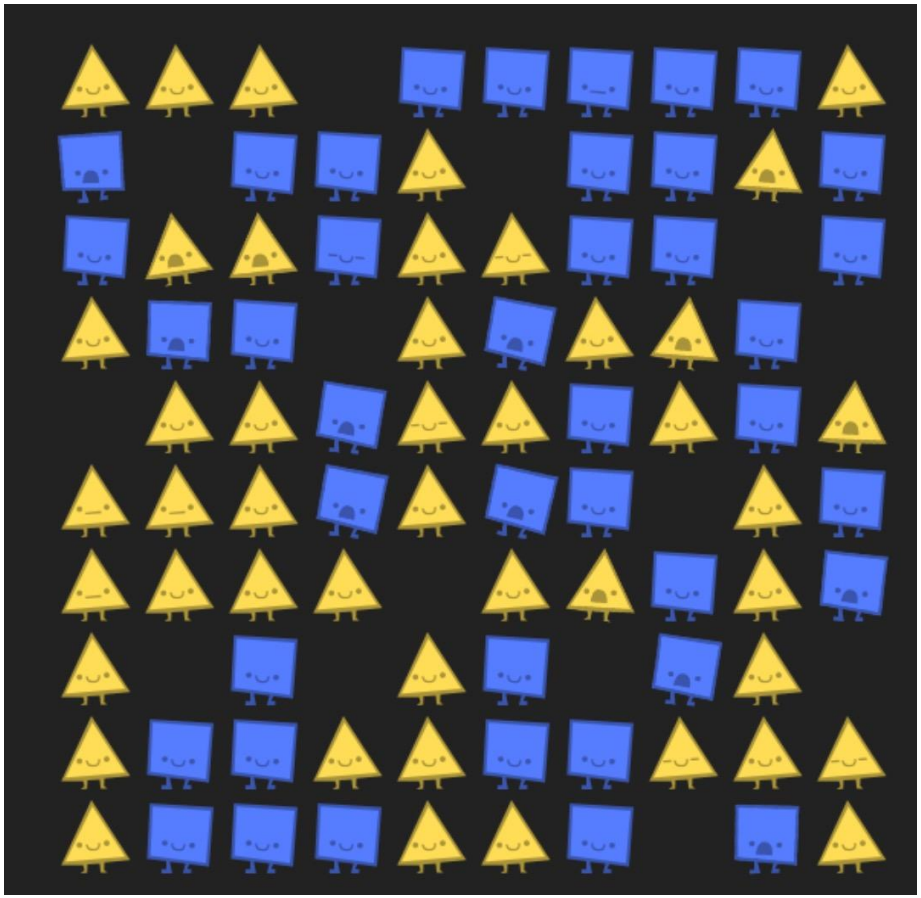
- You can only move Polygons if they are unhappy with their immediate neighborhood.
- You cannot move them if they are currently happy, but their mood can change depending on their neighbors.
- They all believe two things:

“I want to move if fewer than 1/3 of my neighbors are like me.”

