



Looking Back...Moving Forward

2021 Math Summit

NC STATE College of Education

#2021MATHSUMMIT

TRIANGLE MATH ALLIANCE



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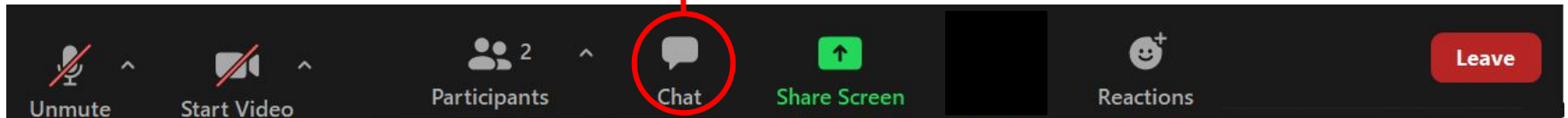


Welcome!

Please introduce yourself in the Chat

Click Chat.

**Tell us where you teach
and something about the
subject/grade level you
teach or your role (i.e.
instructional coach)**



Is Culturally Responsive Teaching even Possible in Mathematics Classes?: *Equitable Teaching Practices in Integrating Culture and Social Justice in High School Mathematics Classrooms*

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Desired Outcomes/Learning Objectives:

-discuss, engage and apply tenets of culturally responsive teaching through high school mathematics standards and the framework for social justice.

-explore ways of creating and extending classroom spaces founded upon students' culture and identities in order to teach rigorous mathematical concepts and applications.

-increase understanding of social justice issues and how they play a critical and pivotal role in teaching mathematics

-review The Equity-Driven Mathematics Teacher Framework

- engage in a sample high school mathematics lesson and apply the framework of social justice

