

Pathhacking a way into STEM

A Justice-oriented approach to understanding how youth author STEM futures against oppressive norms.

The Challenge: Persistent Inequities in STEM access and opportunity.

Inequities in opportunities to participate and achieve in science, technology, engineering and mathematics [STEM] persist. Yet, success in STEM is one viable route towards personal and/or community economic advancement for youth growing up in poverty. It also factors into opportunities for informed, meaningful, and empowered democratic participation. There are many cultural, social and institutional barriers which inhibit pathways to success in STEM, including dominant cultural narratives about what it means to be a STEM person, member in social networks which include STEM people, and distribution of resources for pursuing a wide range of STEM experiences both in and out of school are but a few of the critical barriers youth may face. These inequities have persisted for decades, and the field has failed to adequately respond. Intervention strategies aimed at increasing diversity in STEM guided by the STEM “pipeline” metaphor, are deficit-oriented, and have yielded lackluster results.

“When I think of STEM pathways I think of science fairs and stuff. I don’t think I was ever that kind of a person... It makes me feel like an imposter to call my pathway a STEM pathway.” - Cathy, pre-med university freshman

Reframing the Problem Space: Pathways not Pipelines

To make forward movement in the fight towards equity in STEM for youth of color growing up in low-income communities, we have to understand how territory of STEM can be treacherous for many youth. Youth need approaches that encourage and support them in leveraging *their* powerful cultural expertise towards meaningful learning or engagement in STEM. A pathways lens highlights the forward trajectory of learners’ decisions and opportunities toward promising, possible futures in/with STEM that are not necessarily bound to pipeline-gatekeepers. Pathways involve community-based experiences and resources that typically go unrecognized in schools, but that play powerful roles. However, pathways that youth traverse are not always clearly marked or visible, may not exist in particular contexts, either in-the-moment or overtime.



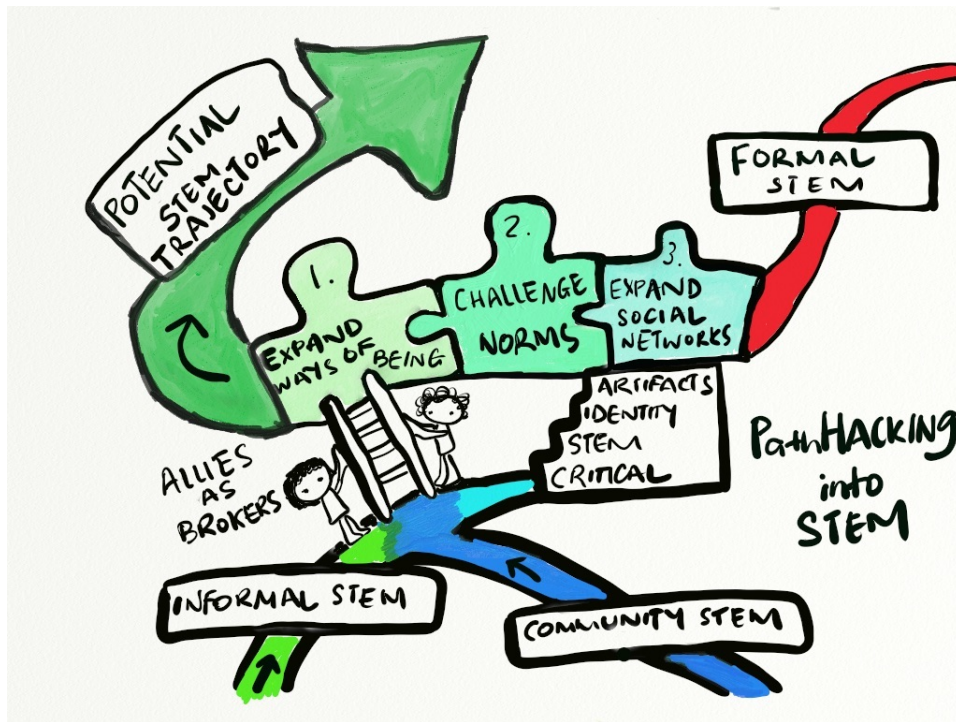
We are interested in how youth create *new pathways and connections*, especially when they *do not* have a clear route. Thus, over four years, we followed 48 youth who persisted with an interest in STEM across home, community and school spaces to make sense of if and how they created their own pathways into STEM.

PATHHACKING

Youth *creating their own pathways* into STEM, often with improvised tools and in treacherous territory, because there were no pre-laid paths or traditional resources easily available for doing so. In building these routes of connection, youth wield creative forces and agency to imagine a way forward, most of the time through unclear territory, with unknown outcomes or stopping points along the way.

We illustrate in the figure below how the process of Pathhacking involved **three key processes**.

1. To pathhack, youth engaged in practices that **challenged and expanded** ways of being in STEM-related spaces;
2. Pathhacking practices help the youth to **re-organize social worlds** for both themselves and their peers, expanding future pathhacking possibilities;
3. In Pathhacking, youth utilize tools in the form of: a) **critical STEM mobility artifacts** and; b) **allies as brokers** across different contexts and over time.



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in and through STEM: Exploring
how youth build connecting
pathways between STEM-
related landscapes*. Teachers
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