Prejudiced Polygons ver 2.2

inspired by the work of Vi Hart & Nicky Case modified from collaborations with Tara Craig & Jaime McCauley

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Introductions

- 1. Introduce yourselves.
- 2. Find **three** things in common.

Norms

- Respect everyone's views.
- Listen actively.
- Allow everyone opportunities to participate and contribute.
- Sit with any discomfort and learn.
- Speak from your own experience, and speak with compassion.

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





...and sometimes they are upset.





All the Polygons live together as neighbors.



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





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



Rules

Today, we'll start with a newly zoned neighborhood.

- 1. **Populate** the neighborhood with a given number of Triangles and Squares.
- 2. Determine if the Polygons are **happy or upset**.
- 3. Goal: **place or move** Polygons, so that everyone is happy.







Polygons all believe two things:

"I am unhappy if fewer than 1/3 of my immediate neighbors are like me."

and

"I am unhappy if I have no immediate neighbors."







Immediate neighbors are defined to be the Polygons on either side or diagonally next to an individual Polygon.

The middle Triangle has 8 immediate neighbors.



These two Triangles are not immediate neighbors.



In this example, the middle Triangle is unhappy because only 1/6 of its immediate neighbors are similar, and 1/6 < 1/3.



The middle Triangle is unhappy because it has no immediate neighbors.













Your turn!

- 1. **Populate** a 5x5 neighborhood with **7 Triangles** and **12 Squares**.
- 2. Determine if the Polygons are **happy or upset**.
- 3. Goal: **place or move** Polygons, so that everyone is happy.
 - If any Polygon is upset, you may move them. Be sure to check their neighbors' happiness from both **before and after** the move.
 - Polygons will only move if they are unhappy. Happiness conditions:

"I am unhappy if fewer than 1/3 of my immediate neighbors are like me."

and

"I am unhappy if I have no immediate neighbors."

Your turn!

7 ... and 12 ... on a 5x5 grid

Goal: Make everyone happy!

Polygons are unhappy if:

- Fewer than ¹/₃ of neighbors are like them
- They are completely isolated

Make observations and explore any tangents or modifications!

Share ideas and observations

One Solution



Another Solution



Explore: What would you change?

"Parable of the Polygons" (Hart and Case)

Parable of the Polygons - "High Tech" Version

- Interactive website created by Vi Hart and Nicky Case
- Based on Thomas Schelling's game theoretic model in his article, "Dynamic Models of Segregation" (1971).
- Differences in the "game:"
 - Start with an established neighborhood of Triangles and Squares
 - Move the unhappy Polygons until everyone is happy
 - Includes happy, unhappy, and neutral states

What do you notice and wonder?

Initial board

One "Solution"



Discussion of Model

- What do you want to change about the "game" or model?
- What assumptions are made in this model?
- How might this be applicable to real life scenarios?

Math Modeling (SIAM's GAIMME)



Three Main Conclusions from Hart and Case:

- 1. Small individual biases can lead to large collective biases.
- 2. The past haunts the present.
- 3. Demand diversity near you.

What might be some small biases that lead to large collective biases across society?





All of these are reasonable desires!













Discuss: In which other ways are we segregated or divided?

An Intersection of Math and Sociology

Dr. Jaime McCauley

Associate Professor of Sociology Coastal Carolina University

- Collaborator on this activity for Version 2.0
- Listed research and examples of negative consequences
- Noted positive benefits of racial and socioeconomic diversity in schools



"The past haunts the present."

How did we get here? Some examples from Dr. McCauley:

- Genocide: physical, spiritual, cultural
- Slavery and economic exploitation
- Jim Crow and forced segregation
- Redlining and overt racism
- Colorblindness and covert racism

"What happens when we fail to develop meaningful connections with people different than us?"

-Dr. Jaime J. McCauley

Discuss: How do we build meaningful connections with people different from us?

How do we "demand diversity" near us?

Dr. McCauley has some ideas:

- 1. Start with yourself.
- 2. Listen.
- 3. Educate yourself.
- 4. Speak out.
- 5. Build trust.
- 6. Be active in your community.
- 7. Integrate, don't gentrify.
- 8. Get comfortable being uncomfortable.
- 9. Focus on the system.

Reflect

References and Resources

- Parable of the Polygons (by Vi Hart and Nicky Case)
- **Project Implicit** to examine implicit biases
- Social Justice Standards (by grade level)
- Dr. McCauley's presentation for Version 2.0
- Math Communities <u>version</u> (Desmos Activity)
- My website for ongoing revisions of Prejudiced Polygons
- Schelling, T. C. (1971). Dynamic models of segregation. *Journal of mathematical sociology*, 1(2), 143-186.
- Our paper on designing this activity (including many resources like books, documentaries and media, articles, a TED talk, and facilitation tips for difficult conversations)

Thank you!

Questions and comments? Email me!

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