



*Interrogating Whiteness as Ideology: The Prework for Centering Culturally Responsive Practices in STEM Teaching and Learning*

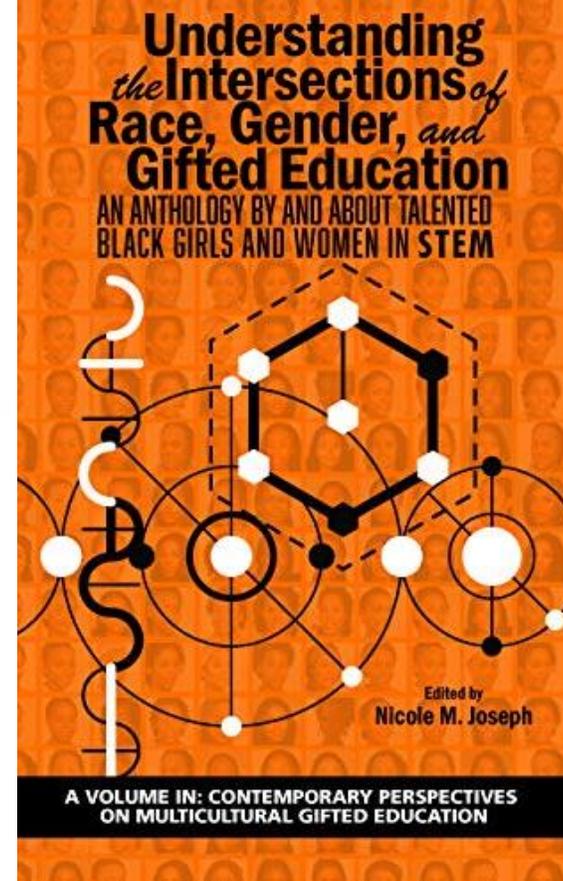
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# Learning Objectives

- Articulate how and why STEM is steeped in whiteness, white supremacy, and antiblackness.
- Explain the STEM System in the U.S. and the different roles STEM actors play in perpetuating an elitist and oppressive system.
- Describe, analyze, and assess Joseph's Black Feminist Mathematics Pedagogies (BlackFMP) model for its potential to disrupt hegemony and be used by instructors in SOLIDARITY with students to create a more democratic and liberated STEM learning experience for BIPOC.

# Norms for difficult conversations

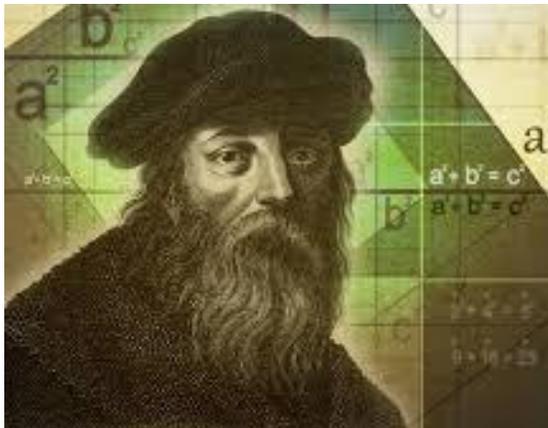
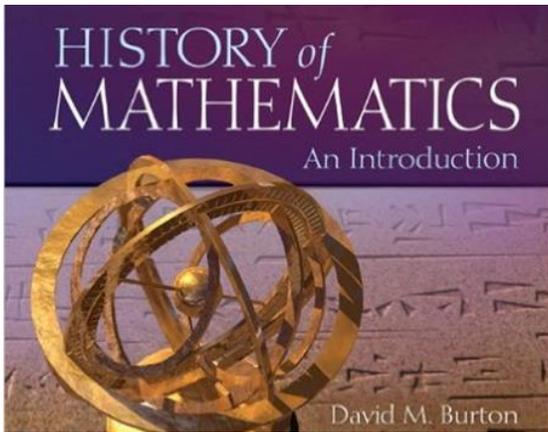
- Listen actively -- respect people when they are talking.
- Speak from your own experience instead of generalizing ("I" instead of "they," "we," and "you").
- Do not be afraid to respectfully challenge one another by asking questions but refrain from personal attacks -- focus on ideas.
- Participate to the fullest of your ability -- community growth depends on the inclusion of every individual voice.
- Instead of invalidating somebody else's story with your own spin on their experience, share your own story and experience.
- The goal is not to agree -- it is to gain a deeper understanding.
- Be conscious of body language and nonverbal responses -- they can be as disrespectful as words.



