The team of independent evaluators filed into the Huntington’s Brody Teaching Lab, where members of the Botanical education staff waited, somewhat nervously, to greet them. Introductions were made, refreshments were offered, and a brief discussion of the group’s goals and objectives ensued. Once these preliminaries were out of the way, the team members dispersed around the room and took up their stations to begin the work at hand.

Peering into the eyepiece of a microscope, one evaluator adjusted the focus slightly, took another look at the specimen under the lens, then spoke in an excited whisper to a woman standing nearby.

“Mom! Look at this. It’s awesome!”

Mother and son were soon bent over the microscope together, examining a leaf’s stomata in the wondrous topography of 100x magnification.

These “scientific experts,” students from elementary and middle schools in the Pasadena area, are among several focus groups that have conducted field tests of exhibits under development for the Rose Hills Foundation Conservatory for Botanical Science, scheduled to open at The Huntington in October. The Conservatory will feature a series of exhibits and experiments designed to engage youngsters in hands-on science, using real scientific instruments and living plants to explore the mysteries of the natural world. Three distinct environments—tropical rain forest, cloud forest, and bog—will serve as habitats for diverse botanical displays and interactive exhibits that examine the ways plants adapt to their environments. The Conservatory’s educational components are funded by a $1.75 million grant from the National Science Foundation.

Although kids ages 9 to 12 and their families are the Conservatory’s target audience, the development of exhibits is far from child’s play. A three-person team led by Kitty Connolly, Conservatory project manager, has devoted thousands of hours to painstaking research, exhibit design, and field-testing.

“Our goal is to give children a chance to practice science on living plants,” says Connolly. “There’s nothing quite like this in the United States. Other botanical gardens have primarily passive exhibits. In this new space, kids will be building science skills through the use of real tools.”

That means that one of the first things the exhibit team had to do was hit the books.

Connolly and her colleagues Karina White and Katura Reynolds spent months conducting extensive research on everything from biology to educational theory, poring over textbooks, science journals, and scholarly papers as they gathered fresh ideas for presenting science to youngsters. They sought to challenge and inspire young minds without oversimplifying the content. Meeting regularly with members of an advisory board composed of educators, scientists, and consultants, the staff developed exhibits that would explore sophisticated concepts playfully. “Algae Identification,” for example, introduces children to the microscopic world of—forgive the expression—pond scum and uses a kid-friendly matching game to help them hone their scientific observation skills as they compare and identify different forms of algae under powerful magnification.

From nursery to library to drawing board to computer, the exhibit team
conducted experiments with specimen plants, created intricate botanical illustrations, and compiled extensive data. Several file drawers were soon overflowing with notes, sketches, and drafts of label text for exhibits with names like “Listening to Trees,” “Spices from the Rain Forest,” “Hitchhiking Seeds,” and “Gotcha!”

“We like to use the pollen analogy to describe this process,” jokes Reynolds. “Create as much of it as you can and hope that some of it will stick.”

All of the exhibits had to meet specific criteria. First and foremost, they had to present concepts or phenomena that children could actively observe. Living plants—the more diverse, the better—were to be used whenever possible. Exhibits should highlight interdependencies, showing the connectivity between plants, animals, people, and the environment. And they should encourage active involvement through the use of scientific tools, such as meters for measuring humidity in the air or the amount of nitrogen in different soils. The designers incorporated sensory learning through touch, smell, and sound, while also assuring accessibility to visitors with different physical abilities, reading skills, or learning styles. Some exhibits might require a facilitator to lead or maintain them, while others could engage grown-ups in the learning process along with the children. The team even addressed the questions of traffic flow and the durability of exhibit materials.

Connolly and her colleagues continually evaluated and reevaluated each exhibit. Many ideas were abandoned early in the process because they failed to meet the necessary criteria. Others proved impractical for heavy visitor use or for the moist climate of a conservatory. As the winnowing...
public, and occasionally the reverse was true. But we’re building these exhibits for children, so their responses are what matter most. Putting these exhibits in front of them was a real eye-opener.”

