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JULY 2018

5

What Is Considered "STEM" and Why?

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What Is the Issue?

People of all ages and backgrounds participate in science, technology, engineering, and math (STEM) processes and practices on a daily basis, whether they are engaging in chemistry in the kitchen or engineering in the backyard. However, the varied and diverse ways in which people engage with STEM are often not acknowledged due to the historical representation of STEM in school, industry, and society. STEM is often stereotyped as an activity done mostly by individuals who are male, white, and highly intelligent.

These cultural models of "who does STEM" discourage many who don't identify as male and/or white, or who don't see themselves as highly intelligent, from choosing or identifying with STEM. To broaden participation, the field needs to define STEM more comprehensively so that people can recognize the ways they already engage in, use, and contribute to STEM disciplines, even if they don't conform to cultural stereotypes associated with the profession.

Why It Matters to You

- **Science communicators** and **STEM educators** can broaden the appeal of their work by designing programs that recognize and build on the everyday ways people already engage with STEM concepts, phenomena, and practices.
- **Professional development leaders** and **science communication trainers** can help their audiences design ways to make connections between their content and the everyday ways in which people engage with STEM.
- **Funders** can encourage science communicators and informal educators to design programs that incorporate and leverage everyday ways of doing STEM.

Things to Consider

Everyday activities—from taking care of animals to cooking, horticulture, garage mechanics and other activities—involve STEM concepts, phenomena, and reasoning. Research suggests that there are ways to break down barriers and stereotypes that operate to exclude people from choosing STEM (National Research Council, 2015). These include helping people to recognize their knowledge and know-how as aspects of STEM, and designing programs that allow people to make their knowledge the very means for participating in further STEM learning.

Research also finds that STEM must be recognized as more than just concepts and skills (National Research Council, 2010). Science also recognizes particular ways of knowing or reasoning, and particular uses for STEM concepts in the practical world. STEM learning also involves developing an identity with or affinity for STEM, so that learners are recognized—and recognize themselves—as individuals with interest and ability in STEM.

People of all ages—from the youngest children to the oldest adults—can and do participate in STEM learning and practices. All of them bring their prior knowledge, experiences, and skills to the learning process.

Reflection Questions

- **What does STEM look like in your project, program, or institution? Would a broad range of communities see themselves and their histories reflected in this vision of STEM?**
- **How is STEM used by your target audiences as a tool or resource for advancing community interests or social justice?**
- **How can you expand your representations of STEM to include everyday engagement with STEM? Can you expand the view to include STEM-related life choices in such areas as jobs, leisure time, civic engagement, and parenting or mentoring?**

Recommended Actions You Can Take

- When engaging in science communication, be sure to explicitly name the aspects of STEM that are present in many professions and areas of life, such as nursing, construction, and cooking. Connect to a broad range of areas when talking about STEM.
- Work with local communities to design STEM programs that position STEM as a tool to address issues that matter to the communities.
- Tell stories of how you—as a scientist, science educator, or science communicator—came to value and pursue STEM. Were any experiences outside of school pivotal in developing your interests?
- Identify the everyday experiences of your target audiences in order to relate STEM concepts and processes to their needs and interests. These experiences are likely to be specific to the populations or communities you serve.

Tools You Can Use

- This research brief, What do we mean by "equity"? from Relating Research to Practice describes four different ways in which STEM is positioned to support equity: in academic and workplace science, project-based activities, community environmental and other issues, and social justice.
- The FrameWorks Institute has identified patterned ways in which the American public thinks about STEM. First, many people do not know what "STEM" refers to. Second, most people think STEM is for exceptionally smart people, so STEM fields are less important than basic literacy. Their research and resources can help frame STEM as relevant to local communities and stakeholders.

REFERENCES

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This material is based on work supported by the National Science Foundation (NSF) under award no. DRL-1612739. Any opinions, findings, and conclusions or recommendations expressed in the material are those of the authors and do not necessarily reflect the views of NSF.