# Selected Research and Resources on STEM & Afterschool

In the course of preparing for the *ITEST Convening Event: Defining an Afterschool Research Agenda*, the ITEST Learning Resource Center (LRC) reviewed a wide variety of publications addressing issues in the STEM and afterschool fields. From this scan of the literature, the LRC has compiled this bibliography of materials for reference leading up to and during the convening.

Beyond the general topic of the integration of STEM workforce development in afterschool, the LRC has sorted literature into five potential areas of discussion for convening participants:

- Effective Program Models & Core Elements
- Professional Development of Staff
- Engaging Under-Represented Groups in STEM
- Partnerships with Industry & Academia
- Sustainability Strategies

White papers are now being solicited to illuminate these and other topics; the LRC makes this collection of research and resources available to assist authors in developing their articles.

The intent of this collection is to reference background materials that provide rich context for an examination of STEM workforce development, informal learning, and afterschool programs, as well as to identify topical research and other resources that can inform the effort to define an afterschool research agenda.

To be included, resources must address issues (identified as areas of discussion above) that are fundamental to this inquiry into STEM learning afterschool. It was also important to find complementary resources that covered various dimensions of an issue (i.e., research related to different groups in the subtopic on engaging under-represented groups). Further, the LRC sought to include National Science Foundation-funded research and publications by ITEST Program principal investigators.

In all, the selected resources include articles in peer-reviewed journals, evaluation reports, research summaries, government-issued reports, books, commissioned white papers, issue briefs, best practices guides, position papers, and various online publications.

The vast majority of resources in this collection were culled from a few key sources:

- Preparing Tomorrow's STEM Workforce through Innovative Technology Experiences for Students and Teachers, a publication of the ITEST LRC (2009)
- Bibliography compiled by the ITEST afterschool interest group, with an emphasis on publications authored by ITEST PIs
- *Learning Science in Informal Environments: People, Places, and Pursuits* by the National Research Council (2009)
- Literature Review compiled by the Coalition for Science Afterschool, the leading advocacy organization for science in afterschool

- *Afterschool Matters*, a national peer-reviewed journal published by the National Institute on Out-of-School Time
- *New Directions for Youth Development: Theory, Practice, and Research*, a quarterly publication focusing on contemporary issues challenging the field of youth development

Other resources were identified via Google web search, using "STEM" and "afterschool" for search terms, plus key words associated with the subtopics, such as "program design," "professional development," and "sustain."

Please note that resources have been categorized in the subtopic most closely related to their content, though they may also pertain to other subtopics.

Additional research and articles of importance identified by white paper authors will be added and shared with participants at the convening, and more broadly via the LRC website. Suggestions for other resources are welcomed.

## INTEGRATION OF STEM WORKFORCE DEVELOPMENT IN AFTERSCHOOL

*The list of references in this section is a heterogeneous collection of publications on STEM and workforce standards and trends, issue briefs, evaluation reports, literature reviews, and research results on subjects such as IT skills development, pedagogical practice, out-of-school time programming, etc. The materials provide general background information on STEM workforce development and/or afterschool, or otherwise relate to multiple subtopics.*

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## EFFECTIVE PROGRAM MODELS & CORE ELEMENTS

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## PROFESSIONAL DEVELOPMENT OF STAFF

*The growing professionalization of the afterschool workforce is reflected in the expanded body of literature available on professional development for afterschool practitioners. This collection of publications presents a number of models and promising practices for professional development of afterschool staff, in the form of toolkits, research reports, guides, and other materials.*

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## ENGAGING UNDER-REPRESENTED GROUPS

*This list includes an array of research studies, issue briefs, guides, and other papers that examine the participation of groups traditionally under-represented in STEM careers. These publications inquire into and share strategies for different dimensions of recruitment, retention, and persistence of these groups – such as girls, minorities, young people with disabilities, and low-income youth – in STEM programs and fields.*

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## PARTNERSHIPS WITH INDUSTRY & ACADEMIA

*Many afterschool programs partner with universities, businesses, and other organizations in their communities for richer programming, recruitment, and sustainability. In this list of resources, a variety of models and case studies, guides, research papers, and other publications tell success stories and share strategies for building effective partnerships.*

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## SUSTAINABILITY STRATEGIES

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