

Rethinking the Science Fair

How much did a student learn about science in the process of creating the poster she is standing beside at the science fair? Probably not as much as we like to pretend, say Mr. Craven and Ms. Hogan.

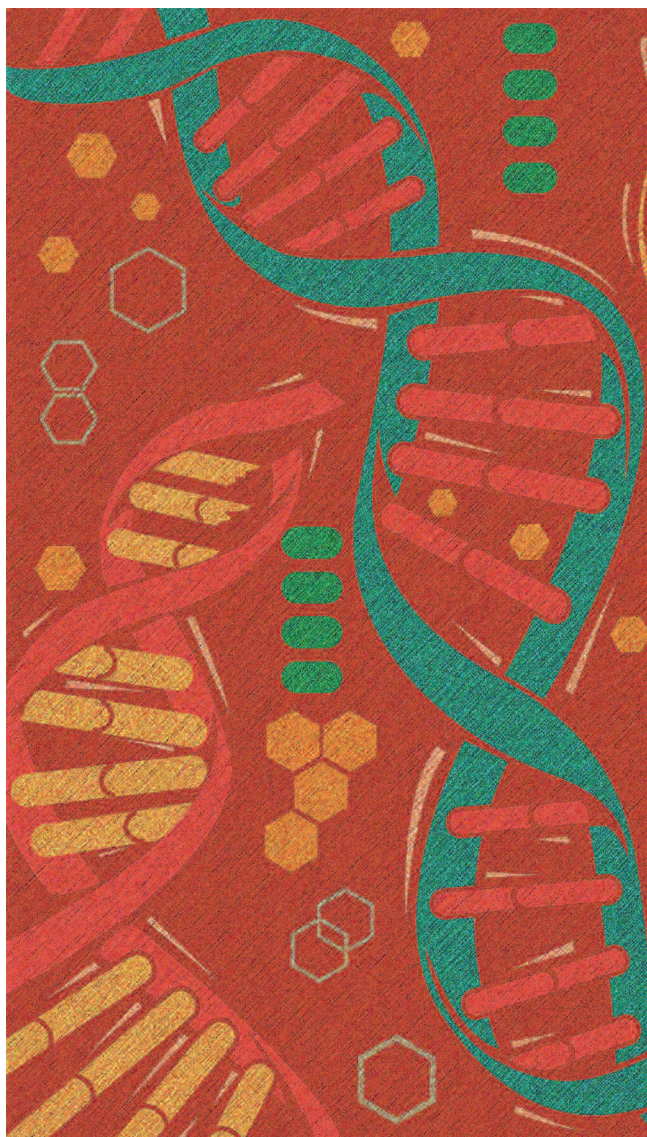
BY JOHN CRAVEN AND TRACY HOGAN

SPRING IS marked by the arrival of such pleasantries as flowering crocuses, budding leaves, cherry blossoms, furry creatures awakening after a long winter's sleep, and birds flitting about after their long journeys north. But the season also plays host to less appealing arrivals in the form of pollen, weeds among the perennials, and that most notorious harbinger of spring, the brown-backed, white-bellied cardboard trifold.

Yes, spring is the season when thousands of these creased cardboard pests can be found lodged under the armpits of students and teachers as they observe the educational rite of spring known as the school science fair. A recent visit to a local school's gymnasium to witness one of these gala events reminded us of why we so dislike science fairs.

Soon after we accepted our invitation to attend the public exhibition of the science fair displays, we found ourselves weaving through a maze of posters in the packed school gym. Our attention was immediately drawn to the efforts of one young girl who was trying to repair a working model set up before her trifold poster. It was a somewhat complicated Rube Goldberg sort of construction, with two stacked containers of water connected above and below by a valve and piping. One pipe was leaking, and the girl was earnestly trying to mend it with plumber's putty. We knelt down beside the contraption and asked its presumed creator what her proj-

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ect was about. We are science educators, after all.

“Well, you see,” she said, “this model has something to do with my topic.” She pointed to the poster, which was helpfully labeled Greenhouse Gases. How interest-

ing, we said. Can you explain what exactly this device demonstrates about greenhouse gases? Unfortunately, the girl was no more successful at explaining the concepts behind her model than she was at stopping the leak.

"You see," she said. "It's about a dynamic system . . . and, uh, this water flowing from the top container — here — to the lower container, uh, there. Well, it's flowing . . . and uh . . ." Fortunately for this struggling girl, her co-presenter stepped in quickly to continue — and amplify — the explanation. This 40-something fifth-grader (eventually identified as her dad) immediately and passionately explained how the model was designed to illustrate a system in equilibrium, much the same kind of equilibrium as that exhibited by the atmosphere with regard to the production and depletion of certain gases. Dad then effortlessly transitioned into a lecture on global warming and greenhouse gases, making copious use of terms like photons, isotopes, and other miscellaneous scientific jargon. It was during this lecture that the 10-year-old fifth-grader wandered off with her friends. She had no doubt heard it before.

"Actually, I wrote a paper on this topic," the father continued, "some 20 years ago." He went on to describe in detail his fascination with the topic and, though he wasn't a scientist (actually, he's in marketing), he just couldn't get enough to read on the subject. At one point, his daughter came back with her friends, and they began splashing about and playing with the tank that collected the dripping water. After admonishing the youngsters to stop splashing, the father turned back to us to tell us about a national atmospheric research group from whose website he had downloaded the plans for this educational model. We politely thanked this overgrown, but very well-informed, young man for a fascinating lecture and wished his daughter good fortune in the contest.

As we left the gymnasium, mouths gaping like the ozone hole over Antarctica, we turned to each other and said at once, "This is why we don't like science fairs!"

We want to be clear on a few things, though. We certainly applaud this father's deep dedication both to his daughter's education and to his own interest in environmental science. Furthermore, we applaud any sincere efforts to engage students in the processes of scientific inquiry. These are all to the good.

However, we also recognize that there are deep divisions between teachers, educators, and scientists with regard to the value of science fair projects. From our perspective as science educators, we all too often see that the final projects at school science fairs don't accurately reflect either the enterprise of science or the students'

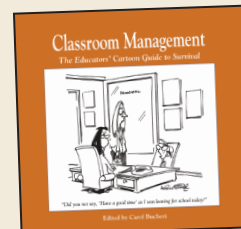
interests. A procedure following a "scientific method" that begins with a prediction that plants kept in the dark and fed acidic fluids will die and ends with a conclusion that the original prediction was correct shows little about whether the "investigator" understands the processes of science.¹ What's more, we are not persuaded that projects conducted and posters created at home reflect anything more than such income-related factors as access to knowledge and availability of resources. Finally, we remain unconvinced that the competitiveness of science fairs does anything to enhance the learning environment of schools.

We ask that parents and teachers reconsider the fundamental purpose of science fair projects. As science educators and parents, we suggest that schools and parents work to move the money invested in posters, instructional time, and after-hours staffing into funds that pay for student experiences outside the classroom, experiences designed to engage young citizens with real-life issues derived from such approaches to science as STS (science/technology/society). Maybe, just maybe, we can use all that time and energy devoted to science fairs to help develop the dispositions and habits of mind that are truly conducive to science literacy.

1. To read more on this matter, we recommend Paul Feyerabend, *Against Method* (Chicago: University of Chicago Press, 1975). **K**

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