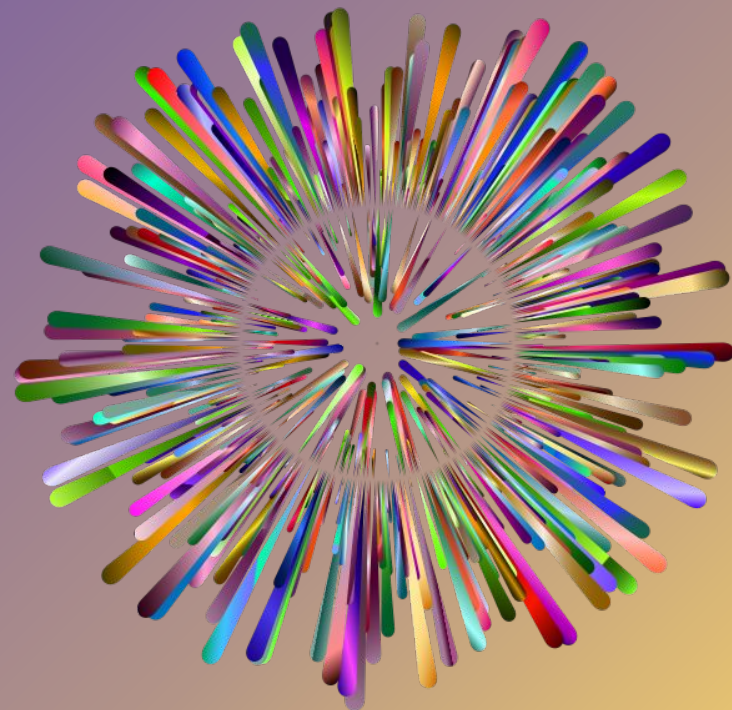


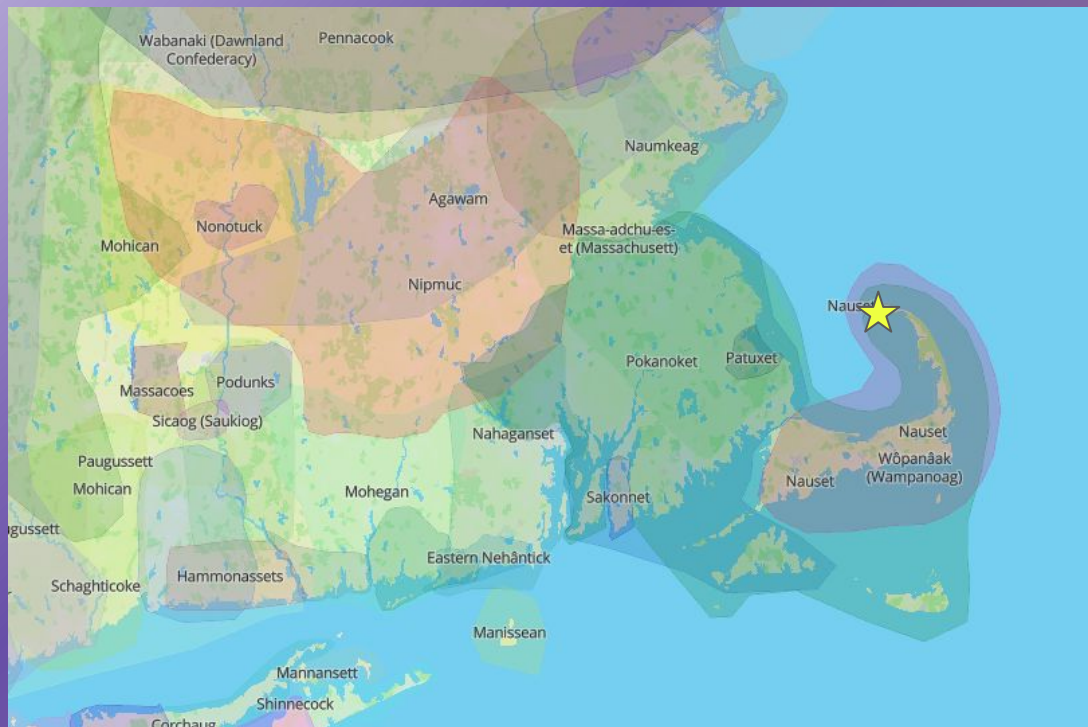
# Powerful Learning is Relevant Learning

Virtual T<sup>3</sup>IC  
September 30, 2023

*Dr. Paul Gray, NCSM President*



<https://bit.ly/NCSMCultural>



## Ancestral lands of the Wampanoag Nation Nauset Nation

Source: <https://native-land.ca/>

NCSM is the premiere mathematics education leadership organization!

Annual conference full of sessions for people who lead math teachers

Focused on equity for all teachers and students to experience high-quality math teaching and learning

Professional learning network

2,200 members strong

Source for resources so I can do my job as a math leader better.

# WHAT IS NCSM?

What is *culturally relevant instruction*?

How do we make our tasks more culturally relevant?