Norms

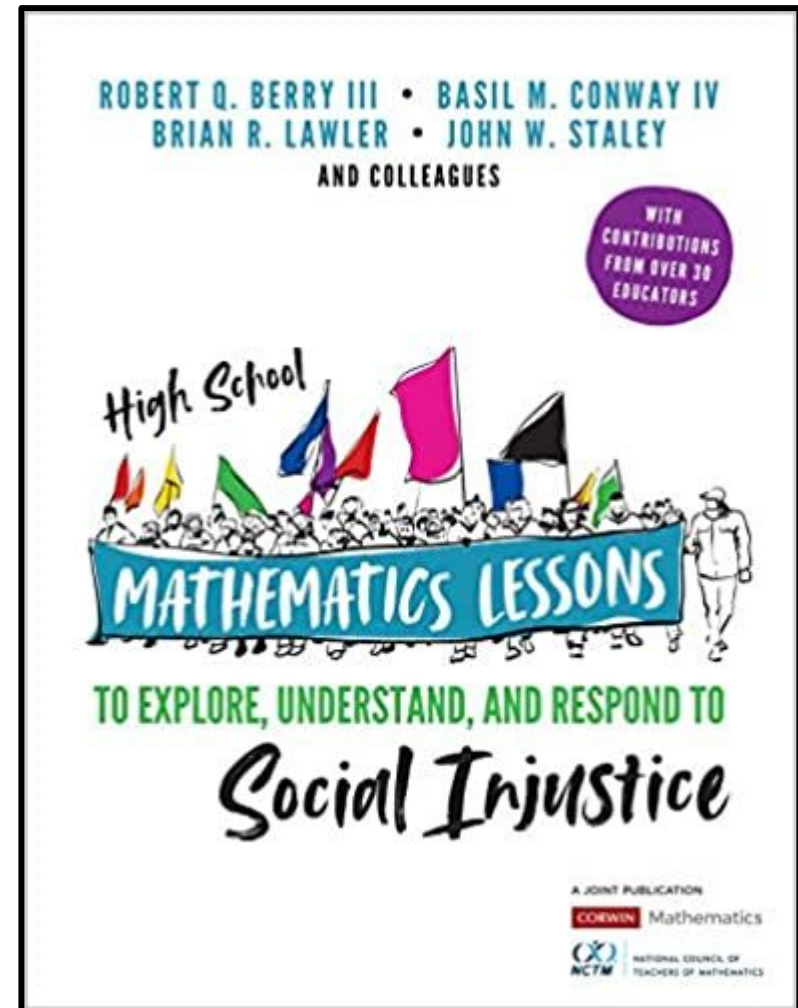
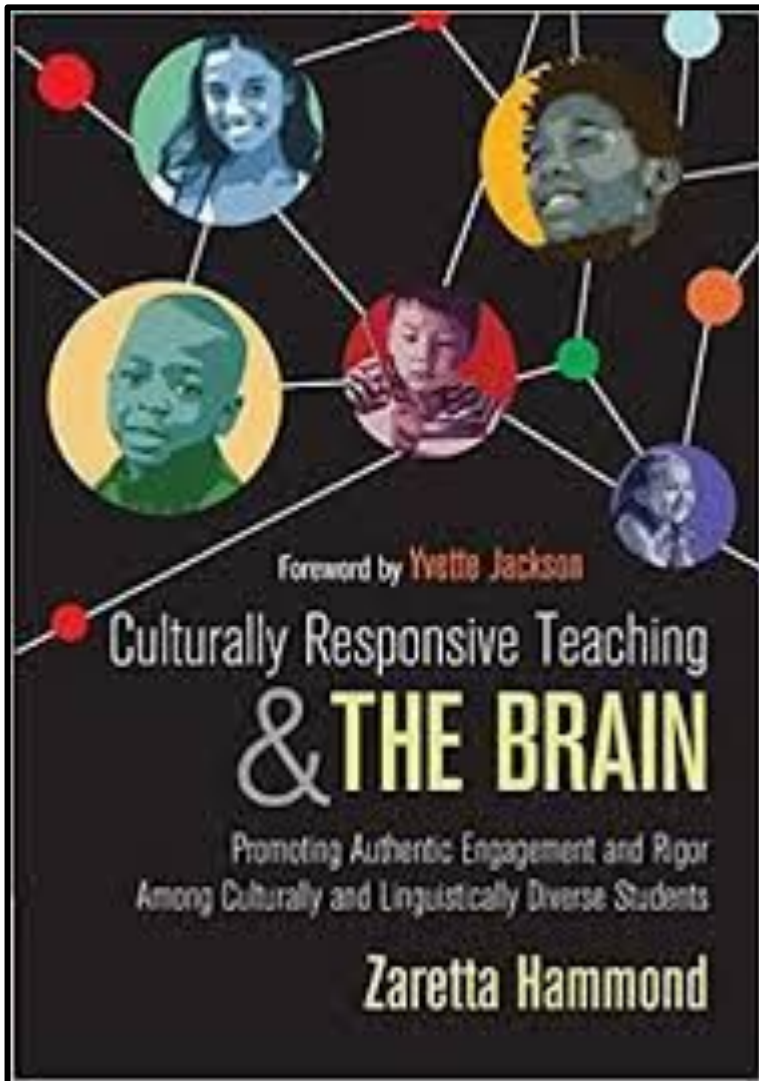
- Be Respectful
- Allow constructive friction
- Listen to understand
- Assume the best/love
- Exercise equity of voice
- Be present and engage in the conversation
- Turn your camera on (when possible and appropriate)

Grounding Activity

- In the chat, please share some successes and challenges you have had in centering social justice in the math classroom.



Anchor Texts



Culturally Responsive Teaching

Culturally responsive teaching is “an educator’s ability to recognize students’ cultural displays of learning and respond positively with teaching moves that use cultural knowledge as a scaffold to connect what the student knows to new concepts and content...”



All the while, the educator understands the importance of being in a relationship and having a social-emotional connection to the student in order to create a safe space for learning” (p. 15).

