PlayScapes: Designed Nature Environments to Promote Informal Science Learning

Dr. Victoria Carr
Principal Investigator

Dr. Cathy Maltbie
Evaluator

Leslie Kochanowski
Project Coordinator
Eastern Deciduous Forest

There are four distinct seasons: winter, spring, summer and fall.
Deciduous Forest: Plants

Trees such as maple, oak, hickory, and beech, hemlock, spruce, and fir are abundant. Shrubs like viburnum and spice bush are also in the forest.

Lichen, moss, ferns, wildflowers and other small plants can be found on the forest floor.
Deciduous Forest: Animals

Mammals commonly found in a deciduous forest include bears, raccoons, squirrels, skunks, wood mice, and deer.
Diversity in Deciduous Forests

Insects, spiders, slugs, frogs, turtles, salamanders, and snakes, mostly non-poisonous are common.

Birds like hawks, cardinals, owls, songbirds, and woodpeckers abound.
A playscape is an intentionally designed, dynamic, vegetation-rich play environment that nurtures young children’s affinity for nature.
Five Playscape Principles:
(Carr & Luken; Cincinnati Playscape Initiative)

- Playscapes elicit hands-on, multi-sensory, unique and personal experiences for children where nature is the focus.
- Areas within the playscape are designed to be open-ended with multiple and divergent uses.
- Selected playscape plants and materials are ones that can be found in nature, preferably indigenous to the local landscape.
Five Playscape Principles (continued)

• Playscape materials provide opportunities to be touched, manipulated, dug, moved, picked, dammed, climbed, built, and experienced by children as they choose to do so.

• Playscapes are built to encourage risk-taking, investigation, language, sensory experiences, child-directed dramatic and themed play, and collaborative and active play.
Playscape Elements: (Carr & Luken; Cincinnati Playscape Initiative)

- Accessible water – streams, fountains, wading ponds
- Unlevel topography
- Gardens and/or edible landscape materials
- Sand, rocks, boulders
- Trees, grasses, shrubs, flowers, herbs, etc.
- Hiding places, tunnels, felled logs, and digging pits
Playscape Elements: (Carr & Luken; Cincinnati Playscape Initiative)

(continued)

• Nature-themed art or some play equipment may be included, but do not intrude upon or dominate the playscape
• Seating for adults to observe children’s play
• Storage for child-sized equipment (shovels, buckets, magnifying glasses, binoculars, etc)
UC’s Arlitt Child & Family Research & Education Center PlayScape
Arlitt PlayScape Opening
August 2012

https://www.youtube.com/watch?v=F90gRNA_BAU
PlayScapes: Designed Nature Environments to Promote Informal Science Learning (NSF 1114674)

Aims are to study:

1) children’s behavior and movement patterns in the PlayScapes

2) children’s scientific thinking that may occur during play

3) the relationship between time spent in the PlayScapes and children’s attitudes about science
Participants
11 preschool teachers and
38 Children Program 1
37 Children Program 2

- Program 1 Fall 2012
  - 3 visits Arlitt
  - 3 visits CNC

- Program 1 Spring 2013
  - 3 visits CNC

- Program 2 Fall 2012
  - 3 visits Arlitt
  - 3 visits Arlitt Playground

- Program 2 Spring 2013
  - 3 visits Arlitt
  - 3 visits CNC
Data Measurements

1. CURRICULUM-BASED ASSESSMENT (CBA)
2. BEHAVIOR MAPPING
3. VIDEO & AUDIO
4. TEACHER FOCUS GROUPS

“[The playscape] enriches our lives as teachers. No doubt we’re seeing the benefits and differences in play.” - teacher 2012
Curriculum-Based Assessment (CBA)

Initial Measure
Baseline understanding of science concept knowledge and inquiry skills

Concluding Measure
Retest using identical measure after 8 months of playscape exposure
CBA

Assessment cards

procedure and protocol

score sheet and prompt
CBA Protocol Snapshot

Curriculum Based Science Assessment (Last edited 9/20/12)

Assessor: __________ Date: __________

Child: __________ DOB: __________ School/Class: __________

Preparation: Organize potted plant, picked plant, hand lens, craft stick, worms & pill bugs and photograph cards.