Reflections and Implications

Stages of Math Tasks

# Words of Wisdom to Set the Table

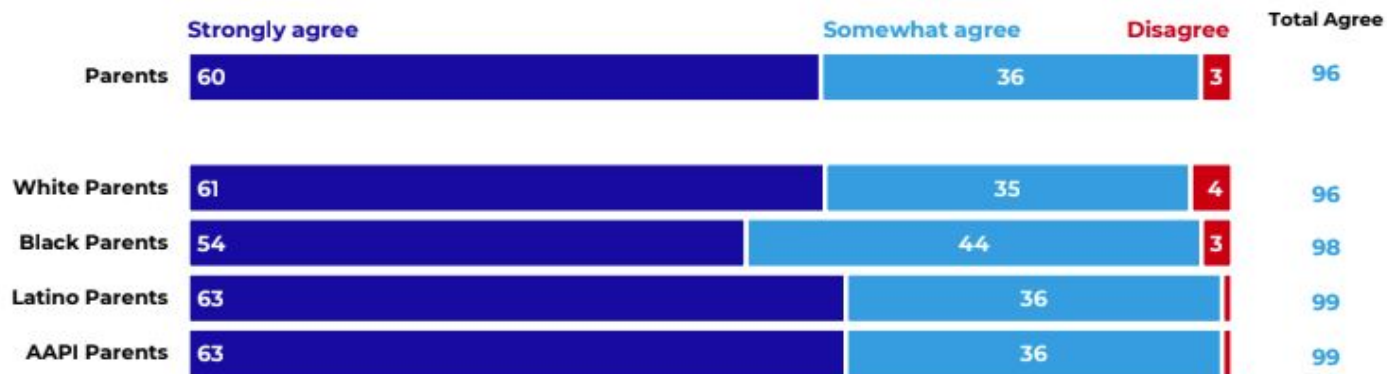
In some places, buzzwords like “culture” and “culturally relevant” are trigger words that cause a particular reaction.

In this presentation, the focus is how we might make science and mathematics more relevant to the humans in our mathematics classrooms.

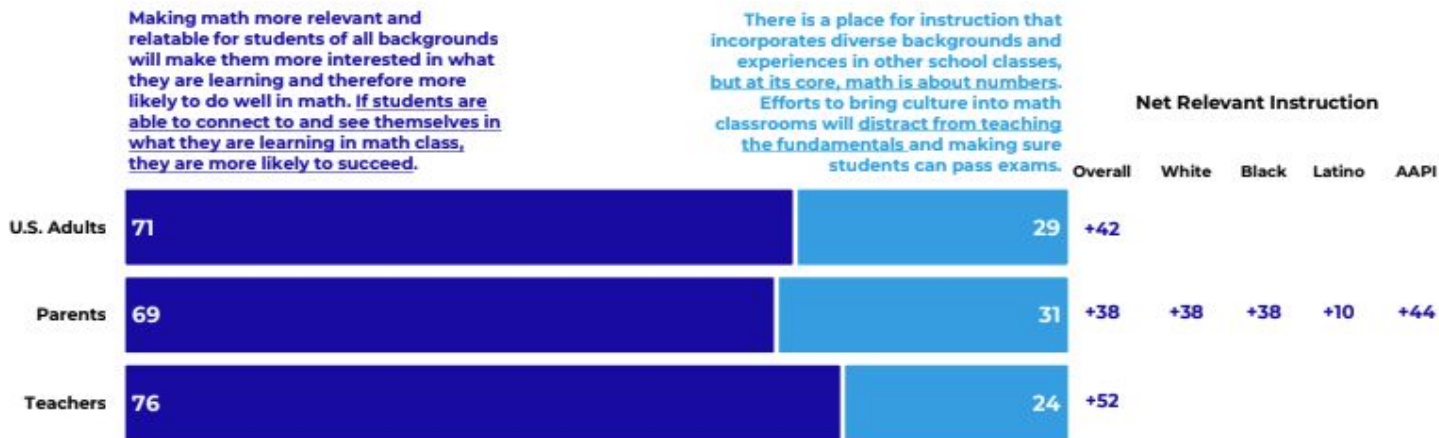
References to “culturally relevant” or “culturally responsive” instruction are used in an academic sense. There is no political motive or intention.

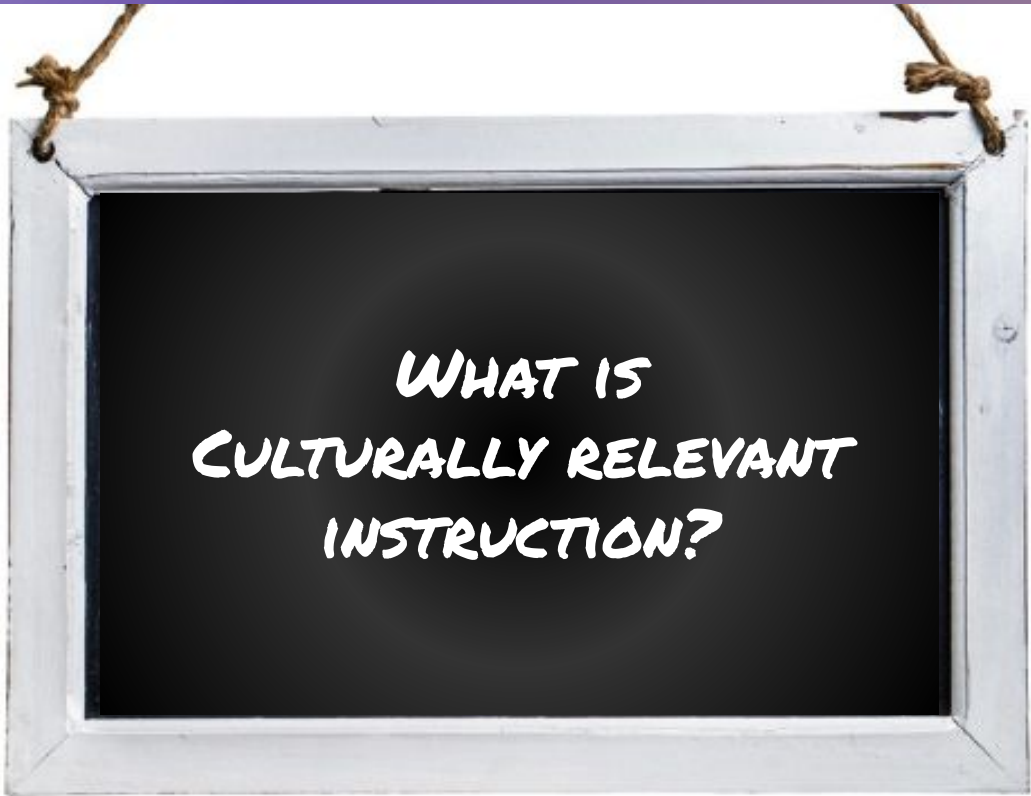
## Parents across groups feel that their own child would be more likely to excel in math class if it felt more relevant and engaging

