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Positioning Science Phenomena as Locally and Personally Relevant

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OVERVIEW: Community-oriented framing is a pedagogical approach for organizing science instruction around local issues and helping students understand science as relevant to their community and themselves.

AUDIENCE: K-12 science teachers, Professional development providers, Teacher educators

KEY POINTS

- Community-oriented framing is defined as a strategy to construct scientific phenomena as embedded in the physical, social, and historical context of a school's community.
- Teachers framed phenomena as locally relevant with two routines: Localizing a phenomenon by narrowing in on the specific ways a socioscientific issue manifests in a place, and Personalizing a phenomenon by centering personal experiences and interactions within a socioscientific system.
- Teachers' framing of phenomena shifted student interactions towards the socially, personally, and locally relevant questions with multiple connections to their everyday lives.

INTRODUCTION: Apolitical science instruction sanitizes scientific phenomena and problems, erasing sociopolitical dimensions from science education experiences and contributing to educational inequities for marginalized youth. This paper is a case study of two science teachers at a Title 1 school teaching Black and Latinx middle and high school students committed to implementing community-oriented framing as a justice-centered science practice. We answer two research questions: What instructional practices did teachers use to frame phenomena in community? And how did students uptake frames of phenomena from their classroom experiences to make sense of the relevance of phenomena to their community?

FINDINGS: The instructional units studied were a 7th grade food justice unit, where students investigated concepts of nutrition, how their favorite cultural recipes could be made more nutritious without losing cultural significance, and lack of access to healthy food options in urban communities of color, and a 10th grade chemistry unit on environmental justice, where students modeled the local carbon cycle, connecting issues of land use change and deforestation to decreasing carbon reservoirs and inequitable access to green space in urban communities of color. Teachers consistently oriented their lessons to the real-world with successfully phenomenological framing and oriented half of the lessons in units to the community. Lessons were oriented to the community with practices of gathering evidence, testing variables, and creating/revising models to localize and personalize phenomena. Most students explained the phenomena of inquiry as personally and locally relevant issues and that they framed the scientific and social systems as inherently connected.

TAKEAWAYS: Community oriented framing is aligned with NGSS's vision of phenomenological framing. It also reaches for educational equity by organizing instruction around community-based questions and the histories and realities of minoritized students to help students construct expansive frames of phenomena. A teacher's framing practices signal to students what is welcome in the classroom. Science teachers can welcome local, diverse sensemaking resources to support epistemic justice for marginalized youth. We contribute the practices of framing phenomena in community as part of the move away from normative science learning of "doing school" and towards justice-centered science for problem-solving in communities.

Full Title: Exploring Science Teachers' Efforts to Frame Phenomena in the Community