I am a scholar, pedagogue, and activist. I am also a wife, a mother, and a daughter.

I am a Black girl cartographer (Tamara Butler, 2018). I care about and have deep concern and advocacy for Black girls' health, lives, well-being, and ways of being in society.

# Why and how is STEM a white institutional space?



- U.S. was founded on scientific racism, slavery, colonialism
- There is widespread Eurocentric bias in the production, dissemination and evaluation of scientific knowledge. Non-western and non-white communities' contributions, values, interests, and knowledge are rarely included and legitimated in STEM textbooks, course syllabi, conferences, and other contexts

(1) Joseph, G. G. (1987). Foundations of Eurocentrism in mathematics. *Race & Class*, 28(3), 13-28.

(2) Prescod-Weinstein, C. (2015). Decolonizing Science Reading List <https://medium.com/@chanda/decolonising-science-reading-list-339fb773d51f>

(3) Battey, D., & Leyva, L. A. (2016). A Framework for Understanding Whiteness in Mathematics Education. *Journal of Urban Mathematics Education*, 9(2), 49-80.

(4) Martin, D. B. (2019). Equity, inclusion, and antiblackness in mathematics education. *Race Ethnicity and Education*, 22(4), 459-478.

(5) Joseph, N. M., & Cobb, F. (2019). AntiBlackness is in the Air: Problematizing Black Students' Mathematics Education Pathways from Curriculum to Standardized Assessments. In *Critical race theory in mathematics education* (pp. 140-163). Routledge.

