Connect™

Innovations in K–8 Science, Math, and Technology

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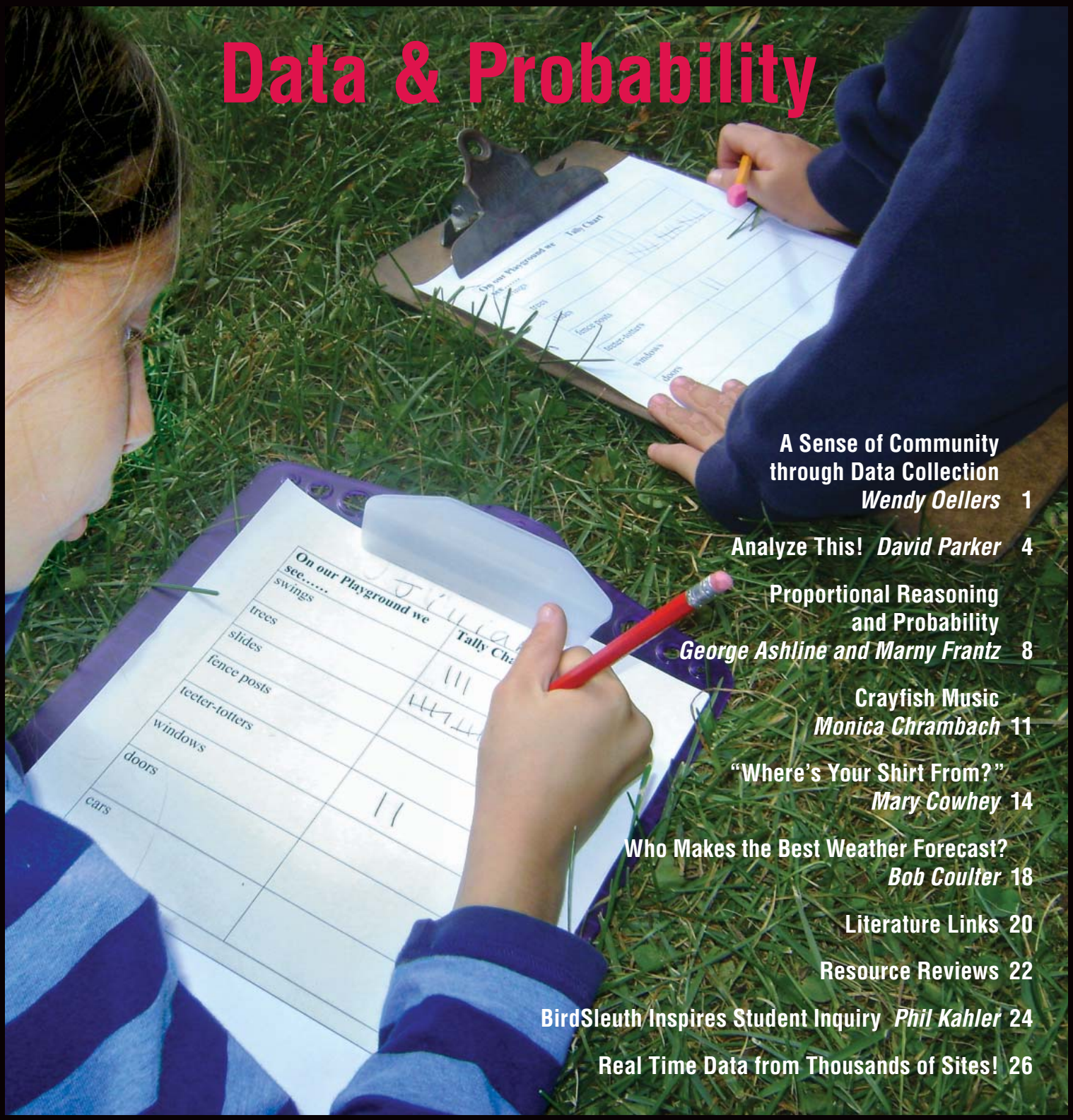

Data, Data, Everywhere!

