



**U.S. Department of Education
Arts in Education Model Development and Dissemination Grant:
Early Childhood STEM Learning Through the Arts**

Abstract

STEM (Science, Technology, Engineering and Mathematics) education has become a top priority across all sectors of our society. Despite ample research showing that young children have the potential to become competent math learners before entering elementary school, few children realize this potential. Yet research now shows that students' math skills as they enter Kindergarten are the strongest predictor of later-school achievement.

To address the STEM learning gap in early education, Wolf Trap Institute for Early Learning Through the Arts will develop, research, and disseminate age-appropriate content, skills, and processes that are common to STEM learning and the performing arts-based learning approaches that Wolf Trap has developed over 30 years of working with public schools and Head Start centers. The active learning inherent in arts-based classroom activities make the arts an especially effective teaching strategy for early childhood educators. Experimental evidence shows that Wolf Trap's Teaching Artist Residency programs enhance math and science skills of low-income pre-K and Kindergarten children and significantly improve their academic readiness for elementary school. Therefore, Wolf Trap is uniquely prepared to address STEM learning needs of young children and to support the professional development of their teachers.

Over the three-year implementation period, the STEM/STEAM project will serve approximately 40 teachers and 1,440 pre-K and Kindergarten students in 20 Title I schools in Fairfax County Public Schools (FCPS), Virginia, providing 23,000 student contact hours of arts programming. Wolf Trap Teaching Artists will coach teachers in creating a rich learning

environment in their classrooms through four residency periods over the course of two school years. Teachers will be actively engaged in developing and implementing new strategies and content that correlate fundamentals of dance, drama, and music with math/science learning outcomes in areas such as geometry/spatial relations, number/operations, pattern, measurement, and math reasoning.

Teachers will have learning experiences both in their classrooms and in professional development settings with Teaching Artists, and they will be supported to become increasingly independent users of arts-based learning strategies. Professional development will include two week-long institutes, which will establish a learning community with Teaching Artists and FCPS teachers; coaching sessions and other workshops over two academic years; and additional opportunities for teachers to lead peer training and parental-involvement training.

Wolf Trap will document this project thoroughly, experimentally evaluating both the implementation of the model and the impact on student learning outcomes. We will disseminate the results through conference presentations, publications, and the network of 15 Wolf Trap Regional Programs, established through a replication process with sponsoring organizations. Because the program is primarily classroom-based, the strategies, content, evaluation tools, and professional development models may be utilized by other teaching artists (with adaptations for art form), arts and cultural organizations, or pre-K and Kindergarten classroom teachers.

Connecting performing arts learning objectives with math/science learning objectives will establish a common language that will allow early-childhood educators to integrate arts-based teaching strategies into pre-K and Kindergarten classrooms and curriculum. STEM + the Arts = STEAM, and STEAM has the power to drive early childhood education.