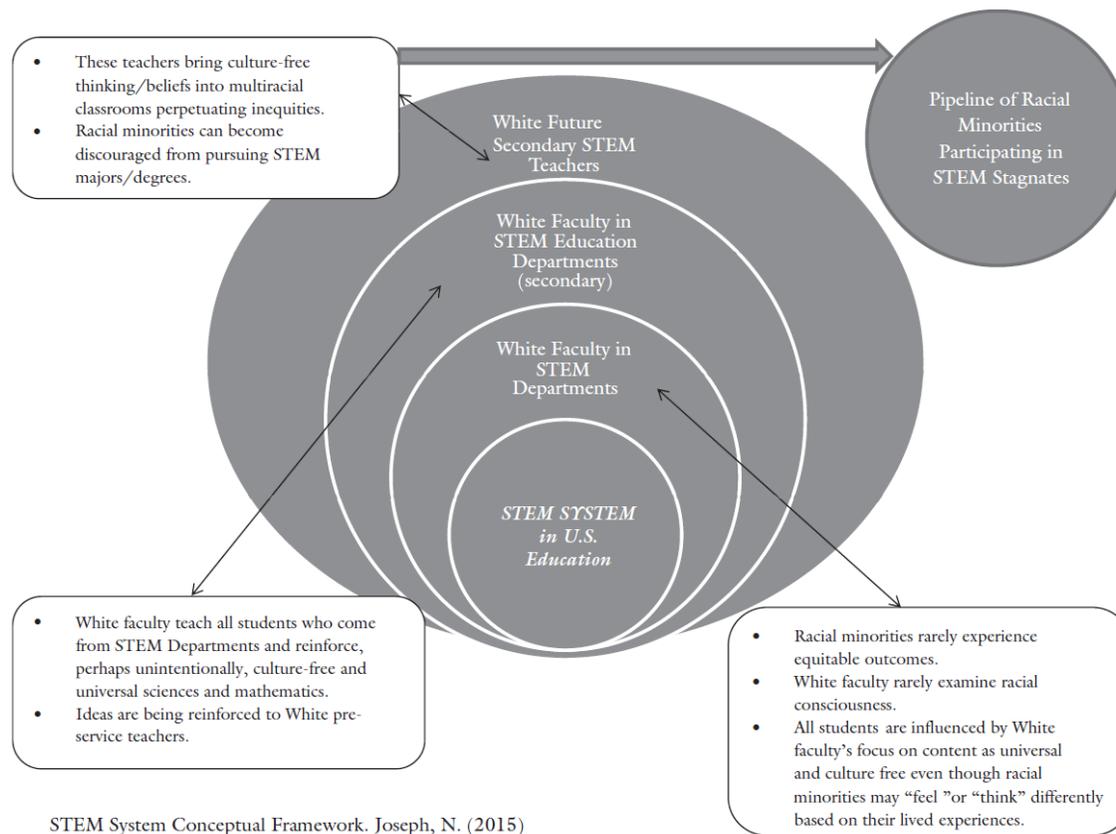
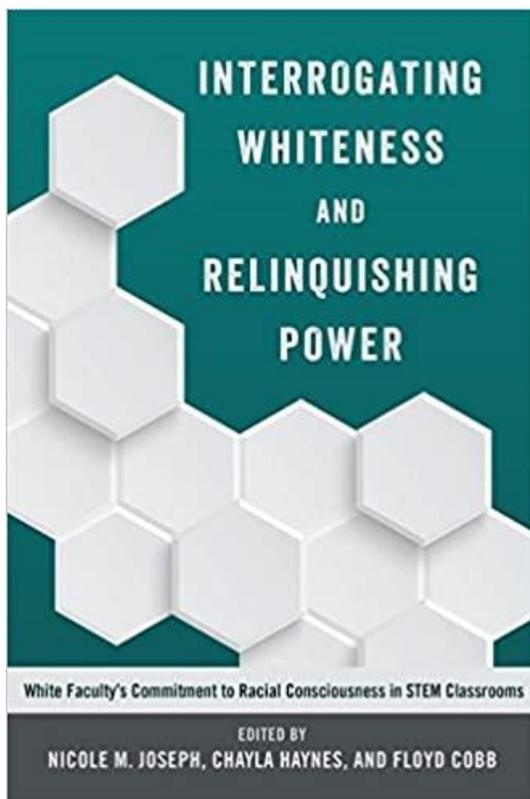


Figure 1.2. STEM system conceptual framework. Graphically designed by N. Joseph, 2015, to explain the STEM system as a White institutional space.

