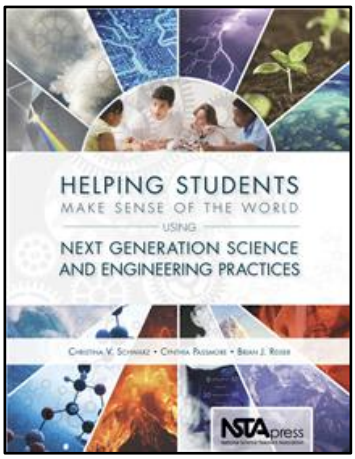
Toward More Equitable Learning in Science

OpenSciEd Goal:
Supporting an equity vision of science instruction in which all students are known, heard and supported with access and opportunities for learning.



"Realizing this potential [of the NGSS] is particularly important in relation to students of color, students who speak first languages other than English, and students from low-income communities who, despite numerous waves of reform, have had limited access to high-quality, meaningful opportunities to learn in science." (p. 33)

Definition of Student Resources

- Student resources are the ways of speaking, knowing, acting and valuing that students use to make sense of the world.
- Students develop these resources as they live their daily lives within their families and communities.

Examples of Student Resources

- Resources traditionally valued in k-12 schools include "known-answer questions, taxonomic thinking, and strict turn-taking" as well as "explanations that are expository or definitional in nature." (p. 35)
    - Metabolic Reactions initial student explanation - *M'Kenna's stomach hurts, which is part of the digestive system. The digestive system is the organs in the body that break down food using physical reactions and chemical reactions so the body absorbs nutrients.*

- Explanatory modes valued in other communities include "storytelling and uses of metaphor" are often not valued in classroom science (p. 35)
    - Metabolic Reactions initial student explanation - *The way the body works is like when I am baking with my grandma. If you mess one thing up, lots of other things can get messed up too. Like if you forget to put baking soda in cookies, they are hard and flat. It makes the other ingredients not work so well.*

How do we notice and leverage student resources?

"By attending closely to what students actually say and do in science, teachers can expand the relationships that are possible among themselves, their students, and science. In this way, they can begin to create more equitable opportunities to learn in science for historically underserved students." (p. 33)
"Creating equitable learning opportunities depends critically on teachers' skills in seeing and hearing students' ideas and reasoning as connected to science... the sense-making repertoires of students from historically underserved communities can be misread as signs of disrespect, confusion, digression, lack of knowledge or disengagement." (p. 36-37)

Bang, M., Brown, B., Calabrese Barton, A., Rosebery, A & Warren, B. (2017). Toward more equitable learning in science: Expanding relationships among students, teachers and science practices. In Schwarz, C., Passmore, C., Reiser, B.J. (Eds.). *Helping students make sense of the world using next generation science and engineering practices.* (pp. 205-228) Arlington, VA: National Science Teachers Association Press.

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