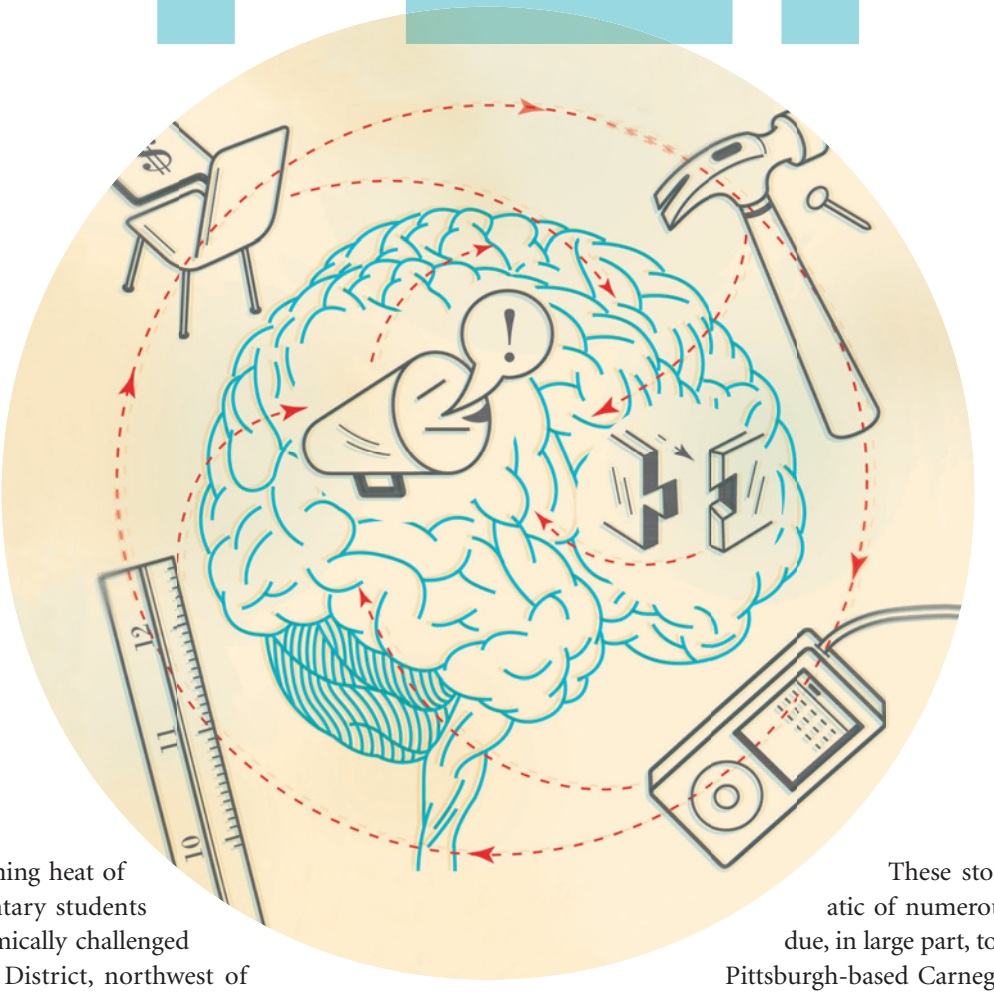
ASSESSING

CARNEGIE SCIENCE CENTER'S NEW EVALUATION TOOLS AND EDUCATION MATERIALS ARE HELPING SCHOOLS DETERMINE HOW WELL THEY ARE TEACHING STEM SUBJECTS TO STUDENTS AND HOW BEST TO COLLABORATE WITH EACH OTHER TO IMPROVE THE PROGRAMS. BY TOM IMERITO



In the early morning heat of summer, elementary students from the economically challenged Sto-Rox School District, northwest of Pittsburgh, rode a bus about 15 miles south to a week-long science, technology, engineering and math (STEM) education camp in affluent Upper St. Clair. Kids from both communities learned the value of hands-on, inquiry-based learning, without regard for district boundaries or demographic differences.

In other parts of southwestern Pennsylvania, South Fayette schools are partnering with those in Pittsburgh and Fort Cherry for teacher training sessions and collaborative grant programs so that all three districts can enhance their STEM offerings. And middle school students in the Blackhawk School District will learn about clean water, public sanitation and world affairs this school year by forging links with a village in a developing country, chosen by the students themselves.

These stories are emblematic of numerous others that are due, in large part, to a program of the Pittsburgh-based Carnegie Science Center called the Carnegie STEM Excellence Pathway. Funded entirely by grants from The Heinz Endowments, the program seeks to improve STEM education by setting benchmarks, providing educational materials, and sharing STEM resources between schools and districts, with special attention to under-resourced schools.