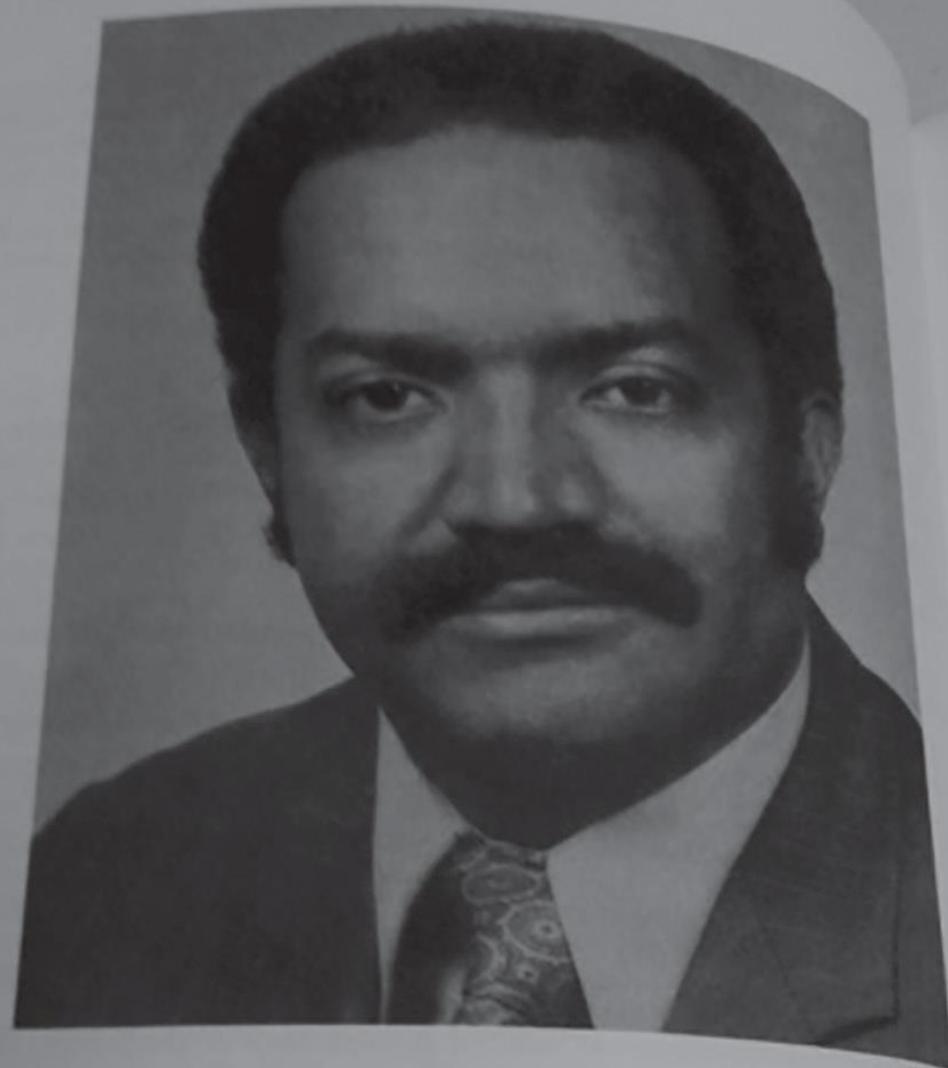
Why and how does STEM continue to be a white ideological and institutional space?

# “Black Mathematicians and Their Works”

---Virginia K. Newell, 1980

“11 of the 12 photos were defaced. It is as if the writer wanted us to know that for a Black person to hold a PhD in engineering, he or she must be at least “half White,” because achievements like these do not belong to Blacks”

--Nicole M. Joseph

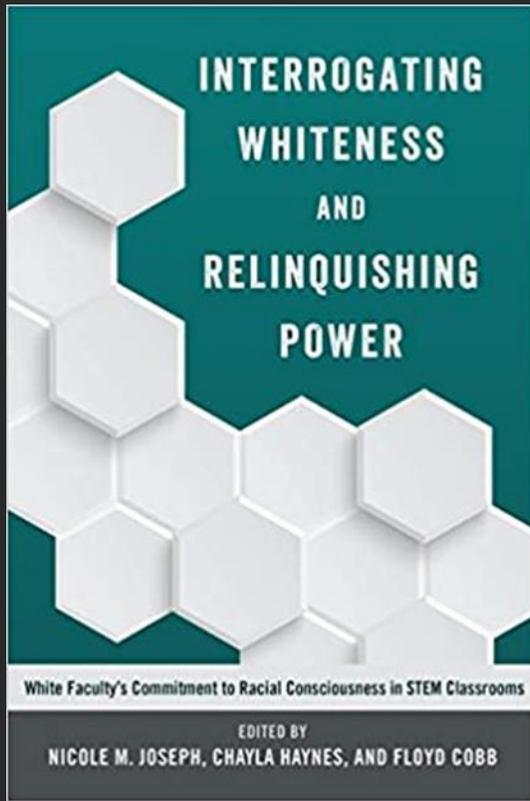


Percy Anthony Pierre, Ph.D.

*Professor, School of Engineering, Howard University*

*“On the Independence of Linear Functionals of Linear Processes”*

*1/2 white*



“When Nothing’s Lost: The Impact of Racial Segregation on White Teachers and Students”

---Robin DiAngelo

“It is absolutely imperative that White faculty address Whiteness. The societal default is racism and White supremacy. **If we are not actively seeking to interrupt it, we are necessarily colluding with it; to not address racism and Whiteness, as White people, is to reproduce racism.** The interruption requires us to address it in ourselves as well as our students. Education faculty, like our students, are overwhelmingly White, and we are not outside any dynamic I have discussed here. As educator and author Anika Nailah captured so powerfully: ‘we have all been taught by White people, who have been taught by White people, who have been taught by White people, who have been taught by White people...using textbooks written by and about White people.’ If we are not challenging that monolithic racial hegemony, we can only reinforce it” (p. 40).