The team conducted a series of evaluation sessions over the course of several months, some taking place in a structured classroom setting at local schools, others offered informally for drop-in Huntington visitors. The boys and girls who participated in the trials represented a broad demographic mix of age groups, ethnic backgrounds, economic levels, and academic achievement.

Johanna Jones led some of the early sessions. She is a consultant with Randi Korn and Associates, Inc., a museum evaluation and audience research firm from Alexandria, Va. “The keystone of evaluation is having clear goals and objectives,” she says. “You want to see if your messages are getting across. How are kids using the exhibits? What are they taking away? Does the information make sense? Are they tripping up on certain terms?”

She discovered, for example, that youngsters frequently stumbled over the word “fertilize.” Its reproductive...
connotation was entirely missed as young imaginations conjured up manure rather than pollen. Jones suggested changes to the label text to put the term in its proper context.

Another exhibit that benefited from field-testing was an exploration of the parts of a flower. In the early prototype, children looked into a microscope to observe a close-up view of a neatly labeled pistil or stamen. Informative, but not very engaging, the education team found. After the first round of evaluations, the microscope was replaced by a goose-necked videoscope that allowed kids to select their own views, manipulate the focus, and project the microscopic images onto a TV screen. A further modification made it even more interactive by the simple addition of a small paintbrush, which kids used to move pollen from one flower to another while observing the pollination process enlarged on the screen.

Taking their assignment as evaluators seriously, the youngsters talked candidly with Jones and the Huntington team. Their opinions were as diverse as the children themselves.

“I liked the moss,” said Ben Symes, 12, who had studied the plants in the “Tiny!” exhibit up close with a magnifying glass. “I never knew there were so many different kinds, and all those different shapes and colors.” He was less enthusiastic about the “Leaf Diversity” display: “Kinda boring,” he offered sheepishly. Ten-year-old Carlos Chan, on the other hand, rated the leaves very favorably. “I liked learning the names of all the different shapes,” he explained, picking up a laminated example of a palmate (or hand-shaped) leaf and comparing it to the featherlike pinnate.

Working with sophisticated tools was a novel experience for many of the participants, who, like Dan Bar-Sever, 11, found that it heightened their interest in both the plants and the scientific process. A sleek chrome and glass refractometer in the nectar exhibit was one of Dan’s favorites. “The way it measured sugar levels was very interesting. It’s really cool, because in addition to learning about plants you have a chance to use the equipment.” Yet even the simplest exhibits attracted their share of enthusiastic reviews. The decidedly low-tech “Drip Tips” employs a plastic squirt bottle to illustrate how rain forest plants shed water by channeling it down the center of their leaves and off the elongated points on their tips. Younger children, in particular, found this activity fascinating. They enjoyed giving the leaves repeated squirts and closely scrutinizing the results.

The thrill of new discoveries caused more than one participant to consider familiar plants in a more inquisitive light. After using a high-tech videoscope to explore “Pollen on the Move” with a flamboyant stargazer lily under magnification, Magdalena Alvarez, 10, shyly suggested the inclusion of “more flowers that we know, like roses.” It was a telling comment, expressing a young girl’s desire to
apply her newfound knowledge to the natural world outside her own front door.

Following field-testing, the education team reviewed the comments, adapting some exhibits while scrapping others. The finalized exhibits, more than 50 in all, have now been handed off to fabricators for construction and installation. Plants that have been nurtured in the greenhouses and nursery will soon take up residence in their new home in the Conservatory.

Several dozen youngsters will be watching with proprietary interest as the doors are thrown open to the public for the first time in October. They have a personal stake in the new endeavor.

“‘I want to go there when it opens,’ says Ben Symes, ‘so I can find out if the exhibits I like are there.’”

And that’s only natural. When you’ve helped to plant the seeds, you want to be on hand to see them when they flower.

Lisa Blackburn is the Communications Coordinator at The Huntington.

“We’re using the most charismatic plants we can find.”

– Kitty Connolly, project manager

Above: Reynolds’ illustrations of a carnivorous sundew (Drosera regia) demonstrate how a plant traps an insect on its sticky surface before rolling its leaves around its prey.

Right: Katalina Gamara, 11, looks for victims on a sundew (Drosera capensis). Photo by Don Milici.

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