

Mathematical Modeling to Investigate Racial Profiling

Lesson	Mathematical Modeling to Investigate Racial Profiling Desmos Activity Created here: https://teacher.desmos.com/activitybuilder/custom/5fc800bee71735263ad06715																								
Grade Level	6 - 12																								
Objective	I can create a simulation that models a real world event I can use data from a simulation to gain an understanding of the real world.																								
Opening/Initiation	Desmos Activity Created here: https://teacher.desmos.com/activitybuilder/custom/5fc800bee71735263ad06715 1. Below is table that is taken from the Connecticut Racial Profiling Report. EDP means “Estimated Driving Population” or the percent of people that drive through the given town that are considered “minority.” <table><tr><th>Department Name</th><th>Number of Stops</th><th>% Minority Stops</th><th>% Minority EDP</th></tr><tr><td>Ansonia</td><td>1,033</td><td>36.3%</td><td>25.1%</td></tr><tr><td>Avon</td><td>205</td><td>18.0%</td><td>13.3%</td></tr><tr><td>Berlin</td><td>1,490</td><td>27.4%</td><td>12.9%</td></tr><tr><td>Bethel</td><td>1,333</td><td>25.4%</td><td>16.5%</td></tr><tr><td>Bloomfield</td><td>792</td><td>54.8%</td><td>42.7%</td></tr></table> What do you notice about this data? What do you wonder about this data?	Department Name	Number of Stops	% Minority Stops	% Minority EDP	Ansonia	1,033	36.3%	25.1%	Avon	205	18.0%	13.3%	Berlin	1,490	27.4%	12.9%	Bethel	1,333	25.4%	16.5%	Bloomfield	792	54.8%	42.7%
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Activity	Teachers says: To investigate situations in the real world, we sometimes create a mathematical model. A mathematical model is a simplified version of the real world that allows us to understand the real world a little better. Over time we can change this model so that it gets closer and closer to the real world.																								

Today we are going to create a mathematical model that represents a police officer pulling over a car randomly to try and gain an understanding of a police officer conducting a traffic stop.

Our essential question is “Do police officers disproportionately pull over Black, Hispanic, or minority drivers?”

A traffic stop is being pulled over for running a red light, having a taillight out, speeding, among other infractions.

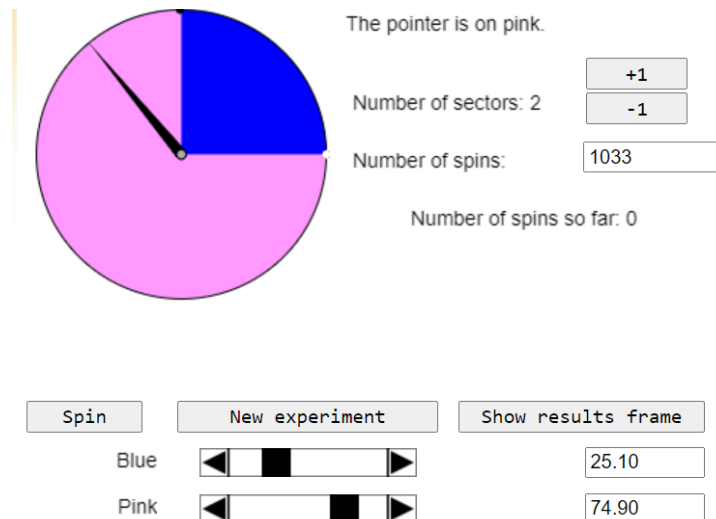
The cop does not HAVE to pull the driver over. This is different than if a car has an accident and the police officer must stop to help those involved.

2. We are going to create a simulation of the traffic stops being done by a town of your choice. We will be using a spinner: [Interactivate: Adjustable Spinner](#)

(If blocked you can use this spinner but it does not let you set spins to over 1000 <https://www.nctm.org/adjustablespinner/>)

Below is a spinner that has been set up for Ansonia:

Department Name	Number of Stops	% Minority Stops	% Minority EDP
Ansonia	1,033	36.3%	25.1%



- What does pink represent on the spinner?
- What does the number of spins represent?
- If I spin the spinner and it lands on blue, what does that mean in terms of our simulation?

3. When I did all 1,033 spins, this is the data I got back:

Probability			
	Count	Experimental	Theoretical
Blue	294	28.46%	25.1%
Pink	739	71.54%	74.9%

In our simulation, blue represents a minority stop. Our simulation stopped 28.46% minority drivers. We set the spinner to represent 25.1% EDP. Does this mean the spinner is biased? Why or why not?

Highlight student answers that help demonstrate sample variation.

To summarize you could say:

Sample Variation is an important concept when thinking about this data. The data that is in the table is just one way that 1,033 cars could be pulled over. If you did the simulation again, you may have found a different percent of minority drivers “being pulled over.” If cars are being stopped at random, there is going to be variation.

4. How much variation would you consider to be “too much?” 0%, 5%, 10%? What percent away from the action population would cause you to think that the police could be racially profiling during their traffic stops. Explain your thinking.

Go over the different types of data that the students can choose from.

Say:

5. There are several data sets that you can use to investigate racial profiling. Each one is linked below and they are very similar to the one we just used:

PDF FILES

- [Ratio of Minority EDP to Minority Stops](#)
- [Ratio of Black EDP to Black Stops](#)
- [Ratio of Hispanic EDP to Hispanic Stops](#)
- [Ratio of Minority Residents to Minority Resident Stops](#)
(only people that live in that town are included in the data)
- [Ratio of Black Residents to Black Resident Stops](#)
- [Ratio of Hispanic Residents to Hispanic Resident Stops](#)

	Google Sheet File: Appendix E (2018) • (Minority/Black/Hispanic stops vs residents) • (Minority/Black/Hispanic stops vs EDP) • (Minority/Black/Hispanic stops vs resident stops) With a group, decided on a town, a data set, and the simulation settings to create a spinner simulation record your findings on a data sheet. TEACHER NEEDS TO CHOOSE You can either have the students answer all the questions in the desmos slide deck Or Students make a copy of the data sheet and put all the answers there. You can also show students as sample of how you filled out the sheet using Investigating Racial Profiling Data Sheet (Teacher Sample) (Delete slides 12-21 and have students answer questions on the worksheet, I would still have students summarize using slides 22 and 23) Show the following sample so student can understand how to fill it out. Use the example from above to demonstrate how they can fill it out: Investigating Racial Profiling Data Sheet (Teacher Sample)
Questions for Discussion	See above
Strategy to Engage All Learners	Use desmos to post student ideas and thinking Provide time for students to share their thinking with each other in small groups or in the larger group. Review plan from above for our considerations.
Closing	As a closure, have students share out what they have found. Discuss what transformational resistance might look like now that they have this data.
Additional Resources	Connecticut Racial Profiling Report.

The data that was shared can also be downloaded in Google Sheets:

[Appendix E \(2018\)](#)

- (Minority/Black/Hispanic stops vs residents)
- (Minority/Black/Hispanic stops vs EDP)
- (Minority/Black/Hispanic stops vs resident stops)

Other data from report:

[Appendix B \(2018\)](#)

[Appendix C \(2018\)](#)

[Appendix D \(2018\)](#)

[Appendix F \(2018\)](#)

[Appendix G \(2018\)](#)