# Mathematical Sciences Doctoral Degrees

	2011	2012	2013	2014	2015	2016
Total (m/w)	849	852	912	948	900	982
Men	619	628	670	694	673	730
Women	230	224	242	254	227	252
WhiteW	155	163	170	179	161	157
BlackW	9	10	6	9	6	11
HispanicW	9	10	6	7	7	9
NativeW	0	0	1	1	0	1
AsianW	38	22	34	32	31	33
Unknown R/E & Two Races	19	19	25	26	22	41

Source: Women, Minorities, and Persons with Disabilities in Science and Engineering (2019). National Center for Science and Engineering Statistics Directorate for Social, Behavioral and Economic Sciences <https://www.nsf.gov/statistics/women/>

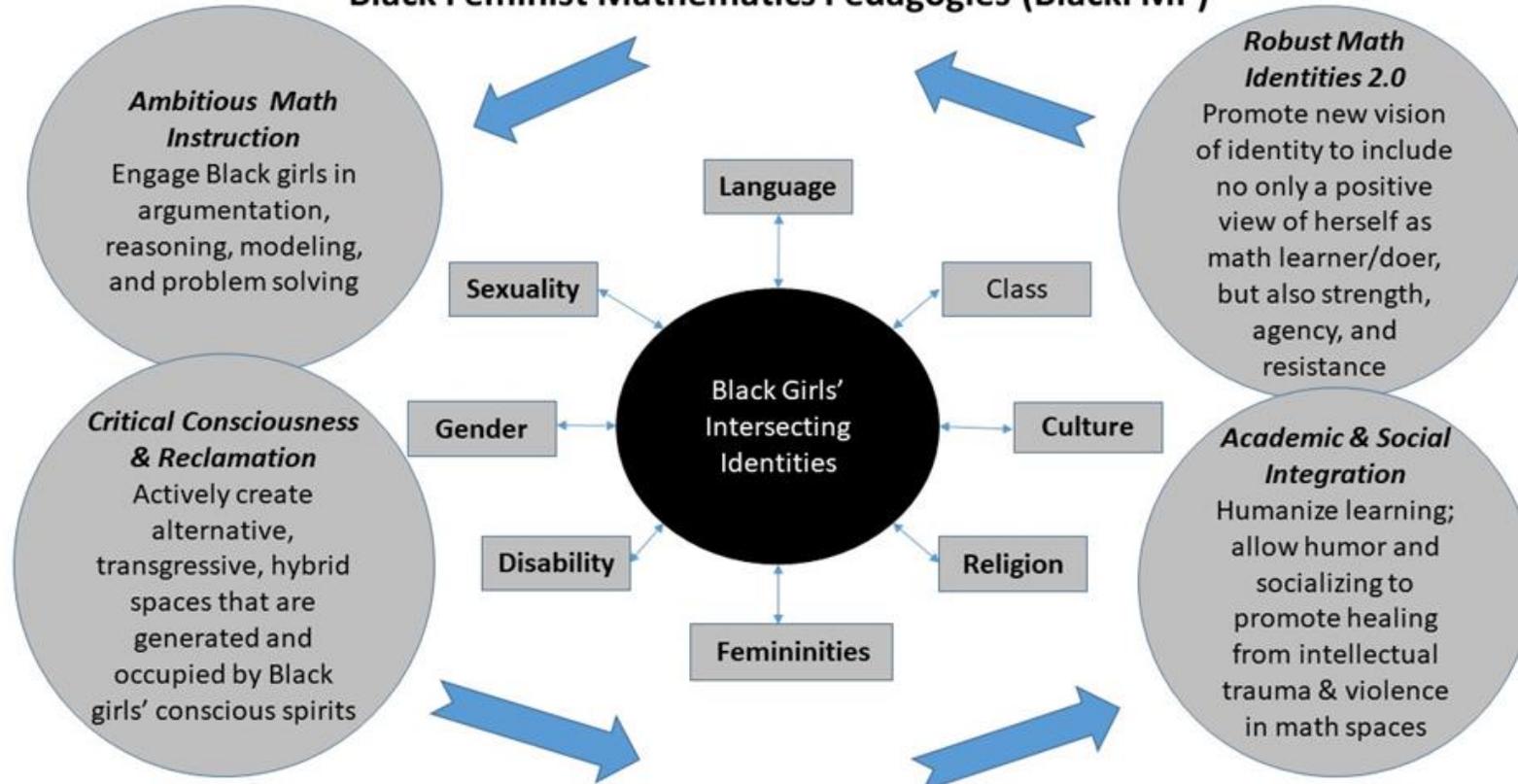
## Summarizing Pre-Work: Transform the STEM System by engaging in ways that DISRUPT Whiteness

