

Moving Toward Antiracist and Justice-Oriented Transdisciplinary STEM

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STEM 8410 – Toward Antiracist and Justice-Oriented Transdisciplinary STEM

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My PBL planning process began in week 9 of this course as I read the article *FORUM: Toward a Politics of Place-Based Science Education* (Aikenhead et al., 2006). I was so moved by what I was reading about the effects of this type of learning, I began to cry. I wrote in my response to that article that “I would love to celebrate the variety of cultures by having students bring in raw foods from their cultures, and research how they are grown in their family’s home country. They would find out the type of climate & nutrients in the soil that makes them thrive and write a paragraph about it. Then I want them to colorfully draw their raw and prepared food. Each will share their presentations, and I will feature them on my walls.” When reading through the HILL model lesson plan, the focus of joy and personal identity opened opportunities to delve into some personally relevant, fun, engaging areas of chemistry that our academic standards don’t approach at all.

With those thoughts in mind, I thought to align aspects of that activity with the chemistry unit we were closing out. Students always ask more questions about the periodic table elements than our curriculum calendar gives us time to address. Joy & identity make me think of home & family. When with my family, cultural food is a big part of our joy and identity. It was a natural leap to decide to connect the elements of the periodic table to food. Connecting food nutrients to the period table would be new intellectual understanding and new skills. Muhammad (2023) taught us that our ancestors embraced joy, despite their oppressive circumstances, with music, art, writing, reading and celebrating with one another. I intended for this to be a joyous time. For criticality, I asked students to research & describe history, conflicts or struggles related to their food. At this point, I saw a path for all parts of the HILL model lesson plan: identity, skills, intellectualism, criticality and joy!

I shared the HILL lesson model focus with all collaborators, and all were thrilled with the concepts. Guided by this focus, and conversations with internal and external collaborators the details somewhat naturally came together. My social studies teacher collaborator who teaches Georgia History (which is fraught with injustices) had not heard of Gholdy Muhammad nor Bettina Love (not that I had either before this course, sadly.) She expressed she really wants to teach using these methods, so I'll be getting both of Muhammad's books for her birthday in a few weeks and Love's book for Christmas -if she doesn't get them herself first!

Somehow, I missed the initial suggestion of having an industry leader collaborator, even as a guest speaker addressing my students, so it was not a part of my initial planning. Thankfully, Dr. Fulton, you shared this with me as feedback, so I tried to make it happen. Unfortunately, I was not able to get a speaker, even on Zoom. But my collaboration with an anesthesiologist family member was extremely helpful with her suggesting the idea of sharing *what the elements do* for our bodies. As I modeled students' research with my favorite cultural food, instead of just showing which elements are present as I originally planned. Every collaborator added some significant piece to the PBL. From this collaboration of ideas, I made the driving question "How can connecting the elements to our cultural foods help us understand chemistry, honor our identities, and challenge the erasure of cultural knowledge in science?" This question connects chemistry to cultural identity (honor our identities). The question encourages criticality by recognizing that some cultural knowledge and contributions have been erased or been given little value in traditional science education. Many of my students noticed it during this PBL! The question promotes abolitionist teaching by fostering joy, community, and empowerment through cultures being affirmed with interdisciplinary learning.

Implementing this PBL was some of the most fun I've had all school year! The initial challenge was trying to figure out WHEN to do it. Since the class I teach is a high school course, there is a lot more content to teach compared to other 8th grade teachers. We always are teaching new content right up until the standardized test. So, I initially taught the lesson to one class that had 20 extra minutes in its schedule and taught them the remaining content as fast as I could so we could get to what I called "the good stuff" of the PBL to incentivize their attention. It worked! We've been doing standardized testing for the last two weeks, so we had class periods that were shorter than usual. Teachers spent mornings before students came doing pre-test procedures. I had to make the most of the few days in between we did not test. The other students heard about it and asked if they could do the PBL too! So, I will start with them Monday.

Students were very engaged with the PBL. They were attentive, asked a lot of related questions, and were absorbed in the work and collaboration. Students looked so at peace as they sat in groups and drew pictures or colored pictures and swapped stories. They were eager to share thoughts, ideas, family activities and memories. There was laughter and expressions that made us know a lot of students related to others' stories – even though they were of different cultures. Writing, drawing and creativity brings joy (Muhammad, 2023)! Some were surprised by hidden artistic talents revealed in the gallery walk. I saw smiles and bouncy confidence in students after getting public compliments from their peers and kind feedback on their Gallery Walk Guide. This was a beautiful change of pace for them especially after the stress of standardized testing.