Ready for Rigor Framework (Hammond)

AWARENESS	LEARNING PARTNERSHIPS
<ul style="list-style-type: none">● Understand how the brain learns● Acknowledge the socio-political context around race and language● Know and own your cultural lens● Recognize your brain's triggers around race and culture	<ul style="list-style-type: none">● Reimagine the student and teacher relationship as a partnership● Take responsibility to reduce students' social-emotional stress from stereotype threat and microaggressions● Balance giving students both care and push● Help students cultivate a positive mindset and sense of self-efficacy

Ready for Rigor Framework (Hammond)

INFORMATION PROCESSING	COMMUNITY OF LEARNERS AND LEARNING ENVIRONMENT
<ul style="list-style-type: none">● Provide appropriate challenge in order to stimulate brain growth to increase intellectual capacity● Connect new content to culturally relevant examples and metaphors from students' community and everyday lives● Provide students authentic opportunities to process content	<ul style="list-style-type: none">● Create an environment that is intellectually and socially safe for learning● Make space for student voice and agency● Build classroom culture and learning around communal (sociocultural) talk and task structures

Breakout Room Discussion

Please introduce yourself in your breakout room, assign a facilitator/timekeeper, and discuss the following:

- In Hammond's Ready for Rigor Framework, she states that it is important to "Connect new content to culturally relevant examples and metaphors from students' community and everyday lives."
- What are some examples of students' communities and everyday lives being connected to learning or discussions in your classroom?
- What have been some missed opportunities for learning?

Social Justice Connections



Student Voice



Social Justice

Why Social Justice?

- Builds an informed society
- Connects math with student's cultural and community histories
- Empowers students to confront and solve real world challenges they face
- Helps students learn to value math as a tool for social change

Four Ideas:

- Access
- Participation
- Empowerment
- Human Rights

Equity-Driven Mathematics Teacher Framework



Social Justice Topics

Disparities in Honors Courses

(Statistics & Probability, Modeling)

Wealth Distribution

(Measures of Variability)

Climate Change

(Algebra, Functions, Statistics & Probability)

Intersectionality/Wage Gaps

(Functions)

“BBQ Becky”, Policing and Racial Justice

(Statistics and Probability)

Fair Living Wage

(Equations, Inequalities, Systems)

Immigration

(Distribution of quantitative data)

Prison Population

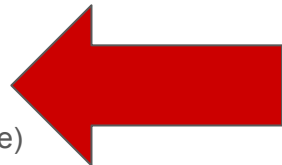
(Data Analysis)

Gerrymandering

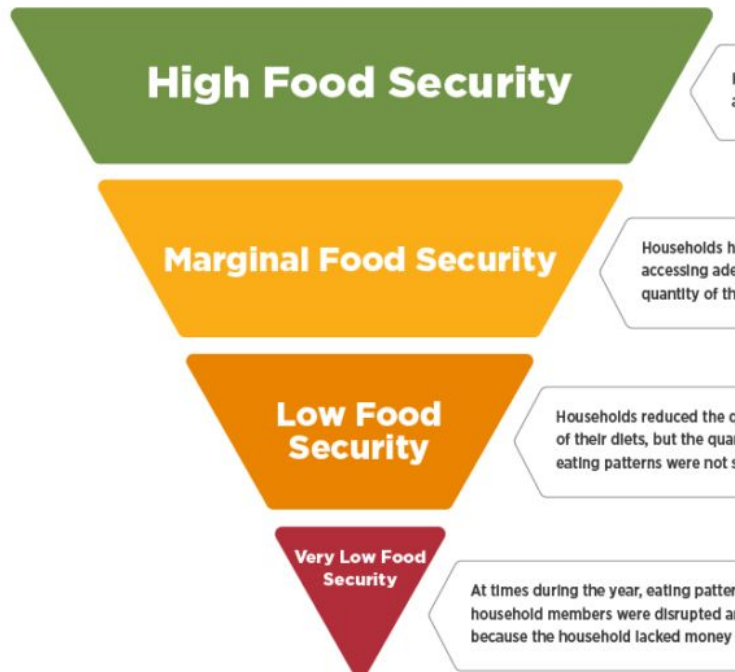
(Geometry: Trig, Similarity, Congruence)

Food Insecurity

(Geometry: Trig, Similarity, Congruence)



Social Justice Math Lesson



Lesson Design

Adapted, High School Mathematics Lessons to Explore, Understand, and Respond to Social Injustice (2020).
National Council of Teachers of Mathematics. Corwin: Thousand Oaks, CA.