### Pre-Work

1. Interrogate Whiteness by reading about how the U.S. has socially constructed these ideas around racialized hierarchies to place White people at the top and others at the bottom, especially Black people.
2. Take personal inventory of oneself and ask “Have I been disrupting whiteness or perpetuating it?”
3. Understand that **racial consciousness** (deep understanding of the racialized nature of our world and critical reflection of how assumptions, privilege, and biases about race contribute to one’s worldview) ***can influence teachers’ and faculty behaviors and that teacher excellence is dependent upon the fostering of inclusion (Haynes, 2017)***
4. Faculty behaviors = course design and instruction
5. Adopt Joseph’s Black Feminist Mathematics Pedagogies (BlackFMP) and other culturally responsive models

Haynes, C. (2017). Dismantling the White Supremacy Embedded in Our Classrooms: White Faculty in Pursuit of More Equitable Educational Outcomes for Racially Minoritized Students. *International Journal of Teaching and Learning in Higher Education*, 29(1), 87-107.

## Black Feminist Mathematics Pedagogies (BlackFMP)



# Black Feminist Mathematics Pedagogies Model

Joseph, N. (2020). Black Feminist Mathematics Pedagogies: A Curricular Confrontation to Gendered Antiblackness in the US Mathematics Education System. *Curriculum Inquiry*