Since its launch last fall, the initiative has touched the lives of more than two million students in 12 states, from as far away as Florida and Oklahoma. The program's positive momentum was further evidenced in March of this year when Pathway representatives were asked to testify in Washington, D.C., before a bi-partisan congressional committee about its achievements.

The idea for the Carnegie STEM Excellence Pathway evolved several years ago when faculty and administrators from schools that

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regularly use the Carnegie Science Center's resources began to inquire about the effectiveness of their own STEM programs. Alana Kulesa, the center's director of Strategic Education Initiatives, remembers questions ranging from, "Just what is STEM?" to "How can we know if our STEM program is up to par?" As a result of those discussions, the Endowments awarded the center a $150,000 planning grant in 2013 to assemble a STEM education advisory committee.

"The initial grant funded the development of a road map that defined what high-quality STEM education looked like and how to achieve it," Ms. Kulesa explained. The advisory committee also determined that its answer to STEM education should be easily available to the entire world—without cost.

The result of this initial effort was a web-based self-assessment instrument called the Carnegie STEM Excellence Pathway Rubric, which examines six areas of STEM competency: teacher qualifications, curriculum, instructional practices, demonstration of skills, family engagement and real-world connections. The assessment ranks competency on a five-step scale ranging from "pre-emerging," where no STEM activities are taking place, to "leading," where STEM principles are integrated into the curriculum through all grades, K–12.

"If a district finds that it ranks as pre-emerging, that's fine," Ms. Kulesa said. "Once a school has gone through an annual cycle, they go through the rubric again, evaluate their progress and set new goals. It's not about rank; it's all about making a commitment to improvement and improving continually."

In an effort to ensure equity among schools, the STEM Excellence Pathway strongly encourages inter-school and inter-district collaboration. Endowments Education Program Director Stanley Thompson said he was intrigued when the Carnegie Science Center approached the foundation with the idea for this type of STEM program because the Pittsburgh region has a number of outstanding school systems as well as a number of under-resourced districts.

"I wondered what would happen if we invited interested STEM educators from the under-resourced districts to work in collaboration with their peers from better-resourced districts to develop a regional STEM education program that we could eventually expand beyond Pittsburgh, conceivably to the entire country," he said.

Blackhawk Superintendent Melanie Kerber has worked in both financially challenged and well-funded school districts. "When you're doing everything you can to just pay the bills, a program like the Carnegie STEM Excellence Pathway may look great, but still be beyond the reach of a system's financial resources," she explained.

The collaboration among districts serves the interests of each participant, she said. "Well-served schools improve their success in obtaining grant monies by sharing their physical resources with an underserved district, while underserved districts improve their STEM offerings by expressing a willingness to partner with a more advanced STEM program."

> "IN ADDITION TO FINANCIAL BENEFITS, STEM COLLABORATIONS RESULT IN POSITIVE PEER RELATIONSHIPS BETWEEN STEM EDUCATORS AS WELL AS IMPROVED STUDENT PERFORMANCE AND SOCIAL INCLUSIVENESS ACROSS SCHOOL DISTRICT BOUNDARIES."
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> **Bille Rondinelli**
> superintendent, South Fayette School District

Although the Pathway program tends to level economic disparities between districts, its effects reach far beyond money. "In addition to financial benefits, STEM collaborations result in positive peer relationships between STEM educators as well as improved student performance and social inclusiveness across school district boundaries," said South Fayette Superintendent Bille Rondinelli.

These interactions allow creative ideas to emerge, such as the Blackhawk School District's international STEM project. After middle school students vote to choose a sister village somewhere in the developing world, they will read the book "Long Walk to Water," an account of the struggles of two children in search of food and water in conflict-ridden South Sudan. During the year, teachers across the curriculum, from math to music, will choose water-related projects and lessons from a website called "H_2O for Life." Students will set a goal for funding a drinking water improvement project for their sister village.

The yearlong fundraising campaign will be capped off by a "water walk," in which students will carry water in jugs in emulation of their third-world peers. Parents, relatives, friends and neighbors will be asked to pledge money for the walk, thereby raising community awareness of the global drinking water problem as well as their community's role in answering it. The yearlong project is exemplary of inquiry-based learning across the curriculum.

As a result of the Carnegie STEM Excellence Pathway's achievements so far, the Carnegie Science Center is pursuing opportunities to train other science centers throughout the nation to become advocates for STEM education and facilitators in their communities. The Endowments has increased funding for the program's next stage by providing an implementation grant of almost $614,000.

And now that it's up and running, the Carnegie STEM Excellence Pathway appears to be on the fast track to success. **h**