Each day we encounter many phenomena that can be tracked, recorded, and analyzed. Data are often needed to make informed decisions, plan collaborative projects, and address individual and community needs or problems. In our teaching of how to collect and use this information, valuable math and science concepts can be embedded in students' experiences. At the same time, we can unite what would otherwise be considered separate disciplines.

When we offer students the opportunity to practice gathering data, we are helping them to develop skills that will benefit them both now and in the future. Going further, their work with probability helps them to understand what is impossible, what is likely, and what can be expected.

This issue of ***Connect*** features articles that highlight students using data to advance their own learning about the world around them. In many of these stories students observe their environment, ask questions, share results, and plan next steps in a process of inquiry that is itself a skill. Whether getting to know each other, the behaviors of crayfish, or the history of labor unions, these students are putting data and probability to work, engaging in both high quality learning and active participation in the classroom and their communities.

Connect™

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"Where's Your Shirt From?"

Second Graders Learn to Use Data to Change the World

by Mary Cowhey

"My teddy bear is naked!" one of my second graders shouted as we settled onto the rug. The other students nervously looked at the teddy bears they were clutching. "So is mine!" "Mine too!" I felt like I just stumbled into the Garden of Eden; the focus of my read-aloud evaporated.

I took a deep breath to calm the rising panic among my students. "I think your teddy bears look just fine. Do you think teddy bears need to be dressed?"

"Well, in Mrs. Bates' class in first grade this happened so we decided to make clothes for our teddy bears," Jeanette said.

That pushed my I-am-so-not-a-crafty-teacher button. "Oh? How did you do that?"

"Everett's dad brought in his sewing machine and we made vests!"

A few days later, Everett's dad, Paul, and little sister showed up with their sewing machine. Each child chose a colored felt rectangle, then traced and cut a simple pattern from it. Paul zipped up shoulder seams on his machine. Another parent helped cut buttonholes. My student teacher and I taught children how to sew on their buttons. We were just starting a math unit on data, so this project provided an authentic opportunity to sort things by their attributes. I read aloud the *Frog and Toad* story, "The Lost Button," which focuses on the attributes of a lost button (shape, size, color, number of holes, etc.). We played "Guess My Rule" with buttons and then with our well-dressed teddy bears.

This flurry of sewing activity inspired interest in sewing, machines, patterns, and clothing. James brought in a book from the 1960s called *How We Get Our Clothing*. I took a quick look at it, noticing it was full of stereotypes. He was desperate for me to read it to the class, so I pulled it out for our read-aloud the next afternoon in the library. We came upon an old black and white photo of white middle-aged women wearing cat's-eye glasses operating sewing machines in a large garment factory, with a caption that said something like, "This is where your clothing is made." I read it, stared at the picture and told the children, "Actually, this is where *my* clothing was made when I was your age. This looks like a clothing factory in New York City and these workers look like the adults in my neighborhood, the parents of my friends. Nowadays, most of our clothes are made outside the United States." Lots of questions bubbled up, "Why don't they make clothes in the United States anymore? Who makes our clothes now? Does it matter where clothes are made?"

Look for the union label

I suddenly remembered a song from my childhood, from a very popular television commercial run by the International Ladies Garment Workers Union (ILGWU). I started to sing it in my creaky voice, "Look for the union label/ When you are buying a coat, dress or blouse./ Remember somewhere our union's sewing/ our wages going to feed the kids and

run the house./ We work hard but who's complaining?/ Thanks to the I. L. G. we're paying our way./ So, always look for the union label./ It says we're able/ to make it in the U.S.A.!"*

By the end of the song I had risen from my rocker and was standing with my arms flung wide, with my off-key voice straining to reach that high note. Heads turned in the library. I sat down and regained my composure. My students were momentarily stunned by my performance, but then James asked, "Where *do* you look for the union label?" I asked Katrina if she could be my model, and looked at the label in the neck of her shirt as I began to explain we probably wouldn't find many union labels anymore. I announced hers was made in Guatemala.

