

Everyday Settings & Family Activities

Criteria for Identifying Productive STEM Programs in Out-of-School Settings



Providing access to productive out-of-school STEM learning opportunities is key to enriching STEM learning for youths and children. As described in the first chapter of this report, productive programs are intellectually, socially, and emotionally engaging. They reflect and develop young people's interest in and understanding of STEM and provide connections to the broader ecosystem of STEM learning and career pathways. In detailing what counts as productive in this chapter, we also pay particular attention to how programs can actively seek to broaden participation of youths from communities historically underrepresented in STEM fields.

The [criteria for identifying productive out-of-school STEM programs](#) are derived from syntheses of research and practice in the fields of youth development, learning science in informal environments, and connected or cross-setting learning. In discussing the supporting evidence for the criteria, we provide examples of how they can operate in practice. Our criteria fall into three categories:

- 1. Productive programs engage young people intellectually, socially, and emotionally.**
 - They provide first-hand experiences with phenomena and materials.
 - They engage young people in sustained STEM practices.
 - They establish a supportive learning community.
- 2. Productive programs respond to young people's interests, experiences, and cultural practices.**
 - They position STEM as socially meaningful and culturally relevant.
 - They support collaboration, leadership, and ownership of STEM learning.
 - They position staff as co-investigators and learners alongside young people.
- 3. Productive programs connect STEM learning in out-of-school, school, home, and other settings.**
 - They connect learning experiences across settings.
 - They leverage community resources and partnerships.
 - They actively broker additional STEM learning opportunities.

Our review of the research suggests that productive out-of-school STEM programs demonstrate a dynamic and interwoven relationship among these three sets of criteria. For example, productive STEM out-of-school programs that intentionally leverage young people's interests help make explicit the connections between STEM experiences across multiple settings and help them see the relevance of those experiences to their daily lives and future careers, which can deepen their intellectual, social, and emotional engagement with STEM.