Assessor: Welcome child to assessment table.

Say: *I am going to show you some pictures and ask you some questions.*

<table>
<thead>
<tr>
<th>Tangible Prompts</th>
<th>Script</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three (3) cards depicting play spaces. Spread out in front of child. Point to each card.</td>
<td>1.a. Here are 3 places where you could play. Where would you like to play?</td>
<td>0</td>
<td>___Climber ___PS ___Room</td>
</tr>
<tr>
<td></td>
<td>1.b. Why did you choose this place?</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Extension:</strong> What makes it_____ (fill in child's term)?</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Three (3) playscape cards. Spread out in front of child. Point to each card as questioning.</td>
<td>2. Now I am going to show you some things you might see in a playscape. A playscape is a place where children can explore nature. You can play outside and be a scientist. Here are some places you could play in the playscape.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.a. Which place would you like to play?</td>
<td>1</td>
<td>___Fort ___Sand ___Creek</td>
</tr>
</tbody>
</table>
CBA Significant Results

- Overall score increased 3.5 points out of 31 possible for all students at the post assessment versus pre assessment
Individual CBA questions related to the following increased significantly:

- Placing items into living and non-living categories
- Identifying seasonal changes at the playscape
- Inquiry and detailed descriptions of investigations with worms and pillbugs in dirt
Behavior Mapping
(& Creation of an iPad App)

Systematic and unobtrusive method for studying connections between behaviors and the physical characteristics of a designated area (Moore and Cosco, 2010)

- records locations and codes behaviors
- Examines behavior settings and affordances
- Captures child’s movement and engagement
2012 Pilot included play categories. This represents the 2012-13 revision whereby the data is still in analysis.
All data points for CNC PlayScape
Fall 2012 & Spring 2013
All data points for Arlitt PlayScape
Fall 2012 & Spring 2013
### Observational Video

<table>
<thead>
<tr>
<th></th>
<th>Spring 12</th>
<th>Fall 12</th>
<th>Spring 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature Center PlayScape:</td>
<td>2.5 hrs</td>
<td>Nature Center Playscape:</td>
<td>3.1 hrs</td>
</tr>
<tr>
<td>Arlitt Playground:</td>
<td>25 min</td>
<td>Arlitt Playground:</td>
<td>3.5 hrs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Arlitt PlayScape:</td>
<td>5.6 hrs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Arlitt PlayScape:</td>
<td>~5 hrs</td>
</tr>
</tbody>
</table>

**VIDEO DOCUMENTS CHILD-DIRECTED INFORMAL SCIENCE LEARNING IN THE FORM OF “VIGNETTES”**
Example from Video

• Picking flowers for their moms, two girls were discussing how butterflies and bees were “pollening” to get the flowers, making references to gardening at their respective homes
Example from Video

- A girl was watering the end of a stick with leaves at one end multiple times at the pump; then planted it with leaves up and stick side down
Example from Video

• Several children were rolling ‘tree cookies’ of differing sizes and shapes down a small hill, predicting which ones would go faster
Example from Video

• With a rock in one hand and a small ‘tree cookie’ in the other hand, one child describes and demonstrates to another how a fat fish would sink and a skinny fish would float
Conclusions

• Our research confirms some of what is suspected or known, but examined the impact of specifically designed affordances on science learning.
• Playscapes are venues for both play and learning across domains: cognitive, language, social, & physical
• More research is needed in this area.
Implications

Many schools and early childhood programs are “greening” their outdoor play spaces, creating playscapes based on aesthetics or other guiding principles. While this is a trend that is certainly appealing for biophillic and health reasons, nature playscapes also serve as a third teacher for informal science learning.