



An NSTA Position Statement: Learning Science in Informal Environments

Introduction

Informal environments—or out-of-school-time (OST) settings—play an important role in promoting science learning for preK–12 students and beyond. The learning experiences delivered by parents, friends, and educators in informal environments can spark student interest in science and provide opportunities to broaden and deepen students’ engagement; reinforce scientific concepts and practices introduced during the school day; and promote an appreciation for and interest in the pursuit of science in school and in daily life. NSTA recommends strengthening informal learning opportunities for *all* preK–12 students.

Research shows that learning science is a rich, complex, ongoing process that builds over a lifetime (NRC 2008; Sawyer 2006). Opportunities to learn science occur throughout the day and year, in a wide variety of settings, and through a range of experiences (NRC 2008). Recent reports emphasize the important role of learning science in informal environments and provide clear evidence that these experiences can promote science learning and strengthen and enrich school science (Bevan et al. 2010; NRC 2009; Phillips, Finkelstein, and Wever-Frerichs 2007).

NSTA considers informal learning environments to encompass a wide range of contexts and settings, including everyday experiences; experiences in designed settings, such as museums, zoos, nature and environmental programs, and other science-rich cultural institutions; experiences in structured OST programs, such as after-school youth programs, clubs, and citizen science; and experiences through science media, such as gaming, television, radio, and the internet (NRC 2009). These diverse opportunities can help learners understand the relevance of science to their lives, the depth and breadth of science as a field of inquiry, and what it might be like to choose to do science in the world, either as a professional or a hobbyist. These experiences may also provide important and unique opportunities to engage students who come from communities historically underrepresented in the sciences (Banks et al. 2007; NRC 2009).

NSTA advocates for informal learning opportunities for all students and recommends expanding these opportunities, especially for students from communities underrepresented in STEM fields. NSTA further recommends expanding the role of informal science institutions in the design and delivery of professional supports for teachers; building stronger links between preK–12 schools and informal science institutions; improving systems for measuring and assessing the impact of informal learning experiences; and providing greater recognition and support for informal science educators who represent a wide range of organizations and institutions.

NSTA underscores the critical role of parents and other caregivers in encouraging and supporting their children's science learning at home, in school, and throughout their community and acknowledges the recommendations in the NSTA position statement, Parental Involvement in Science Learning (NSTA 2009). The following recommendations address the need to strengthen and expand structured (designed) learning in informal environments with support from schools and educators.

Declarations

NSTA recognizes the critical role that informal science learning opportunities provide preK–12 students. Informal settings create opportunities for students and others to develop interest, readiness, and capacities to pursue science, technology, engineering, and math (STEM) learning in school and beyond. More than half of a child's waking hours are spent outside of school.

- NSTA recommends expansion of informal learning opportunities for preK–12 students, especially students from communities underrepresented in STEM fields, to promote their interest in and readiness for school science.

NSTA recognizes the important role that informal science institutions play in supporting preK–12 teachers of science. Every year, informal science organizations provide professional development resources and workshops to tens of thousands of teachers across the country. Informal settings provide science-rich and socially supportive professional communities for teachers and model ways for them to make science more engaging and interactive for their students.

- NSTA recommends expansion of the role of informal science institutions in the design and delivery of professional supports for teachers in both preservice and inservice contexts.

NSTA advocates for stronger links between formal and informal science learning. Informal contexts provide resources for expanding the curriculum, reinforcing key concepts, and providing links to real-world situations and scientists, as well as scientific data, instruments, and laboratories.

- NSTA recommends systematic promotion of strong and sustained links between districts, schools, and informal settings and appropriate research and evaluation of the ways these links strengthen the quality and quantity of science education in preK–12 classrooms. This requires increased investment in programs and research.

NSTA calls for better measures for learning in informal environments. Student learning measurements developed for school settings are typically not attuned to learning in informal settings and may not fully capture the important contributions that these opportunities can make to students' interest, readiness, and capacity in STEM subjects.

- NSTA recommends development of more appropriate measures to capture the ways learning in informal settings can help prepare a more science-engaged and knowledgeable citizenry. These assessments would be embedded and non-obtrusive and

would inform program designers and funders. Significant investment in and experimentation with measurement approaches is needed.

NSTA recognizes informal science educators as an important part of the science education workforce. Informal science educators have expertise in science and in making science accessible and engaging to a wide, diverse range of learners. Many receive too little recognition, compensation, and professional development opportunities.

- NSTA recommends an increase of support for informal science educators so they are able to continually improve their professional practices by expanding opportunities for their own professional learning, including (but not limited to) how they can collaborate with schools and teachers to advance student engagement with and pursuit of science.
- NSTA recommends a heightened awareness and recognition of the important role that scientists and industry professionals play in supporting informal science education programs.

*Adopted by the NSTA Board of Directors
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References

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Additional Resources

Center for Advancement of Informal Science Education (www.aise.insci.org).

Fenichel, M., H. A. Schweingruber; National Research Council (NRC). 2010. *Surrounded by Science: Learning Science in Informal Environments*. Washington, DC: National Academies Press.

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