Making math education more relevant and engaging will make it more likely that my child succeeds in math:



## Large majorities are inclined to believe that making math education more personally relevant and relatable for students of different backgrounds will make it more likely that they succeed in math class





WHAT IS  
CULTURALLY RELEVANT  
INSTRUCTION?



# Culturally Relevant Instruction



“I think we’ve been asking some of the same old questions, and they haven’t been yielding very much.

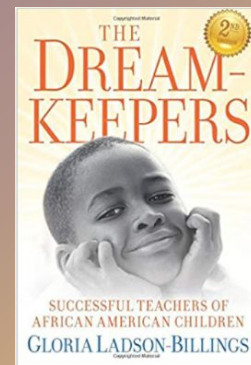
We’ve been asking what’s wrong with these kids, what’s wrong with their parents, what’s wrong with their culture...I think those are not the right questions. I think we have to begin to ask questions about how might school be very different?”

–Dr. Gloria Ladson-Billings

# What is culturally relevant teaching?

“..a pedagogy that empowers students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes. These cultural referents are not merely vehicles for bridging or explaining the dominant culture; they are aspects of the curriculum in their own right.”

Gloria Ladson-Billings, *The Dreamkeepers*, (1994, pp. 17-18)



# Pillars of Culturally Relevant Pedagogy



## Academic Excellence

Attention must be paid to academic content development as to avoid a “feel good” curriculum that leaves students without the necessary content knowledge.

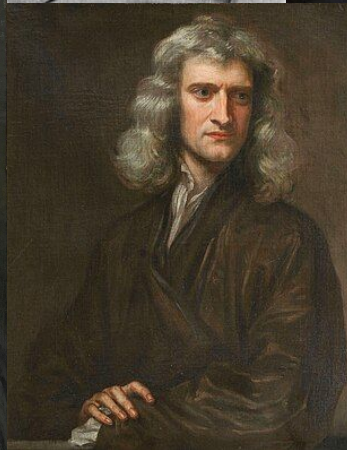
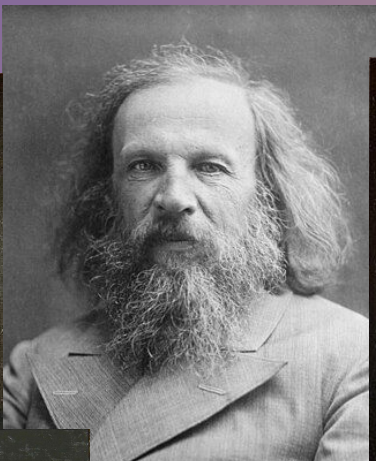
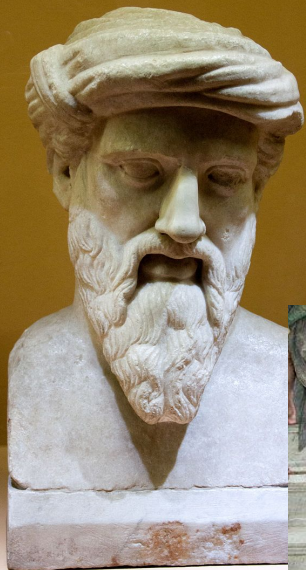
# Pillars of Culturally Relevant Pedagogy



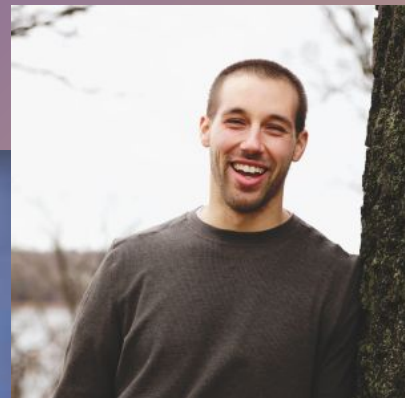
## Cultural Competence

Students must learn how to appreciate and affirm their own culture while developing fluency in at least one other culture.

