

## **Playscapes: Designed Nature Environments to Promote Informal Science Learning**

### **Background**

Early childhood education and informal STEM learning have common key characteristics. Both emphasize meaningful, child-initiated learning strategies that highlight firsthand experiences and active participation, cognitive and affective process development, and an interdisciplinary and holistic approach to problem solving and concept development. The typical venue for learning in early childhood education is a classroom where exemplar teachers thoughtfully craft rich learning environments for experiential learning. In fact, notions of the environment as a third teacher and intentional classroom design are ingrained in early childhood education best practices; however, this is rarely extended to outdoor settings, and many educators underestimate the learning potential of outdoor play.

To address the need for outdoor environments that are intentionally designed to elicit STEM learning while inspiring free play, the University of Cincinnati's Arlitt Child and Family Research and Education Center and Cincinnati Nature Center partnered to create the Cincinnati Nature PlayScape Initiative. The premises and practices embraced by the initiative were derived from existing research and practice in the fields of early education, biological sciences, and environmental psychology. Subsequently, two playscapes designed to kindle free play, environmental awareness, and learning for young children in the Greater Cincinnati area were built to emulate the natural environment using plants and spaces indigenous to the locale. In both the 10,000 square foot urban playscape on the university campus and the 1.6-acre rural playscape at the Cincinnati Nature Center, affordances for exploration were key experiential goals. The Cincinnati Nature PlayScape Initiative is studying where preschool children play within these two respective playscapes, what materials they use, with whom they are playing, if science learning occurs through their play, and teachers' perceptions of their experiences.

### **Documented Results**

Playscape experiences offer numerous opportunities to observe living things in the environment and explore nature's biodiversity. Play within nature engages children as young naturalists and serves as a venue for drama, exploration, the arts, and the creation of rich play scenarios. Within these scenarios, there are numerous opportunities to engage in mathematics, building and construction, and the use of technology to explore and study the complexity of the environment. Results from the study of how children learn about science in the playscape indicate that young children do this regularly and organically within the context of their play.

To document where children were playing, an iPad behavior-mapping app was created. Results indicate that areas such as the streams and woods have affordances that elicited high levels of play and science learning, thus becoming defined behavior zones that were targeted for further study through video and audio analysis of children's play. Analyses to date suggest that the playscapes offer affordances that prompt children to measure, build, discover, and question natural phenomena using what the initiative team termed as "preschooler's science language."

The premium value of loose parts and play within the playscape were substantiated by data collected through the behavior mapping iPad app and videography. In addition, playscape design

elements foster spatial and environmental awareness, evidenced by the manner in which children used maps and commented on the flora and fauna. Results also suggest that playing in these designed settings instills self-determination among children, particularly with regard to choice making, problem solving, self-regulation, and engagement.

Through the initiative, a curriculum-based assessment was created to determine if children were more inclined to engage in inquiry processes and whether or not they gained knowledge about life science. This assessment was administered pre- and post-playscape experiences. Data from the assessments are currently being analyzed.

Lastly, although audio data on teachers' support of children's learning are still being analyzed, teacher participants in the study provided substantiating feedback about the engagement of children in STEM-like exploratory and constructive play that suggests playscapes are excellent venues for informal STEM learning.

### **Potential Applications**

Children who are given opportunities to become immersed in nature may become STEM literate at very young ages, creating an understanding on which concepts and content can be built as they mature. Through the use of behavior mapping, our initiative discovered the most compelling spaces within a playscape that attract preschool children's play, inquiry, and construction. What the children did with minimal adult guidance and what teachers did to increase focused attention on STEM learning was also studied. Preliminary results indicate that playscapes for young children inspire play, nurture biophilia, and promote STEM learning.

### **For More Information**

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