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PIE

Playfully Inventing & Exploring
with Digital & Other Stuff



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"A Day in the Park"

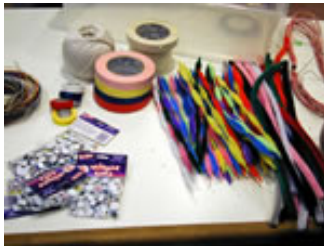
Here's how we described the "Day in the Park" workshop to participants:

" Would you like to make a flower that spins when you shine light on it? How about a frog that jumps into a pond when it gets too hot? A swing that moves whenever you breathe? Then join this workshop! We'll use craft materials, motors, sensors, and tiny computers to create interactive inventions that can respond to light, temperature, and wind. Put yourself in the shoes of a designer, and contribute to the construction of a miniature dream-park display!"

Goals of the Workshop

- Get inspired by thinking about experiences you've had outdoors in a park
- Write a computer program that makes a machine move
- Experiment with programming a machine to react to sensor input

Materials



- construction paper
- craft sticks
- color foam sheets
- googly eyes
- glue sticks (low-melt)
- pipe cleaners
- colorful rubber bands
- aluminum foil
- cable ties, colorful
- glue sticks ("permanent adhesive")
- markers + crayons
- brads
- colored masking tape
- artificial grass
- batteries for Crickets
- wire and string
- natural materials (leaves, sticks, stones, etc.)
- LEGO bricks and motors

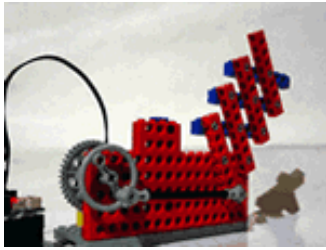
EQUIPMENT

- Crickets and sensors



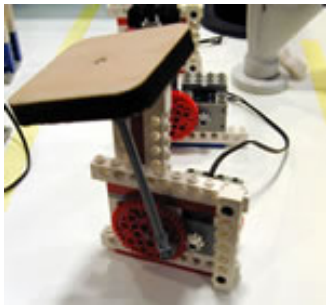
- computers (to program the Crickets)
- LCD projector (for demonstrating how to program)
- flashlights
- scissors
- hole punches
- low-melt hot glue guns

Set Up



When we ran the workshop, we had very limited time (only 45 minutes!). Because we wanted participants to have time to program, we realized they wouldn't have time to design and build their own moving contraptions. So, before the workshop, we pre-built "motion modules" for them to use.

[See the motion modules](#)



We wanted to encourage people to add craft materials to the LEGO motion modules. So, we cut small pieces of balsa wood (with a hole in the center). These wood pieces fit on top of a module, and made it easy to attach craft materials.

You could cut pieces of cardboard instead. Or, just provide inspiring examples that combine LEGO parts with craft materials.



All the materials were arranged to look inviting and to be easily accessible.

We used colored masking tape to help visually organize and separate the various modules and materials.



We created an inviting landscape for the park on a table using fake grass, blue paper, crumpled brown paper.



Natural materials were incorporated into the setup of the park.

If there'd been more time in the workshop (or if it could be held outside) it would be nice for participants to walk around in a park and pick up their own leaves and branches to use.



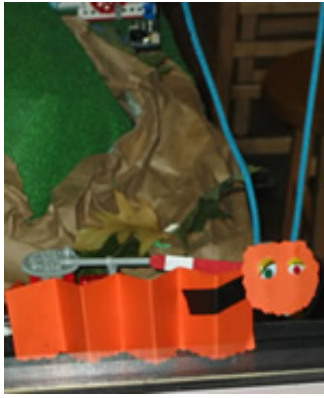
We also made examples of [animals cut from construction paper](#). (The accordion cuts and spirals work great with the motion modules.)

Introduction



We first briefly introduced the participants to the idea of creating a park.

We asked and created a list of some things they've noticed in a park (such as squirrels, trees, and swing sets).



Then we demonstrated a couple of sample creations. In each example you trigger a sensor to start something moving.

For example, when you cover the light sensor, the caterpillar moves.



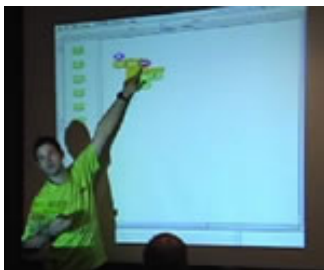
When you touch the grass, it starts to wiggle.



We demonstrated how to program using this giraffe (made from construction paper).

The giraffe is attached to a motion module that moves up and down. We plugged the motor on the motion module into the Cricket.

We also plugged in a "wind sensor" (a pinwheel attached to a reflectance sensor).



Then we showed how to write a simple program to make the giraffe move.

"When you blow on the pinwheel, the giraffe moves for 5 seconds."

Working & Playing



Some people knew right away what they wanted to make. Others spent time talking and experimenting before getting inspired.



One boy wasn't sure what he wanted to do. After experimenting with a motion module, he got an idea, "I know! I'll make a guy skateboarding!"

One of the girls thought of creating a sprinkler system for the park--and asked her father and sister to help.



This girl and her mother began by choosing a motion module and programming the motor to move.



This group connected a small branch from a tree to a little motor, and decorated the base. Then, they programmed it to spin.



This program waits until you press the touch sensor, then turns on the motor for 2 seconds.

(The "forever" block runs the program over and over, so it works every time you touch the sensor.)



Once they finished their creations, participants filled out small cards (which we called "inventor cards") and then attached them to their sculptures.

On the cards, each group described their sculpture and briefly explained how it worked.



At the end of the workshop, participants added their creations to the park display.



The park attracted lots of interest and became a focus point for conversation.

To see the park in action and the setup of the space, [watch this video \(5.8MB\)](#)

Other Thoughts & Reflections

Because this workshop was part of a large one-day public event, we offered it six times during the day, with each workshop limited to only 45 minutes. (It took a lot of staff to make so many short workshops go smoothly.) The same ideas could work well as part of a longer full-day or several-day workshop.

This workshop is a good introductory activity to programming. It provides an inviting way into robotics that engages people who wouldn't necessarily be interested in traditional approaches to robotics.

Since the time was so short, we warned people they might not have time to finish. But we suggested that if they started something and didn't have time to finish, someone else in the next group could continue working on it.

The participants were very interested in filling out the inventor cards to describe their sculptures. This process helped provide closure and encouraged participants to reflect on what they had made.

If you're planning a park workshop, you could have participants add photos and descriptions of their creations to the [PIE Project Gallery](#).

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