Explore, Tinker, and Play: Everything I Need to Know about Teaching Writing I Learned at the Science Museum

Right now our colleagues in science are thinking about teaching writing. Between the science and technical subject standards listed in the Common Core State Standards and the science practices, named in the Next Generation Science Standards (many of which we would name as literacy practices), science teachers may be in the midst of a pedagogical revolution. It seems likely, then, that they will look to us for help. How will we respond? Perhaps we might begin by thinking about how we can learn from one another.

In my work with the Intersections Project, an NSF-funded collaboration between the National Writing Project (NWP) and the Association of Science and Technology Centers (ASTC), I have visited many science museums. What I am seeing in these spaces has caused me to reflect on when and how learning takes place and has me thinking about how we teach writing as well as how we might work with our colleagues.

Exploration Is Expected

The Children’s Creativity Museum in San Francisco is an interactive art and technology museum. When my daughter Anna was eight or nine, this was her favorite museum. Her favorite room was the animation studio, where visitors are given a work space, a big hunk of modeling clay, some wire, and a few sculpting tools. Participants build clay figures and then film them using stop animation techniques.

We have been to the Children’s Creativity Museum several times, often intending to visit the animation studio, and yet we never go with a plan or a script. Each time, we start from the wire and the hunks of clay, shaping the clay to see what we make. Once we see what we have created, we play around with where these creatures might meet and what might happen in that space. We often try and reject many scenarios, laughing ourselves silly over scripts that go nowhere. And yet we never say, “Next time, let’s come with a script and know what we are going to make. Then we’ll be much more productive.” A great part of the joy is in the exploration, in letting your hands decide what they “feel like” making.

As a writer, I often begin projects similarly, with the mental equivalent of a lump of clay and some wire. In recent visits to science centers, I’ve been contemplating my experience in each, how it resonates with experiences I’ve had in other science museums, and what that tells me about writing and teaching writing. A while ago I opened a Google doc on this topic, and each time I had a thought, or even just an inkling, related to the topic, I flipped over to this space and wrote it down. Before I knew it, I had a document full of scrappy little paragraphs and sentences trailing off into nothing. It was, in large part, coming back again and again to this document, exploring the connections and the disconnections among the ideas that were piling up there, that led to this column. The freedom in not having to say anything particular right away has allowed me to learn something new.

And yet, when I was a classroom teacher, I often felt compelled to teach students to write in a more structured way, too often circumventing the opportunity for exploration, rarely giving students the opportunity to write around an idea in order to find out what they thought. If I had it to do over, I’d make more room for playful exploration, for mucking

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about, for helping students learn that writing is not just a way to say what you already know, but a way to learn something new.

**Work Looks Like Play**

The first time I visited the Reuben H. Fleet Center in San Diego, there was a new exhibit of Keva planks, which are deceptively simple building blocks. In the Fleet Center on the day we visited, this room full of Keva planks served as a make-play-build space for families, providing challenges such as "who can build the tallest structure." When planning our visit, I had expected to see many of the museum exhibits; however, once we got there, my husband, daughter, and I soon found that we couldn’t pull ourselves away from the challenge at hand, and we spent the rest of the day working to build a tall structure. When our first structure collapsed, we walked around the room, both to stretch and to see what others who were building taller structures had done differently. We went back to our table with a clear idea that we needed a wider base, and we began building again. We talked, we laughed, we kidded one another, but make no mistake, we worked hard to make each attempt taller than our last, if not the tallest in the room.

Thinking about when work looks like play also leads me to reflect on my own classroom. The times when work looked like play stand out in my memory, perhaps because they are too few. For example, when I taught eleventh-grade English, students struggled to warrant their evidence. They assumed that the logic in their minds that connected a piece of evidence from the text to the thesis they were supporting was as clear to their reader as it was to them. They believed that the stated evidence spoke for itself. One of the most productive activities we did to meet this writing challenge was a game called "steal this evidence." The class divided into two teams, each arguing the opposite side of a proposition. Each team amassed textual evidence, writing quotes from the novel we were reading on index cards. On game day, each team took turns reading one of their quotations. If the other team could show, through a warranting statement, that a piece of evidence presented by the other team could be used to support their own thesis, they could steal that evidence. In the end, each team was required to write an essay with the evidence it had amassed, both through reading and thievery. Because by now they were often writing from evidence they hadn’t initially selected, the need for warranting became much clearer. And it was fun to present arguments made with stolen evidence. Like my family with the Keva planks, students talked and laughed, supported teammates and competed against rivals; but this wasn’t simply a fun game, rather it was work that looked like play. Again, given the opportunity to return to the classroom, I would strive to provide more such opportunities that allow students to work together to do something that they can’t yet do alone, to learn from each other, and to take the work, but not themselves, very seriously.