In addition to showing understanding of the new content and skills, the project required students to research & describe the history, conflicts or struggles they found connecting the ingredients, people and/or food chemistry in the country and / or region. There was a place for them to write about these findings on their project, and a place on the Gallery Walk Guide where student evaluators were asked to respond to the history, conflicts or struggles mentioned relating to the food, ingredients or its people. These findings prompted a lot of conversation. Several shared they learned a lot that they didn't know about cultural oppressions and one asked "Why haven't we learned about this before now?" Another challenge, however, was that some students chose to skip the "conflicts or struggles" and just wrote about other historic facts. When I noticed this the second day, I brought them back to my slides and reminded them of where I had shared my shrimp creole food. I had shared how in colonial southern Louisiana, the Anglo-Saxons conflicted with Creoles wanting them to cook and sell only American food and abandon their cultural cuisine. The Creoles firmly held their ground and refused at the cost of facing deportation, persecution and the ban of their right to speak their native language. I urged them to dig deep and gave tips on key search words to find the attempts at cultural erasure. A few more revised and did better, though most stuck with the benign histories. I'm not sure if they did not want to read about negativity or if laziness was the culprit.

When I do this lesson in the future, I will do it once testing is done, so students do not have to feel so rushed. This needs to be a time of pure joy, inspiration and strengthening of our young people so they become disruptors of people squashing the truth of other cultures. Kendi (2019) said "The structure of racism is not going to construct and deconstruct itself. Individuals organized together created the structure. Individuals organizing together will ultimately abolish

the structure and construct an equitable and just structure of antiracism.” Where better to start banding together than in your classroom? I want to give them time to discuss, organize together and build deep convictions. I also will provide more space on the response document because those who were all-in about the conflicts ran out of space, I will also be sure to start early and get an industry speaker, preferably in person. I think it would be more effective for the project and inspiring to students for a professional actively in the field to host a question-and-answer session. It would also likely spur some students to consider that science profession for a career.

My understanding of antiracism and abolitionist teaching just began when I started this course. I learned that “race is a classification humans have created and can adjust as desired” in the very first reading we were assigned (Bonilla-Silva, 1997). My mind was blown and I was ashamed I didn’t know that. I remember that when I first saw the terms on the covers of Kendi’s & Love’s books, I thought I could infer the meanings of anti-racist and abolitionist teaching using their dictionary root words. It turned out that I knew nothing about those words either. I saw clearly it was time to get humble, learn, and CHANGE!

One major takeaway has been that we are either an anti-racist or a racist (TED.,2020). Another is I am going to do whatever it takes to be an abolitionist teacher by making my room a homeplace and recruiting coconspirators (Love, 2019). I will frequently add historic content & criticality opportunities that inspire embracing identity to my lessons (Muhammad, 2020.) Most importantly, I will deliberately plan joy into my lessons (Love, 2019; Muhammad 2023). I see how my students’ emotional and educational health depends upon this.

References

- Aikenhead, G., Calabrese, A. B., & Chinn, P. W. U. (2006). FORUM: Toward a Politics of Place-Based Science Education. *Cultural Studies of Science Education*, 1(2), 403–416. <https://doi.org/10.1007/s11422-006-9015-z>
- Bonilla-Silva, E. (1997). *Rethinking racism: Toward a structural interpretation*. *American Sociological Review*, 62(3), 465–480. <https://doi.org/10.2307/2657316>
- Kendi, I. X. (2019). *How to Be an Antiracist*. One World.
- Love, B. (2019). *We Want to Do More Than Survive: Abolitionist Teaching and the Pursuit of Educational Freedom*. Beacon Press.
- Muhammad, G. (2020). *Cultivating Genius: An Equity Framework for Culturally and Historically Responsive Literacy*. Scholastic Inc.
- Muhammad, G. (2023). *Unearthing Joy: A Guide to Culturally and Historically Responsive Teaching and Learning*. Scholastic Professional.
- TED. (2020). The Difference Between Being “Not Racist” and Antiracist | Ibram X. Kendi. In YouTube. <https://www.youtube.com/watch?v=KCxbl5QgFZw>