

How Are Science Fairs Faring?

As districts pull back, fair organizers promote STEM and recruit young scientists, and corporations are offering national competitions to fill the void.

BY RON SCHACHTER

FOR MORE THAN HALF A CENTURY, THE ANNUAL science fair has been a fixture in many a school's academic life, both for science teachers, who guide classes through the hands-on experience of researching topics of interest, and for students, who often hectically put the finishing touches on their work the night before it is exhibited in the school gym or other public space.

From there, winning submissions can advance to district or regional science fairs and—with enough scientific know-how and inspiration, as well as school and parental support—to national science competitions. It's a pathway that, for years, has distinguished up-and-coming scientists and has provided a glowing addition to their college applications.

Two seniors from Acalanes High School, part of the Acalanes Union High School District in Lafayette, Calif., shared the top \$75,000 prize in the prestigious Intel International Science and Engineering Fair (ISEF) in May for their project, "The Treatment of Simulated Cancer Cells with Compton Scattering-Produced Secondary Radiation," a potentially more effective and less expensive cancer treatment which places tin metal near tumors before radiation therapy.

In the second year of the national Disney Planet Challenge—a contest focusing on environmentally-oriented research by entire elementary and middle school classes—the fifth-graders at the Erwine Intermediate School from the Coventry Local Schools in Akron, Ohio, won top honors for their entry, "Stand Your Ground—Stomp Out Invasive Plants," which involved identifying and destroying invasive plants across two acres at nearby Cuyahoga Valley National Park.

In the first annual Google Global Science Fair, a completely online event, the grand prize winner offered improved treatments for patients with ovarian cancer who had built up resistance to existing chemotherapy drugs. She won ►



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Students from Lafayette (Calif.) School District won the 2011 Intel International Science and Engineering Fair's highest honors for their research on treating simulated cancer cells with Compton scattering-produced secondary radiation. Such research could offer a safer, more effective and less expensive method of radiation therapy for cancer treatment.



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a \$50,000 college scholarship, a trip to the Galapagos Islands, and an internship at the world-famous European Organization for Nuclear Research in Geneva, Switzerland.

For all the glory and other rewards that accompany these events, National Science Teachers Association President Francis Eberle says that the greatest value of science fairs, especially at the school and district levels, is that all participants receive a crash course in how science works. "A science fair allows students to raise their own questions, to answer those questions, and to come up with evidence for those answers," he explains. "It allows students to engage in doing science."

That may sound like an infallible formula for making the most of high school science, and last fall President Obama added his own element by hosting a science fair at the White House. But in recent years, a growing number of schools and districts have been skipping science fairs, especially on the high school level—a casualty, say the proponents of these competitions, to the requirements of the No Child Left Behind law and the pressures of preparing students for standardized achievement tests.

Tougher Times at the Grassroots

While higher-profile international events—from the Intel fair, to the Siemens Westinghouse Science and Technology Competition, to the recent efforts of Disney and Google—are going strong, there's rising concern about the grassroots science fairs that feed them.

Over the past decade, the Los Angeles County Science Fair, one of about 350 regional fairs across the country that attract the top student winners in school and district competitions, has seen the number of participating schools drop from 244 to 185.

At the regional Tidewater Science Fair in Virginia, the number of high school student projects declined from 450 in 1996 to under 200 in 2004, when the

state's Standards of Learning (SOL) tests designed to meet NCLB requirements took effect, and all but two of the more than a dozen districts eligible for the science fair dropped out.

Danny Peters, who directed the Tidewater competition from 2005 to 2010, increased participation to more than 300 by admitting middle school projects, but

he says that the number of high school projects has wobbled between 100 and 120. "SOLs came into play, and that changed the way science was taught," he says. "Doing science projects takes time from the teacher's day. For the schools that do participate, it's teachers who promote science projects. Without teachers promoting them, there's not much participation."



Second- and third-graders from Zachary (La.) Elementary School are growing bitter panicum grasses in their school nursery to eventually plant along the coast to help prevent coastal erosion. They won the 2010-2011 Disney's Planet Challenge for elementary schools with the project: *Wetland Warriors: Fighting to Save Our Coast.*



In the Creal Springs (Ill.) Schools, seventh graders are working in the Cache River wetlands at Buttonland Swamp where they are studying macro invertebrates to determine water quality. It's part of their project, *Wetland Warriors: Restoring Health to Our Wetlands*, which won the 2010-2011 Disney's Planet Challenge for middle schools.

Dean Gilbert, president of the Los Angeles County Science Fair and a science consultant to the county's schools, points to NCLB's focus on math and reading scores in determining whether schools meet their Adequate Yearly Progress goals, especially at the upper levels. "We've seen an increase in participation in middle schools, but a decrease in high schools," he reports.

"The dagger in the back is the emphasis on reading, language arts and math," Gilbert continues. "Principals are saying, 'Why should we invest in science fairs when our accountability is in reading, language arts and math?' And teachers say, 'Why should I put one more thing on my plate?' We're fighting the perception that the work and effort to do a science fair isn't worth it."