# Cultural Competence and Identity



# Cultural Competence and Identity



# Pillars of Culturally Relevant Pedagogy



## Critical Consciousness

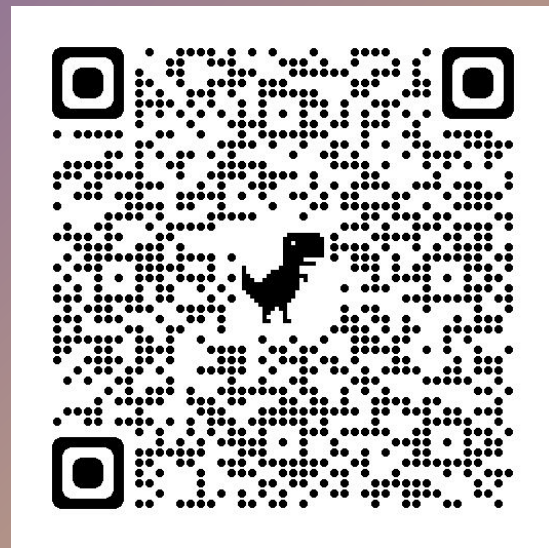
Students must develop an ability to identify, analyze, and solve real-world problems, particularly problems resulting from societal inequities.

# Multiple perspectives of how culture strengthens learning



Culturally  
Relevant  
Pedagogy

Culturally  
Responsive  
Pedagogy

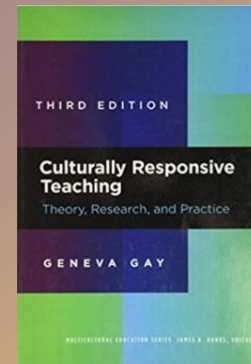




# Culturally Responsive Pedagogy

“...using the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant and effective for them. It teaches to and through the strengths of these students It is culturally validating and affirming”

Geneva Gay, *Culturally Responsive Pedagogy*, (2000, p. 29)

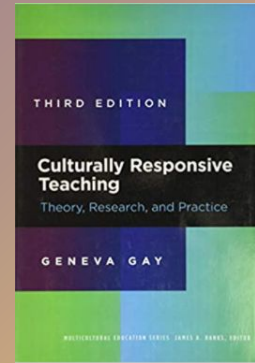


# Culturally Responsive Pedagogy

“...**routine** because it does for Native American, Latino, Asian American, African American, and low-income students what traditional instructional ideologies and actions do for middle-class European Americans. That is, it filters curriculum content and teaching strategies through their cultural frames of reference to make the content more personally meaningful and easier to master. ...

**radical** because it makes explicit the previously implicit role of culture in teaching and learning, and it insists that educational institutions accept the legitimacy and viability of ethnic-group cultures in improving learning outcomes”

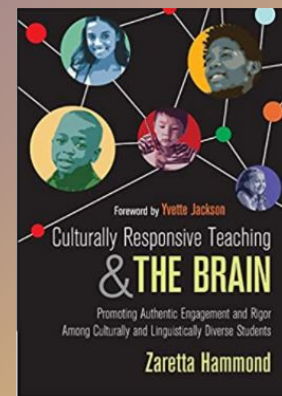
Geneva Gay, *Culturally Responsive Pedagogy*, (2000, p. 32)



# Culturally Responsive Pedagogy

Hammond extends this definition as “an educator’s ability to recognize students’ cultural displays of learning and meaning making and respond positively and constructively with teaching moves that use cultural knowledge as a scaffold to connect what the student knows to new concepts and content in order to promote effective information processing.”

Zaretta Hammond, *Culturally Responsive Teaching and the Brain*,  
(2015, p. 15).