There was an explosion of activity as instantly arms slipped out of sleeves and shirts spun around so children could read their labels. They squinted hard at the neck labels of their friends. "Geraldo, my shirt is from Mexico, where you're from!" "Ms. Cowhey, how do you say L-e-s-o-t-h-o?" Shoes started coming off. "Vang, my sneakers are from Vietnam, just like you!" "My sneakers are from China! Everett, isn't that where your little sister's from?" "Ms. Cowhey, James is hiding in between the bookshelves!" James emerged breathlessly a second later to announce, "My underpants are from *Honduras*!" I cringed at the thought of the wedgie he must have given himself to gather that data.

Making connections

I noticed the librarian tapping her watch, indicating that we'd overstayed our library time and that another class would be arriving momentarily. I hustled my students out of the library and into the bathrooms to wash up for snack-time, trying to think how I might channel this newfound enthusiasm for data into our next math *Investigations* unit on data. Perhaps we could connect it to our second-grade geography focus on continents and oceans. I noticed

that the children were lining up in a more orderly fashion than usual. They were checking the shirt labels of the students in front of them and whispering where their pants were made.

During snack time I distributed globes or world maps to each table and made a rough graph on the chalkboard, with seven sections. I asked them to give me the names of all the continents and predictions for which continents would have made the most and the least clothing. After some debate about what continents the USA and China were parts of, there was a general consensus that Antarctica would have few or no items and that Asia and North America might have a lot.

Each child called out the country where her shirt was made. Her tablemates figured out which continent that was part of, and I confirmed it on the large world map, while adding a tally mark to our graph. The children were wild about this activity and soon they were calling out all kinds of data, where their pants, sneakers, lunch boxes, jackets, backpacks, and thermoses were made. It was all very exciting, but when we tried to settle on a title for our graph, we realized it was a jumble of data. "Where some of our stuff was made" was the best we could come up with. I needed to reflect a bit.

Why did I distinctly remember standing up to sing along every time that commercial interrupted the Brady Bunch or the Mary Tyler Moore Show? My father, a union activist, never watched television, so had my sisters and I decided on our own to stand up for the song? Did we do

The children were wild about this activity and soon they were calling out all kinds of data.

* "International Ladies Garment Workers Union Anthem." Lyrics, Paula Green; music, Malcolm Dodds.

After some trial and error, they came up with a color scheme by continent.

it in solidarity or just for fun? I Googled it and learned that it had been one of the most effective ad campaigns in history. I watched a video clip of the commercial and it was as I remembered it, with first one worker singing, and then more and more joining her, leading up to the arms-outstretched finale. I transcribed the lyrics onto a poster.

The next day I told my class more about the history of the commercial. We looked at the lyrics and got props to illustrate trickier vocabulary (like *blouse* and *wages*) for our English language learners. We blocked it out and sang it like they did on the real commercial. One of my former students, now in high school, came in to videotape it for us. Students wondered if their parents or grandparents remembered this too, so we struggled to come up with a fair survey question, "If you were at least five years old *and* living in the United States in the 1970's, do you remember the *Look for the Union Label* television commercial?"

We sent the survey home as family homework and were impressed to find so many who did remember it. One parent said that her friend's family also regularly stood up to sing along with the commercial. Another homework task asked families to try to find relatives and stories about people who worked in the garment industry, in the U.S. or elsewhere. One student had a great-uncle who owned a clothing factory and another great-uncle who was an ILGWU organizer who organized a strike in his brother-in-law's factory. We researched the history of our local silk mill, button, and sewing machine factories.

Sorting it out

Since we were learning a lot about sorting in math, I sent home another homework assignment for the students to learn their family's scheme for sorting laundry. They were each to sort a basket of their family's laundry and use tally marks to collect data on where their family's clothing comes from.