This lesson is a *launch-explore-summarize* instructional model and is intended to take approximately 180 minutes to complete.

*Note: This lesson has been modified to give participants an overview of the activity.

Launch (10 minutes)

1. Read the food insecurity facts on Austin provided in the text, [Democratizing Access to Health Foods](#), and review the map provided in the activity.
2. After reading, participants should engage in a reflective discussion considering the following questions:
 - What do you notice?
 - What do you wonder?
3. Respond to Rose Flores' quote, "It's a great deal of trouble just to feed a family." How do you characterize what "trouble" might look like when it comes to feeding a family?

Explore (15 minutes)

4. Use the worksheet, [The USDA Problem](#). Participants should begin the activity on this worksheet. The problem calls on students to develop a solution to an authentic problem posed by a "client," the US Department of Agriculture (USDA).
5. Participants are to use mathematics to develop two procedures for the USDA (1) - that the USDA can use to determine if a geographic region is a food desert and (2) that the USDA can use to locate a grocery store within a food desert so that it no longer qualifies as one.
6. Participants should engage in modeling cycles where they iteratively refine their model to make it applicable to a variety of situations to develop procedures that the USDA can apply to locate food deserts and optimize the location of grocery stores.
7. (Not for this presentation, but a teacher could then have students apply this learning to grocery stores in their local area, using Google Maps and creating a visual of their community. Students can answer the following questions: *What factors have played a major role in determining the number of grocery stores in a certain area? Why do you think this is the case? How could things be different? What groups of people in the area are most likely to live in a food desert? Why might this be the case?... etc.*

Summarize (5 minutes)

8. The summary is the time for participants to clearly and precisely communicate their ideas and defend their decisions while providing the rest of the class an opportunity to engage with those ideas and critique the group's reasoning.
 - Explain why the mathematics you ultimately used makes the most sense to you.
 - What were the most important considerations behind your mathematical procedures for determining next steps for the USDA grant program?

Part I: Launch Activity (10 minutes)

Democratizing Access to Healthy Foods

"It's a great deal of trouble just to feed a family."—Rosa Flores, Austin, Texas

Consider these facts about Austin.

Austin stands out as the most economically segregated major metro area in the country, where minorities, especially Latinxs, lack access to affordable housing and healthy food.

- Rosa Flores lives in eastern Travis County. She is among those who must travel many miles to the nearest full-service grocery store to buy fresh food at a lower price. We consider Rosa and her family to be **food insecure**—that is, they lack consistent access to enough food for an active, healthy lifestyle. The Flores family lives in what is known as a “**food desert**,” which is a geographic area with severely limited affordable, healthy food choices (especially fresh sources of protein and fresh fruits and vegetables).



Image Source: resat_dongel/iStock.com

Where are the majority of full-service grocery stores in Austin? In districts where most of the residents are white and wealthy.

- District 2, where 69 percent of the 80,004 residents are Hispanic, has only two grocery stores. By contrast, there are nine such stores in District 10, where 9.3 percent of the 80,839 residents are Hispanic and 78.3 percent are Anglo. The difference in median household income is about \$90,000 between districts, according to city data.

Retrieved from the companion website for *High School Mathematics Lessons to Explore, Understand, and Respond to Social Injustice* by Robert Q. Berry III, Basil M. Conway IV, Brian R. Lawler, and John W. Staley, Thousand Oaks, CA: Corwin, www.corwin.com. Copyright © 2020 by Corwin Press, Inc. All rights reserved. Reproduction authorized for educational use by educators, local school sites, and/or noncommercial or nonprofit entities that have purchased the book.

The grocery-cart markers in the map below are the locations of grocery stores in Austin, Texas. What do you notice about how they're distributed on the west and east sides of Interstate 35?



One report on the economics of Austin concluded, “The rich and poor effectively occupy different worlds, even when they live in the same cities and metros.” We will now explore what these different worlds can look like through a survey. Get a notecard from your teacher. You'll be answering some discussion questions about Rosa Flores and her story.