# Mirrors and Windows

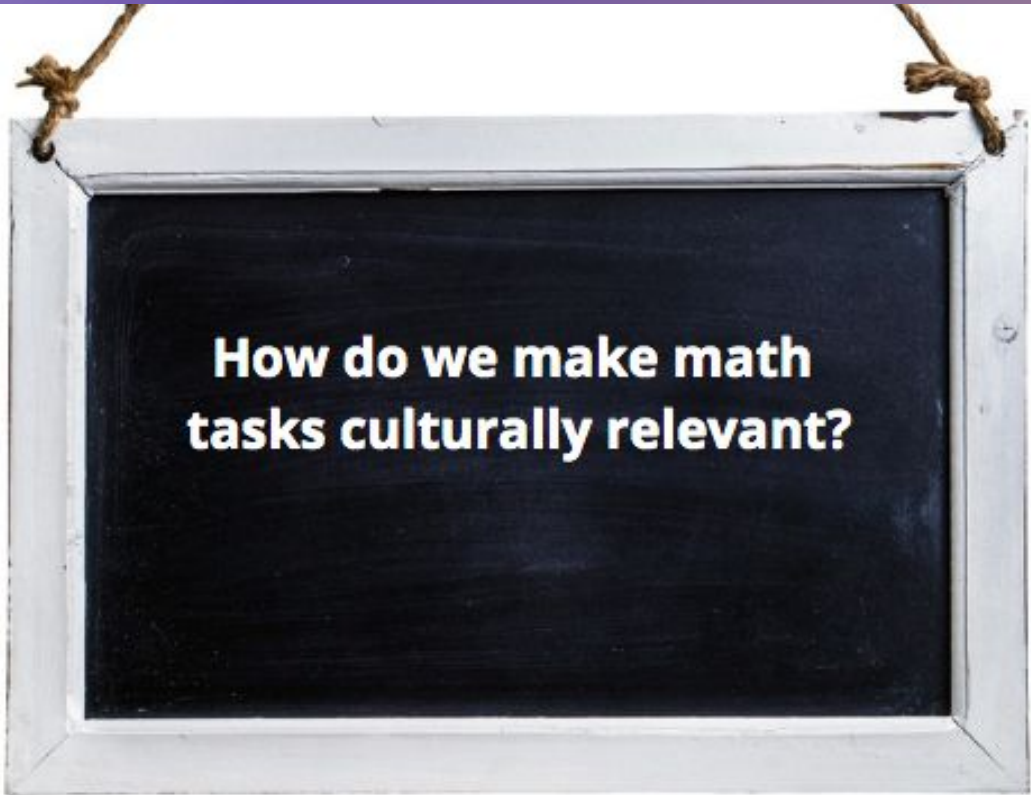


Rudine Sims Bishop, 1990  
Rochelle Gutiérrez, 2012



# Why is culturally relevant teaching important?

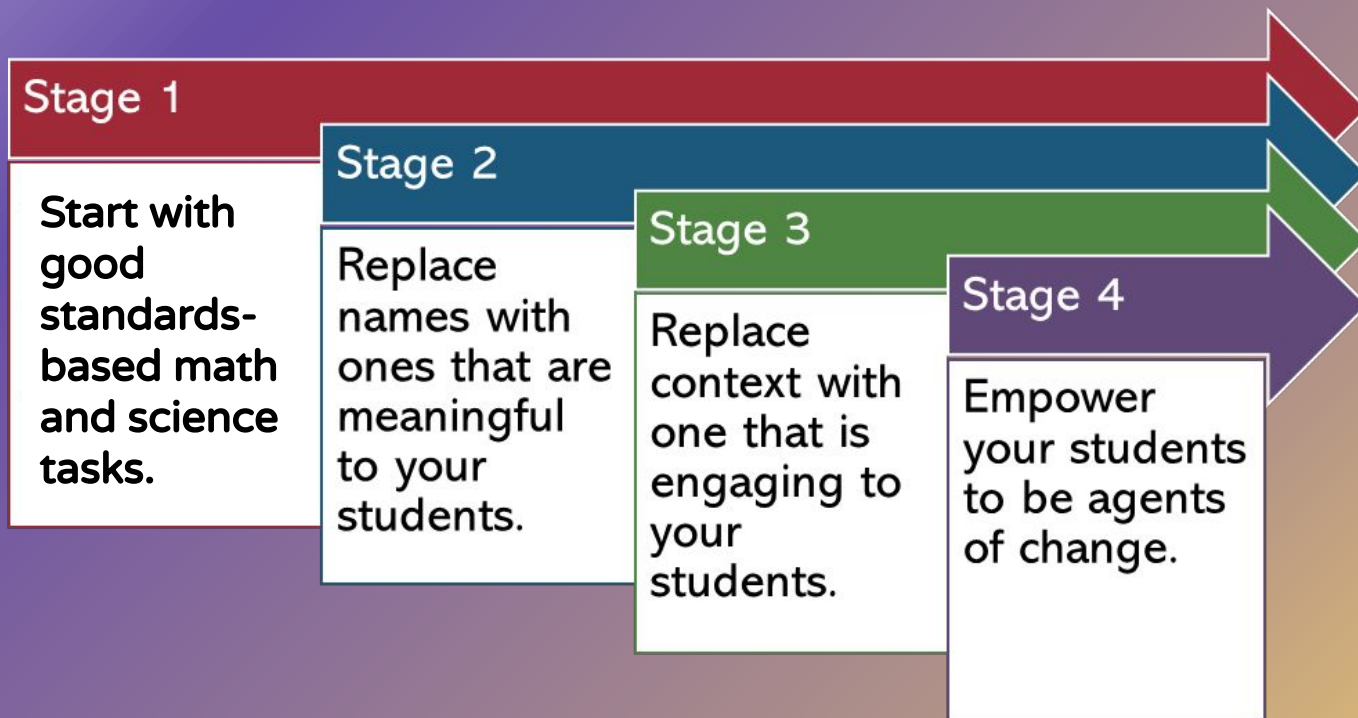
- Our teaching faculty is 79% white and our student body is only 48% white (2017-18 school year, NCES)
- Multicultural classrooms are ripe for windows, mirrors, and sliding glass doors (Rochelle Gutierrez, Rudine Sims Bishop)
- Asset-based view honoring the cultural funds of knowledge (Marta Civil) that students bring with them from home to the classroom



**How do we make math  
tasks culturally relevant?**



# Continuum of Culturally Relevant Tasks





# Stage 1 Task

Start with a good standards-aligned task

- [Achieve the Core](#)
- [Illustrative Mathematics](#)
- [Nrich](#)
- [Youcubed](#)



## Stage 2 Task

Replace names with ones that are meaningful to your students.

The robotics club at your school is hosting a fundraiser and plans to sell a slice of pizza with a cup of water for \$1.10. If a slice of pizza costs \$1 more than the cup of water, how much should each item cost separately.