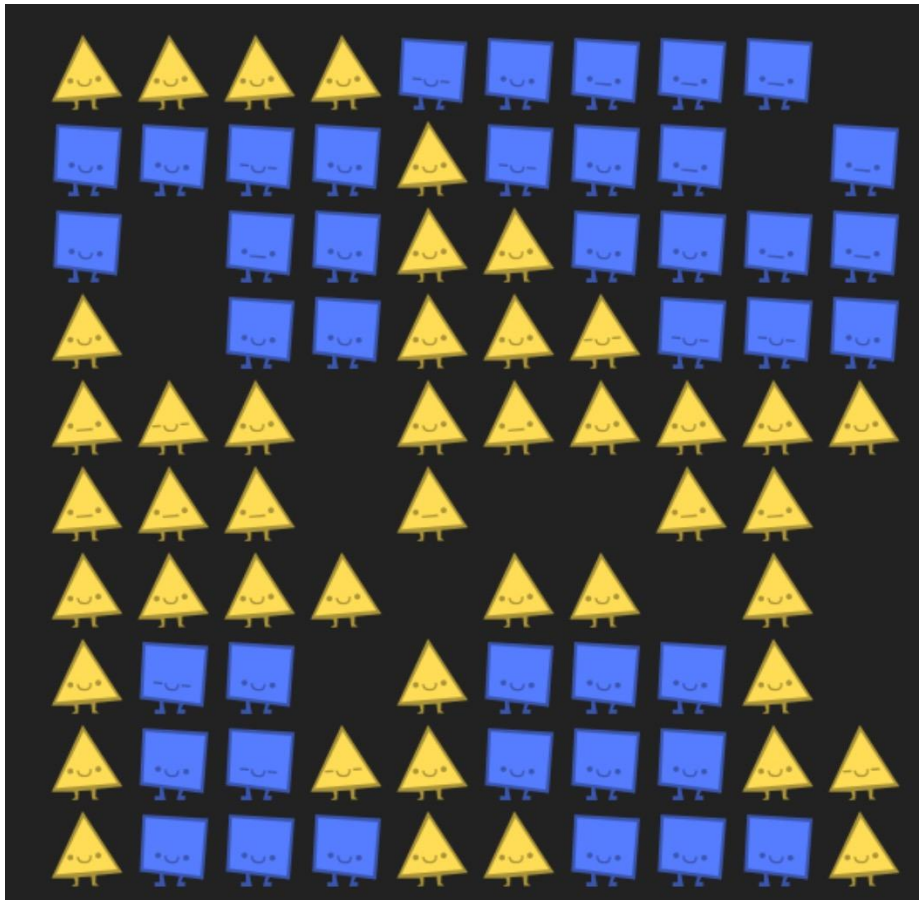
and

“I want to move if I have no neighbors.”

How would you win?