Retrieved from the companion website for *High School Mathematics Lessons to Explore, Understand, and Respond to Social Injustice* by Robert Q. Berry III, Basil M. Conway IV, Brian R. Lawler, and John W. Staley, Thousand Oaks, CA: Corwin, www.corwin.com. Copyright © 2020 by Corwin Press, Inc. All rights reserved. Reproduction authorized for educational use by educators, local school sites, and/or noncommercial or nonprofit entities that have purchased the book.

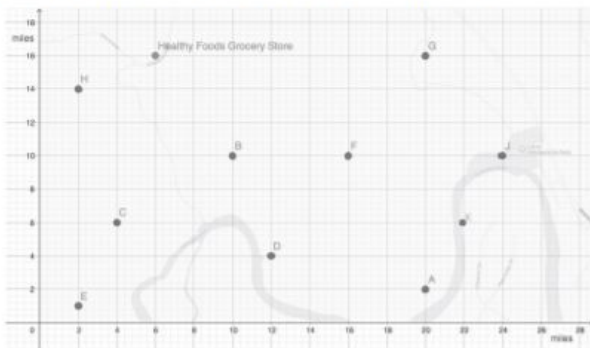
Part II: Explore Activity (15 minutes)

The USDA Problem

"Food deserts" exist in areas where it proves to be extremely difficult for residents to access affordable, healthy foods. In order to expand the availability of healthy foods, the US Department of Agriculture (USDA) has developed a program to provide grants to states for funds to support the establishment and operation of grocery stores in underserved communities. In order to implement this program, the USDA needs a procedure for determining if a particular geographic region qualifies as a food desert.

The map below identifies the locations of ten randomly selected homes along with the grocery store that's closest to each of them.

1. What questions do you have when looking at this map?
2. How long does it take you to get from your home to a grocery store that sells fresh foods?
3. Would you say Home G has easy access to the grocery store? How far is it?



Source: Map Data © Google 2020

4. The USDA has asked you to help them with their grant program by doing the following:
 - a. Develop a procedure for determining if this region qualifies as a food desert. Show how your procedure works for all ten houses shown on the map. Give details so that the USDA can check and employ your procedure to locate food deserts.
 - b. Develop a model that will help the USDA identify the optimal location for a new grant-supported grocery store in this area so that it is no longer classified as a food desert.
5. Write a letter to the USDA officials that explains how your two procedures work. Make sure the officials will understand how to use your procedures not just for the map in this problem but also for any map of a geographic area they wish to investigate.

As you read the Explore activity, consider the following questions:

- How does culture show up in this activity?
- How does this activity connect to math standards (what math concepts are addressed)?
- How does social justice connect to this activity? What might be ways for students to address this issue?
- In what ways might you provide students unfamiliar with this topic additional context?
- What would you (the teacher) need to be mindful of when facilitating this activity?
- How do you see yourself using this lesson in your own mathematics classroom?

Part III: Summarize

1. The summary is the time for participants to clearly and precisely communicate their ideas and defend their decisions while providing the rest of the class an opportunity to engage with those ideas and critique the group's reasoning.
 - Explain why the mathematics you ultimately used makes the most sense to you.
 - What were the most important considerations behind your mathematical procedures for determining next steps for the USDA grant program?
2. Once other groups present their model, answer the following:
 - What are the key mathematical ideas underlying each of the models?
 - How are similar ideas represented in different ways?
 - What do you see differently in your own model now that you've explore other groups' models?
 - What new insights do you have?

Social Justice - Taking Action

Example: To begin action, students research their own contexts, apply their methods, then start a letter-writing campaign.

What might be other examples of students taking action?



What's surfacing for you?

In the chat, list an idea, concept or goal that was presented today (or discussed in your group) that you'd like to push yourself to do this school year.

Questions

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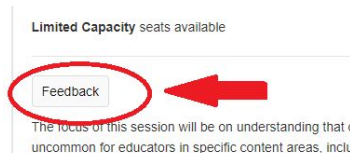
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Answers

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YOUR FEEDBACK IS IMPORTANT

- Go to either:
 - <https://2021mathsummit.sched.com/>
 - or
 - 2021 Math Summit event site on SCHED app
- Login with user info and event password (Math2021)
- Select current session
- Click Feedback button above description



- Complete Google Form Survey and click **Submit**



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