SCIENCE EDUCATION

A Science Teaching System Honed in a Two-Room School

MILES CITY, MONTANA—Back-to-school week in this ranching community of 9000 residents on the western edge of the Great Plains means a return to the classroom for more than schoolchildren and their teachers. Joining the 27 fifth-graders in Bonnie Boggs's homeroom at Garfield Elementary School this year will be Leonardo, a Missouri River yellow-eared slider turtle, tiger salamanders in their own swimming pool, and South American cockroaches. And then there are Boggs's first love, Zsa Zsa the tarantula and Arby the black widow. These creatures and their wild relatives—especially spiders—will feature in virtually all of Boggs's lessons.

They are essential elements of an innovative teaching plan that Boggs developed over the past 14 years, when she taught in a two-room schoolhouse in a remote region of this sparsely populated state. Remarkably, for a teacher whose students consisted of a handful of kindergarten through eighth graders, Boggs won national recognition last May, when she received a prestigious Presidential Award For Excellence in Science and Mathematics. "She stood out from the time she entered," says Emma Walton, who directs the 12-year-old awards program, which is administered by the National Science Foundation.

Boggs brought her teaching plan and living props with her this summer, when she moved here from the tiny town of Loma, where she had been teaching at Loma Elementary. Located down a dirt road, 70 miles from the nearest city, Loma Elementary is a throwback to a bygone era. Within the dingy white, asbestos-sided schoolhouse, Boggs took an untraditional approach to science teaching. "Her science was her main thing," says George Carver, a Loma school board member for the past 27 years. "She really excelled at that." Science, in fact, permeates every lesson—and in surprising ways. Take spider social studies: Students trace spiders around the globe, studying the geography and history of the location. Or they make up fictitious locations and deduce what kind of spider could dwell in that environment. "Focusing on science is a tremendous way to act out hands-on learning," Boggs says.

In Loma, half the school was a traditional chalkboard-lined classroom, while the second room was dedicated to science and housed her menagerie of animals and insects, which now resides in her Miles City classroom. In addition to studying the day-to-day lifestyles of these creatures, Boggs also ties in lessons about environmental, conservation, and preservation issues. "Young people have to understand [those issues] so they can make good decisions in the future to keep our world on the right track," she says.

In Boggs's classroom, science is taught every day and in every subject, although she only uses books as references. Arachnology is the dominant theme. She draws on spiders to teach spelling, vocabulary, pronunciation, and grammar through a game she created called Venom, modeled after Bingo. Through her spider readings, Boggs acquired 340 words that she now uses to replace the columns of numbers on a Bingo-like card, and V-E-N-O-M replaces B-I-N-G-O across the top. For instance, a caller hollers, "V-chelicerae," instead of "B-9." Spaces are covered with plastic spiders, not beans. Winners shout "venom!" and verify their choices by correctly pronouncing, spelling, defining, or using each arachnological term correctly. "I guarantee that by the time you play this, you have a wealth of information about spiders," says Boggs.

TIM BURMEISTER

Intricate web. Award-winning elementary school teacher Bonnie Boggs uses spiders to weave science into virtually every lesson.

Boggs's obsession with arachnology started in the fall of 1986 when a student brought a female black widow spider to school. Boggs began hunting for details about this notorious species, which is common in Montana, and discovered that good information was scarce. So she and her students observed the black widow during the winter. "I just fell in love with her," says Boggs. "She was so personable." They named the spider Charlotte, read E. B. White's book, *Charlotte's Web*, and discussed the advantages and disadvantages of spiders versus humans. Right before Easter break that year, Charlotte became lethargic and appeared on the brink of death, so Boggs took her home, worried that she would otherwise die alone. "One day I checked her and she had laid an egg sac," says Boggs. "That was her whole problem: She was gestating. I called all the kids on the phone and told them."

Former students of Boggs say she has had a powerful impact on their lives. "My rural grade-school experience with [Boggs] is probably the most important thing in my being successful now," says Emily McKeever, who studied with Boggs at Loma and is now an accounting major at Gonzaga University in Spokane, Washington. "She always encouraged me and gave me a foundation to be successful."

Boggs's reputation spread as she began traveling to schools statewide and presenting workshops on spiders, which attracted the notice of the press (she's become a perennial Halloween story) and her colleagues, who nominated her for the presidential award. Last spring, she journeyed to Washington, D.C., where she and the other 107 awardees met with Vice President Al Gore. They also received $7500 each to supplement their science education budgets, which she has taken with her to Garfield Elementary.

Boggs has already spent a little of the award money: In May, she hired hot-air balloon specialists from Wyoming to demonstrate the wonders of air power to her Loma students, who are members of NASA's Young Astronauts Club. But Boggs plans to spend the bulk of the spoils on a video microscope to enhance her spider studies, which she'll continue in her new setting.

For Boggs, the presidential award takes a back seat to the satisfaction of knowing that she has inspired students to find answers for themselves. "I've steered kids toward reaching out for more answers instead of reading a chapter in a book and quitting there because they take a quiz and think they know everything," says Boggs. "I don't teach it that way. We roll up our sleeves and really jump into it." Spiders and all.

–Carol Potera

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