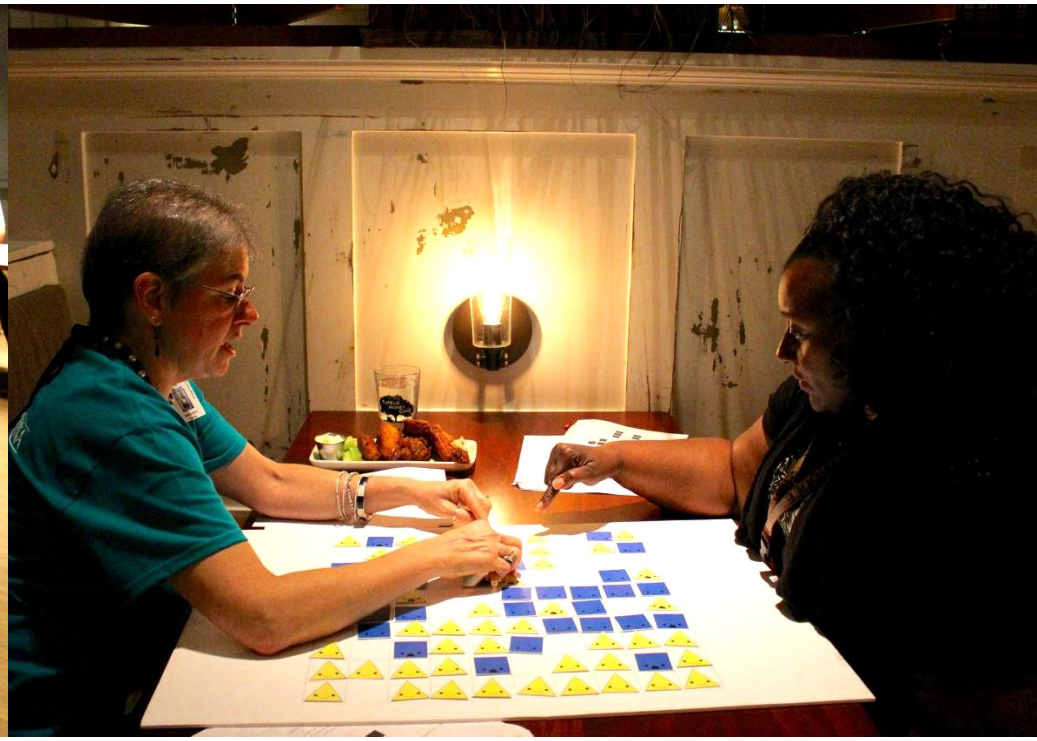
Solution



Phases

Phase 1

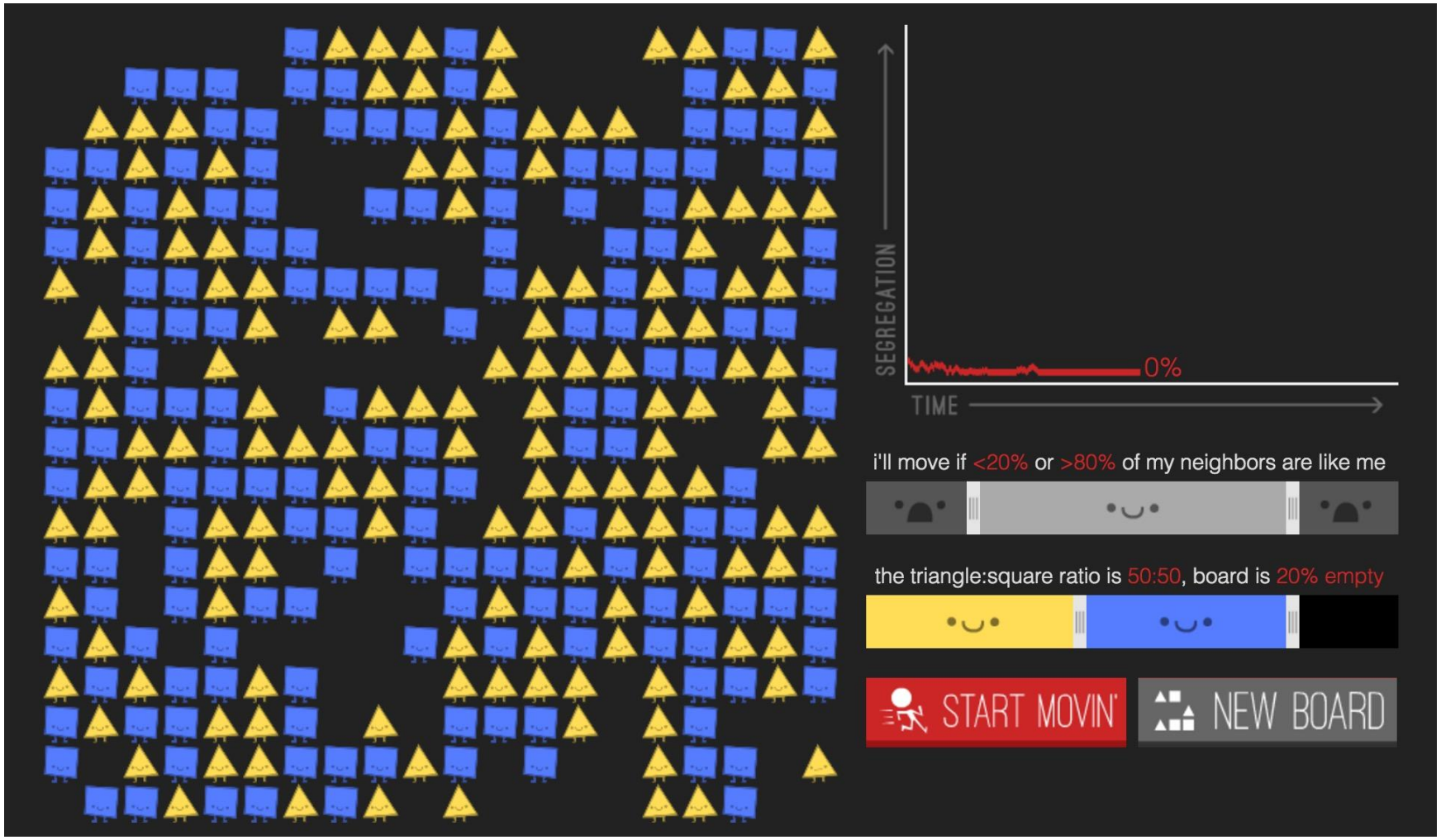
Teachers got very engaged and wanted to win!



Phase 2

"About halfway through the game I started seeing the pieces as **people and not just shapes**. I then realized I didn't want to win anymore if the goal was **segregation**." -Sydney Logan

Phase 3


SEGREGATION
0%
TIME
i'll move if <20% or >80% of my neighbors are like me
the triangle:square ratio is 50:50, board is 20% empty
START MOVIN'
NEW BOARD

Discussion

- More than fractions
- Talking more than typical math sessions
- Opening the door for social issue discussions

Questions?

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- Parable of the Polygons: http://ncase.me/polygons/
- Project Implicit: https://implicit.harvard.edu/implicit/index.jsp
- Social Justice Standards: http://www.tolerance.org/anti-bias-framework

I am an advocate for environmental protection and climate stability
in part because my travel to this conference has increased my carbon footprint.

Join our efforts:

https://www.facebook.com/groups/mathpeopleforplanet/

https://www.teamsierra.org/StandTogether/mathpeopleforplanet

https://sites.google.com/view/greenmath