*The robotics club at Westpoint Middle School is hosting a fundraiser. Syretha plans to sell a slice of pizza with a cup of water for \$1.10. If a slice of pizza costs \$1 more than the cup of water, how much should Syretha charge for each item separately?*

## Stage 3 Task

Replace context with one that is engaging to your students

There were many women who took part in the movement for civil rights for African Americans. While most people are familiar with how Rosa Parks refused to give up her seat on a bus in Montgomery, Alabama, on December 1, 1955, very few people know that a fifteen-year-old African American girl named Claudette Colvin refused to give up her seat nine months earlier. Because of their treatment on the buses, the African American residents of Montgomery organized a boycott, meaning they refused to ride the buses, until they could sit wherever they wanted to. Therefore, they had to find other methods of transportation to and from work. This provided an opportunity for African American taxi drivers to transport boycotters as an alternative to the buses.



Margot Adler and Phillip Hoose (2013)  
Juan Williams (2013)

# Stage 3 Task

There were 56 birdhouses at school. Today, 4 classes made more birdhouses. Each class made 8 birdhouses. How many total birdhouses are there now?



Source: Student Achievement Partners. "Two-Step Problems Using the Four Operations Mini-assessment." Achieve the Core.  
Photo by [Lubomirkin](#) on [Unsplash](#)

Replace context with one that is engaging to your students

Let's say during the boycott, the taxi driver charged 8 cents per passenger. The first hour the driver worked, he made 56 cents. For the second hour, the taxi driver transported 4 people. How much total money did the taxi driver make in the first two hours of work?

Source: Seda & Brown (2021)

## Stage 4 Task

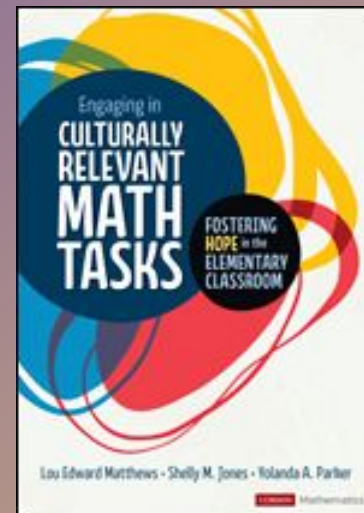
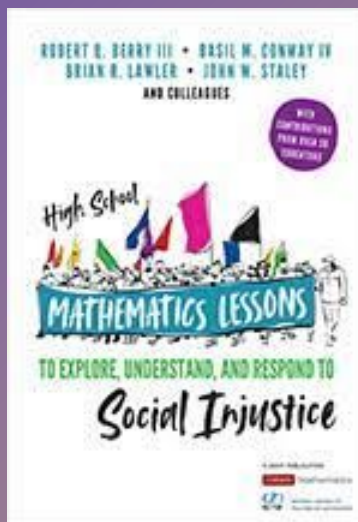
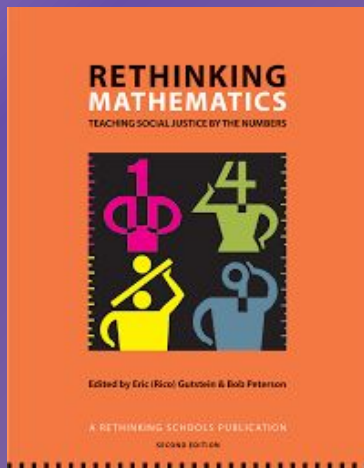
# Empower your students to be agents of change

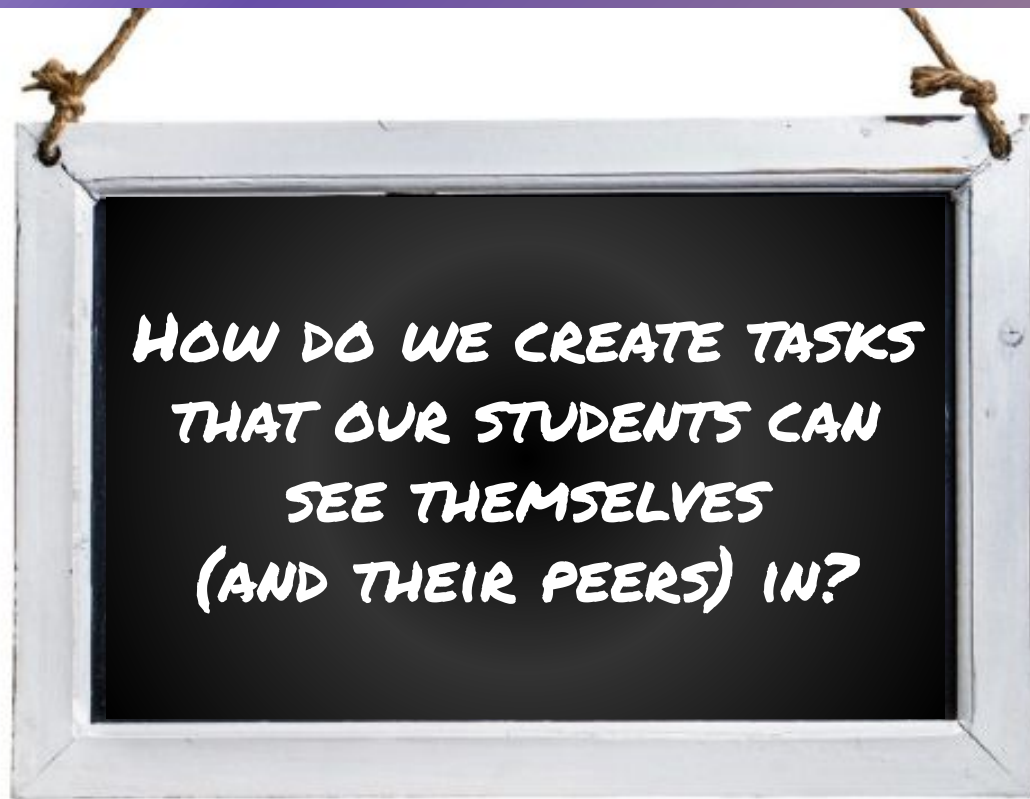
- What similar contexts might there be in your school community?
  - Pollinating plants for local bees and butterflies?
  - Grocery store or health care deserts?
  - Resource allocation in the school - bookstore, cafeteria, etc.?