Science fair organizers are also facing competing demands on student time, especially for those who might be inclined to enter science fairs, according to Michele Glidden, director of science education programs at the nonprofit Society for Science and the Public, which oversees the more than 300 regional fairs and manages the Intel ISEF, originally known as the National Science Fair.

"Those students are often in multiple activities," Glidden points out. "We hear all the time that a student is on the school baseball team or off to a debating competition that conflicts with the school fair."

Craig Barrett, the former CEO of Intel who championed the company's sponsorship of ISEF and has vocally supported science fairs at all levels, takes a more critical view. "I've looked at science fairs for a long time as great vehicles to promote science and math and kids' interest in those topics," he says. "Nobody ever talks about cutting football or basketball. Cutting science fairs seems outrageous in the 21st century, when knowledge is so key."

National Fairs Expand

Even as some local science competitions shrink, the number of national science fairs and participants is growing. "There's a mixed message," Glidden says. "At the Intel level, the prestige, the quality of research and the interest is as high as we've ever had." The Intel ISEF, which awards prizes in 17 categories, from earth ►



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and planetary sciences to microbiology to engineering, counted 1,250 total projects this year, some of them jointly submitted, from almost 1,600 high school students.

Proponents for national fairs point out that the recognition of student work goes far beyond the judging. Barrett insists ISEF's high profile and \$75,000 grand prize is a good sell for competing students. "When you hang out a substantial award, that says to kids you can be successful in this area and be rewarded. It's big enough to catch their attention," Barrett says.

"Almost every year, we have kids who end up getting a patent as a result of their projects," adds Los Angeles County Science Fair President Gilbert, who regularly stocks the Intel competition with top finishers from his regional competition. "We had one kid who developed a water filter for a polluted creek. Another developed a protocol for raising lobster larvae that's used by scientists around the world. Our kids are getting called by engineers and scientists. That's the type of chemistry that comes out of these science fairs."

While the Intel ISEF and the Siemens Westinghouse competition have been attracting high school scientists for better than 60 years, other national and international science fairs have come on the scene more recently.

Since 1999, Discovery Education has held its annual Young Scientist Challenge for fifth- through eighth-graders. The competition poses everyday problems—from testing the "five second rule" when it comes to food safety, to finding a solution to a safety threat, to creating a video focused on an innovation that keeps people healthier. The 10 finalists earn summer internships with research scientists from the competition's co-sponsor, manufacturing giant 3M, and the eventual winner receives a \$25,000 prize and the title "America's Top Young Scientist."

Disney Offers a Challenge

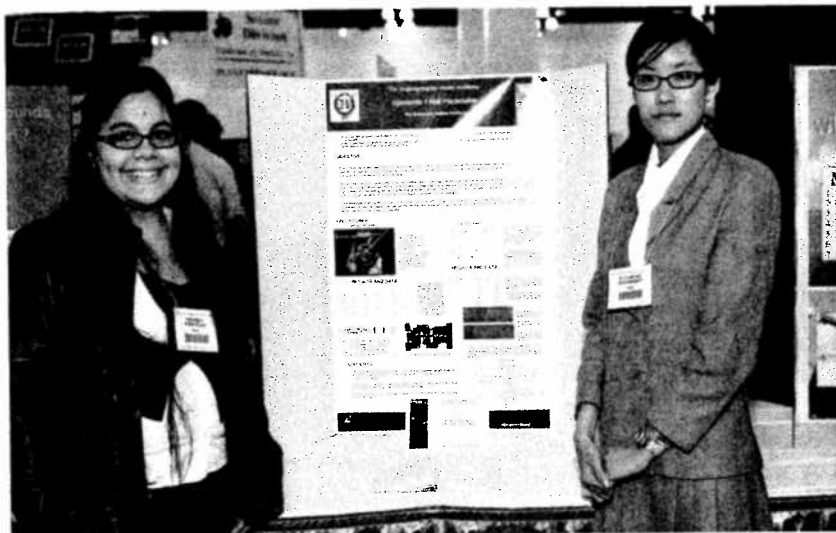
The Disney Planet Challenge also targets younger students. Two years ago, Dis-



*The Hamilton (Ohio) School District's science fair is considered a "district expectation." Sophomores, above, show off their project, *The Effect of Different Substances on the Dissolving Rate of Grow Capsules*, in February.*



Senior Adrienne McColl of the San Pedro Marine Science Magnet School won the Los Angeles County Fair and placed first in both the California State Science Fair and in Intel's Animal Biology category.



*At the Los Angeles County Science Fair, two juniors, Nathalie Rodriguez and Petcharat Denprasert, students at the Bravo Medical Magnet High School, won the Senior Sweepstakes Award for their project, *Injectable Fetal Pacemaker*.*

ney expanded its 15-year-old competition in Florida and California to the national stage. Christiane Maertens, Disney's manager of corporate citizenship, notes that the science competition for third- through eighth-grade classrooms attracted 250 class projects in 2009-2010 and 350 last year.