*Example of faculty behavior change (course design and instruction)*

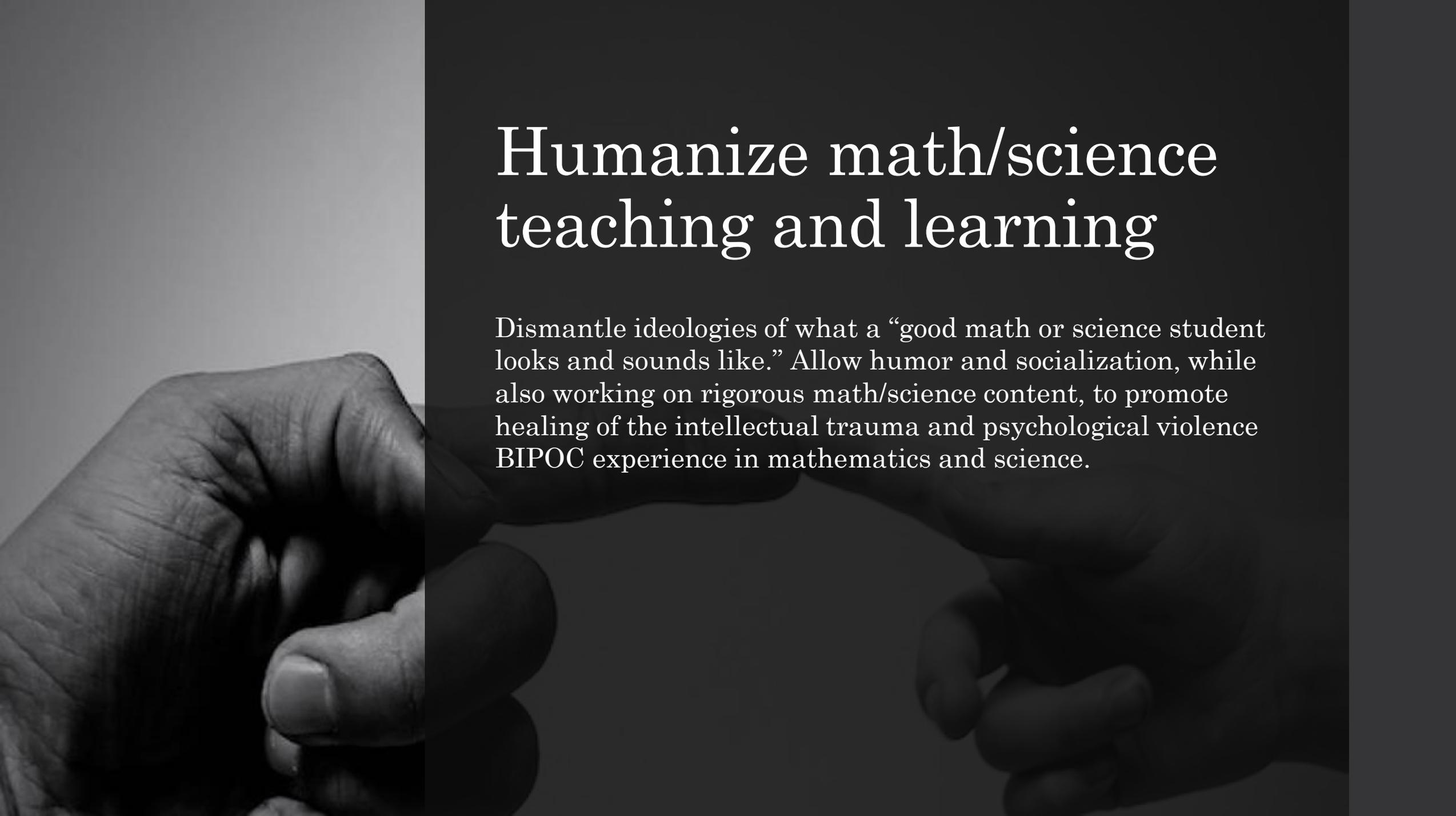


# Promote robust math/science identities

BIPOC rarely have opportunities to view themselves as strong math/science learners in addition to others (teachers, peers) viewing them similarly.

Challenge “smartness” in math/science and expand what counts as contributions to scientific and mathematical ideas. Increase BIPOC’s interest in math/science by working in solidarity with them exploring both challenges they face and possibilities for growth in math/science learning.

PERSON  
GENDER: MALE  
AGE GROUP: YOUNG MAN  
ETHNICITY: AFRICAN  
PART: HUMAN FACE  
DETECTION: 63421 POINTS  
POS (X/Y/Z): 6322 / 2576 / 96



# Humanize math/science teaching and learning

Dismantle ideologies of what a “good math or science student looks and sounds like.” Allow humor and socialization, while also working on rigorous math/science content, to promote healing of the intellectual trauma and psychological violence BIPOC experience in mathematics and science.

# Activate and Develop BIPOC's Critical Consciousness in Math/Science Lessons & Activities

For far too long, mathematics/science have been used to weaponize and demean BIPOC through deficit narratives (i.e. annual state testing that places BIPOC at the bottom of the math/science achievement hierarchy without considering the structures that created conditions for such results).

Do this in **SOLIDARITY** with BIPOC making tools accessible (i.e. research and organizing for activism in their schools) to commission them to reclaim the mathematics/science classroom in new and liberated fashions.



We DO Belong...thank you for listening!



Euphemia Lofton Haynes



Chelsea Walton



Turner Frank



Marjorie Lee Brown



Gloria Hewitt



Mikayla Sharrieff, India Skinner, and Bria Snell



Gloria Granville



Talitha Washington



Talithia Williams