There were 56 birdhouses at school. Today, 4 classes made more birdhouses. Each class made 8 birdhouses. How many total birdhouses are there now?

# Stage 4 Task

## Empower your students to be agents of change





# Tools for Professional Learning Communities





# Culturally Relevant/Cognitively Demanding Rubric

## REPRODUCIBLE

Figure 1.13. The Revised CRCD Mathematics Task Framework

Task Level	Description of Mathematical Task Level
Emerging	<p><b>Requires considerable cognitive effort in mathematics</b></p> <ul style="list-style-type: none"> <li>• Task is mathematically rich and cognitively demanding.</li> <li>• The task requires considerable efforts using multiple representations and strategies to develop deep understanding of mathematics.</li> <li>• Task content draws from connections to other relevant subjects, disciplines, and concepts.</li> </ul>
Developing	<p><b>Requires considerable cognitive effort AND is embedded in cultural/self/community inquiry and activity</b></p> <ul style="list-style-type: none"> <li>• The task is centered in real-world situations requiring students to inquire deeply about themselves, their communities, and the world about them.</li> <li>• Requires students to draw from, use, and embrace community and cultural knowledge directly in developing strategy and solution process.</li> <li>• Task content seeks to add to this knowledge through mathematical activity.</li> </ul>
Exemplary	<p><b>Requires considerable cognitive embedded in cultural inquiry and activity AND targets cultural/self/community empowerment and social justice</b></p> <ul style="list-style-type: none"> <li>• The task requires students to examine structure and assumptions of self, community, the world, and its relations in considerations of solutions and strategy limits.</li> <li>• Task requires students to examine conditions of opportunity, justice, suffering, and inequity that arise in their communities, schools, and the world around them.</li> <li>• Task utilizes mathematical sense-making and the solution processes to help students to develop informed perspectives and take action on real-world issues.</li> </ul>

Source: Adapted from Matthews, Jones, and Parker (2013).

Figure 1.13. The Revised CRCD Mathematics Task Framework

Visit <http://mathedleadership.org/EResources> to download a free reproducible version of this figure.



# Where does this task fall on the CRCD Rubric?

Two hikers begin hiking the North Dome trail in Yosemite National Park, which is  $5\frac{3}{4}$  miles to the summit. The hikers cover  $2\frac{1}{8}$  miles before taking a break. They then hike another  $1\frac{1}{2}$  miles before taking a second break. How many more miles do the hikers have to go before reaching the summit?



Source: *Holt Mathematics Course 3* (2007), p. 86

## Where does this task fall on the CRCD Rubric?

A water pipe has an outside diameter of  $1\frac{1}{4}$  inches and a wall thickness of  $\frac{5}{16}$  inch. What is the inside diameter of the pipe?



Source: *Holt Mathematics Course 3* (2007), p. 87

# Mathematics Task Modification



## *Stage 4 Task: Empower your students to be agents of change*

### Sources for Social Justice Contexts

- [Engaging in Culturally Relevant Math Tasks: Fostering Hope in the Elementary Classroom](#)
- [Mathematics Teachers' Use of the Culturally Relevant Cognitively Demanding Mathematics Task Framework and Rubric in the Classroom](#)
- [Rethinking Mathematics: Teaching Social Justice by the Numbers](#)
- [Radical Math](#)

### Mirrors, Windows, and Sliding Glass Doors

1. This task may act as a mirror for which group of students?
2. This task may act as a window for which group of students?

# Peer Feedback

Partner up or make a triad. In this pair or triad...

- When you were modifying your task, what questions emerged that you'd like to get some insights on? Ask your colleagues those questions.
- Review one another's modifications. What suggestions do you have?

# Student Actions when engaging in a Social Justice-Oriented Mathematical Task

Student Action	Indicator
Interpreting the problem and the underlying social justice issue	<ul style="list-style-type: none"><li>• Discuss broad social justice issues.</li><li>• Consider the cause to the social justice issue.</li></ul>
Proposing approaches to addressing the social justice problem	<ul style="list-style-type: none"><li>• Identify vital aspects of the context to reach goal.</li><li>• Choose context-based methods for a potential solution.</li><li>• Search for more information.</li></ul>
Mathematizing the situation and working mathematically	<ul style="list-style-type: none"><li>• Use background knowledge and assumptions to mathematically interpret the situation.</li><li>• Write and speak about mathematical representations of the context.</li></ul>
Validating the solution against contextual constraints	<ul style="list-style-type: none"><li>• Verify mathematical results against constraints.</li><li>• Think about realistic implications of their choices.</li></ul>
Applying the solution to a social justice context	<ul style="list-style-type: none"><li>• Report out the mathematical solution with regard to the social justice context.</li><li>• Justify mathematical choices using assumptions about the context.</li></ul>

Source: Hyunyi Jung and Sarah Brand, 2021

# Reflections and Implications

We know that the instructional tasks a teacher selects are critically important for the mathematics and science students will learn and the science and mathematical experiences they will have.