"It's a competition, but also a resource that allows teachers to integrate project-based learning in their classes with the environment, which is a hook for students," Maertens says. Teachers can enter projects from each of their classes, and to promote increased involvement, Disney has worked with the California-based WestEd K-12 Alliance, which offers professional devel-

opment in math and science, to create a free, eight-lesson curriculum on how to put a science project together.

Kathy DiRanna, WestEd's director, consulted elementary and middle school standards for all 50 states and created 50 exemplars—in areas such as recycling—to demonstrate how developing Planet Challenge projects could meet state requirements. "We wanted teachers to understand how they really could do science projects as part of a standards-based curriculum and be true to what their states were asking them to do," DiRanna explains. "Now they can say, 'I know I have to be accountable, but I can provide really unique ►"

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opportunities that can be transformational for kids.”

A Continuing Tradition in Ohio

Administrators at the Hamilton City (Ohio) School District, meanwhile, tell a different story when it comes to school science fairs. Such local competitions have long been built into the formal curriculum for the district’s schools. “It’s a district expectation, and when you set that expectation, you’re going to get results,” says Terry White, Hamilton City’s instructional specialist in science, who adds that required fairs predate his arrival 35 years ago.

“We believe it has high value,” says Hamilton City Superintendent Janet Baker, while also acknowledging, “Teachers are pulled in a lot of different directions, but I’m not willing to give up everything to narrowly focus on tests.”

The district’s sixth-graders must submit individual projects, as well as a related research paper. Fifth-graders build toward that task by working in teams of four to create their projects, and fourth-graders submit a single entry as an entire class.

Honor students at the eighth- and 10th-grade levels—about a third of the population in those classes—also are required to come up with science fair entries. “Part of



Last May, students at Malcolm X Elementary School in Washington, D.C., had a hands-on discovery during Siemens Science Day, which partners with Discovery Education. Above, the students and a scientist study the properties of Oobleck, a slimy cross between a liquid and a solid.



At the first annual Google Global Science Fair in California, Fort Worth (Texas) student Shree Bose, who was the grand prize winner, is describing her project, AMPK and Cisplatin Resistance, in which she discovered a way to improve ovarian cancer treatment for certain patients.

what we like about our science fair is that students need to have discipline to do the projects,” observes Baker.

White points out that the curriculum

pacing guide for Hamilton City teachers includes a detailed example of an experimental project. He has also created a resource manual and provides mentoring

Tips for a Successful Science Fair

K12 administrators, looking to encourage quality student projects, can follow these suggestions from various experts:

- Lead from the top, suggests Hamilton City (Ohio) School District Superintendent Janet Baker, who continues the tradition of holding district science fairs. “I think the expectations for anything you want done have to start at the board and superintendent level,” Baker suggests.
- Look for ways that the skills involved in creating science projects match state standards in science, math and even language arts. (With language arts standards in mind, Hamilton City requires sixth-graders to include a research paper with their mandatory science exhibits.)
- Take advantage of the recent push for 21st-century skills, especially critical thinking, collaboration and creativity.

“These Cs are embedded in science fair research,” says Dean

Gilbert, president of the Los Angeles County regional science fair.

- Find local or online volunteer mentors—from companies to higher education institutions—to work with students on their projects, an approach that adds expertise and helps take the entire load off already busy teachers.
- Take advantage of free lesson plans available for creating science projects. For example, Disney’s Planet Challenge—for grades 3-8—provides an eight-lesson package aligned with the standards in all 50 states.
- Partner with local organizations—from Rotary Clubs and Boys and Girls Clubs to community colleges and hospitals—to exhibit students’ projects as a way of giving their work a higher profile.

for teachers. All of the student projects are displayed at the local Rotary Club on Fridays, rather than on a weekend. "This way we get almost 100 percent involvement," says White, adding that the district even allocates funds to bus students and teachers to the fair.

Looking for a Local Comeback

In Los Angeles County, meanwhile, Gilbert has been busy recruiting schools to the regional fair. "We started to do a better outreach to inner-city schools, and we've sent trainers to teach how to incorporate science projects into the curriculum," he explains, noting that inner-city schools are more prone than other schools to place less weight on science as they strive to meet AYP in math and reading.

Those schools receive a CD of resources for creating classroom science fairs, and Gilbert has also launched a project called "Mentor Match," which pairs volunteer college students majoring in science with African-American, Hispanic and female students in underserved school districts. The L.A. County fair has gone even farther afield to generate interest in science projects. "We've been successful in getting juvenile court schools and their at-risk kids involved in science fairs," Gilbert says. "Some have won awards and come in a coat and tie to get their awards accompanied by their probation officers."

Gilbert and other science fair supporters are hoping that the recent emphasis on science, technology, engineering and math (STEM) initiatives, the increased number of high schools specializing in science, and the focus on 21st-century skills, will make science fairs a more attractive proposition. "We see a lot of participation from magnet schools that place an emphasis on science," reports Glidden of the Society for Science and the Public.

"It's important for district administrators to realize that, in the big push for 21st-century skills such as critical thinking, communication and collaboration, these are all embedded in science fair research," emphasizes Gilbert. "It's the perfect package deal." **DA**

Ron Schachter is a contributing writer to DISTRICT ADMINISTRATION.



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