We got a ton of data and then tried to figure out how to organize it. By now the children were familiar with line plots and bar graphs and what clothing-producing countries belonged to what continents. After some trial and error, they came up with a color scheme by continent (Asia was red, North America was green and so forth). We cut out rectangles in the different colors. Working in groups, the children went through their data, writing the country name on an appropriately-colored piece of paper. Then they pooled their data and sorted it again, by continent and country. Since the students were working in groups of four, they had a lot of data. Each bar graph grew to at least six feet.

The students were interested in looking at the graphs made by the other groups, to see if they reflected similar trends. They liked to describe the data: "Asia and North America usually have the most. In Asia, it's usually China, India, and Vietnam that have the most. In North America, the USA and Canada are biggest, but they never

have too much. Honduras, Guatemala, Mexico, Haiti, and Dominican Republic have a lot."

As the graph construction continued, students generated more questions: "What happened to the sewing machine, button, and silk factories we had here? What happened to the ILGWU? How come the clothing factories moved south and then out of the U.S.? How are workers treated in other countries? Do they have unions? What does "fair trade" mean?" We met with the economic development officer for the city, to learn about local industry and unionization. We visited our local Ten Thousand Villages store to learn about Fair Trade.

Language arts

We read aloud picture books about organizing, like *Swimmy; Farmer Duck*; *Click, Clack, Moo*, and *Harvest of Hope* (a biography of Cesar Chavez). We read *¡Sí Se Puede!/Yes We Can!* about the Justice for Janitors organizing campaign. We followed local news stories about the negotiations and pending strike at the local supermarket.

As my students told our story of learning about where clothing comes from, they realized a lot of people didn't know what a union, strike, or boycott is. Jeff proposed we write our own Protesters' Dictionary for kids, and that became our next writing project. We invited families in to see our graphs and participate in our shirt survey. We shared our Protesters Dictionary and played our *Look for the Union Label* commercial.

The real work

I was excited to see my students' thirst for data propel them to learn geography and economics and reflect on issues of social justice and activism. We had a strong *Investigations* unit on data, which uses relevant data like counting the number of pockets we are wearing, the number of teeth students in the class and other classes/grades have lost, and developing their own surveys about "favorite things." I taught that unit, but at the same time, we used the children's natural curiosity about where our clothing was made to learn how to sort and classify data, represent and describe data, and design and carry out our own data investigation.

These former second graders are now going into fifth grade. I've watched my students proudly as they've moved on and enjoy seeing them volunteer to weigh and graph the trash in the cafeteria to gauge our school's progress to reduce garbage and increase composting. I watch them record data and make graphs on "Walking School Bus" days about how students got to school. I've watched them debate how to make graphs to compare incubator hatch rates of Aracauna and Black Australorp chicks, or what to do with a collection of egg cartons showing where different families get their eggs from if we want to know how many "food miles" the eggs traveled.

Of course, I expect they will be able to construct a graph when given data, or interpret a graph on a standardized test, but more importantly, I expect that they will have internalized the habit of collecting data to better understand a situation. I expect that they will feel comfortable mucking around with data, trying it one way and realizing they have to refine the question or think more critically about their sample or reorganize the graph or tape on more paper or come up with a half dozen more questions. I expect that they will have the confidence that the data they gather, represent, and analyze will help them solve problems, pose new questions, and ultimately, change the world.

As the graph construction continued, students generated more questions.

Mary Cowhey teaches second grade at Jackson Street School in Northampton, Massachusetts, and is the author of Black Ants and Buddhists: Thinking Critically and Teaching Differently in the Primary Grades *(Stenhouse, 2006), winner of the 2008 National Association for Multicultural Education book award. Her essays and articles have been published in* What Keeps Teachers Going, Why We Teach, Dear Paulo: Letters From Those Who Dare Teach, Teaching With Fire, Teaching Tolerance, Rethinking Schools, Instructor, *and* Connect.