Instructional tasks should provide windows, mirrors, and sliding glass doors for students from a variety of cultural backgrounds.

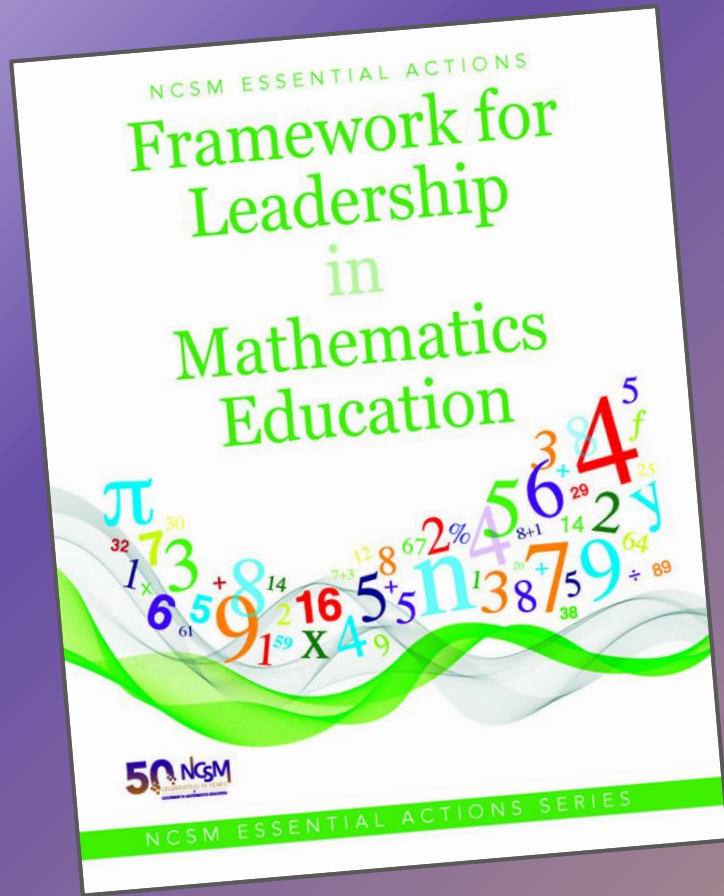
“Culturally relevant” tasks are not found in textbooks, Pinterest, or TPT.

Professional learning is essential.



# NCSM Resources





Door prize!

# 55th Annual Conference



## Registration Open!

- October 28-31, 2023 in Washington, DC
- Register today: <https://bit.ly/NCSMDC23>
- NCSM 2023 Conference will be **after** NCTM's Annual Meeting!

# Podcasts!

## LEARNING WITH LEADERS

BOLD MATHEMATICS LEADERSHIP SERIES:

We're ALL Math People! 



## 2023 Series: We're ALL Math People!

- Hosted by Dr. Katey Arrington and Dr. Brian Buckhalter
- New episode on the 11th of each month
- More info:

<https://www.mathedleadership.org/podcast/>

# Position Paper

[https://www.mathedleadership.org/wp-content/uploads/2021/10/NCSM-TODOS-Multilingual-Learners-Position-Paper-2021\\_UpdatedLogos.pdf](https://www.mathedleadership.org/wp-content/uploads/2021/10/NCSM-TODOS-Multilingual-Learners-Position-Paper-2021_UpdatedLogos.pdf)



## Positioning Multilingual Learners for Success in Mathematics

*A joint position statement from NCSM: Leadership in Mathematics in Education and TODOS:  
Mathematics for ALL (Fall, 2021)*

### Our Position

NCSM: Leadership in Mathematics Education and TODOS: Mathematics for ALL (TODOS) prioritize policies and practices that position multilingual learners (i.e., children learning mathematics in languages that differ from their students' first languages) so that they can access, engage, and thrive in mathematics education. Accomplishing this will require a systemic approach and investments that influence policies and practices. These include professional development, infrastructure, curriculum, family/community engagement, language development, and mathematics teaching, learning and assessment.

We acknowledge that:

- The use of students' first language is a human right (Skutnabb-Kangas, 2000) and should be promoted in the mathematics classroom;
- Mathematics is a human activity;
- Race, class, culture, language, and their intersections play key roles in the teaching and learning of mathematics (see [The Mo\(ve\)ment to Prioritize Antiracist Mathematics: Planning for This and Every School Year](#));
- Multilingual learners should be viewed as students who possess knowledge, strengths, and resources (i.e., asset-based rather than deficit-based lens);
- Every mathematics teacher is a language teacher — particularly the academic language used to formulate and communicate mathematics learning (Lager, 2006); and
- Leaders and teachers from mathematics and second-language acquisition should work collaboratively to accomplish this work, in cooperation with families.

# Questions and Comments



# Culturally Relevant Tasks

Dr. Paul Gray

NCSM President (2021-2023)

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