**Making Something Requires Time to Tinker**

In a recent visit to the Arizona Science Center, I visited the Forces of Nature exhibit, the centerpiece of which is an immersion theater experience. Standing in the middle of a large room, I was warmed by heat lamps (to make real the experience of a volcanic eruption and wildfire), sprayed by water (to convey the feeling of a monsoon), and whipped by strong bursts of air (for a tornado). However, by about the second minute, I was distracted by another display in the room: a simple table with water and sand, where three adult men were building a sluiceway. They bent over the table, slowly, carefully scraping the sand into complicated networks of trenches and dams. Every few minutes, they stood, released some water, and watched what happened. After putting their heads together, they returned to their work, refining their waterway. I kept my eyes on these apparent fathers for the rest of my visit to Forces of Nature, equally taken with their tenacity at tinkering and concerned about where their children might be. I was impressed with the way they kept at it, making small changes, reiterating their design, trying again. When I asked the museum staff member about the exhibit, she said, “That’s one of our most popular displays. People get caught up there all day.”

The scene reminded me of the third quarter in my husband’s school. That’s when every eighth grader commits to a ten-week-long inquiry into a topic of choice. The quarter culminates with an event at which each student presents
findings in both a multigenre research paper and a physical display. On presentation day, the school’s library, eighth-grade classrooms, and hallways are filled with students describing their research, employing a wide variety of displays—from websites to storybooks to life-size three-dimensional sculptures. Parents visit, as do seventh graders who are aware that next year their work will be on display. It’s a grueling quarter in our house; the eighth graders and their teachers work hard for ten weeks, learning, writing, designing, and implementing. Many tears are spilled. Students achieve different milestones at different times and via different pathways. Each day different students need different materials, different work spaces, and different kinds of help. And yet, by the end of the quarter, every student proudly displays a final project.

In general, in my experience, schools are not well designed to give students the time and space required to undertake projects like this. Such undertaking takes a lot of time; it takes false starts and do-overs, and it takes tenacity. The third quarter of eighth grade is legendary at my husband’s middle school, in large part because students have too few of these intense, sustained experiences and rarely make and display work that feels truly their own.

Imagination, Creativity, Innovation, Persistence

And that’s the interesting thing about the spaces in which students play, explore, make, and tinker, it seems to me. Whether located at a museum, at home, or in school, these are spaces in which students imagine, create, innovate, and persist. Though we can see this in all kinds of learning spaces, science and science museums have a materiality and an expectation of exploration that encourage this kind of engagement and let us all see what this kind of learning looks like.

My time in science museums, then, has me longing for a new relationship with content-area colleagues forged in new ideas about learning what schools could be. One model for this type of relationship with learning is called Connected Learning. Connected Learning is “a model of learning that holds out the possibility of reimagining the experience of education in the information age. It draws on the power of today’s technology to fuse young people’s interests, friendships, and academic achievement through experiences laced with hands-on production, shared purpose, and open networks” (Alameda County Office of Education; see http://connectedlearning.tv/sites/connectedlearning.tv/files/styles/900w/public/DG_Macarthur_r03-960_0.jpeg?itok=-lfe4eUy). Connected Learning’s learning principles (that learning should be interest-driven, peer-supported, and academically oriented) and design principles (learning experiences should be production-centered, openly networked, and organized around a shared purpose) provide a framework for how we might work together in a new way with our science teaching colleagues. Perhaps the Common Core State Standards and the Next Generation Science Standards will provide an opportunity to reimagine schools as places where students have more opportunities—across subject areas—to explore, play, and tinker. Through the Intersections project, National Writing Project Sites and their local science museum partners are exploring this idea by designing projects at the intersection of literacy and science. We look forward to learning what teachers and students make of and through writing when given opportunities to explore, tinker, and play.

Works Cited


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