


Harnessing Divine Nonchalance: Teaching Everyday Science in a Pandemic

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ABSTRACT

In this personal narrative reflection, the author examines her experiences teaching everyday science during the COVID-19 pandemic. She provides examples of curiosity-driven explorations with her own twin sons related to growing plants and baking bread. Through social media she shares her home experiences with others, building a remote community of practice around everyday science learning. She concludes with recommendations for teachers and parents interested in following a similar path.

Introduction

On Friday March 13, my sons, seven-year-old twins in first grade, and their classmates were dismissed from school early. Families were told that school would be closed until at least April 14, when students were scheduled to return from spring break, and that remote learning was to begin the following Monday. The children were sent home with packets of school supplies and books and a table of sample activities and resources parents could find easily online. The school district made the purposeful decision not to introduce any new content during this time. Instead, we were given a variety of supplemental materials to use to help our children along. We were asked to encourage our children to log on to a variety of websites to support them in mathematics and literacy. We had our marching orders while the teachers scrambled to figure out the next steps amongst the uncertainty.

To quote so many of the memes shared by introverts in the days leading up to mandated social distancing, “I’ve been preparing my whole life for this moment.” I have spent my entire adult life teaching in one capacity or another as a camp counselor, lab instructor, seventh grade teacher, graduate teaching assistant, and for the last decade, science teacher educator in higher education. My husband is an essential employee and as such, I knew I would be on my own navigating this new normal with respect to our children’s education.

I decided to build a structure for our mornings. I would wake up early and spend a few weary hours focused on my own work. Then, after having breakfast, my boys and I would walk the dog and they would play for a bit while I set up “mommy school” (they named it, I didn’t). For mommy school, we each selected one book to read. We alternated who read which page and kept master lists of the books we read together and words that we found tricky. The mathematics workbooks that their teachers sent home (because they learn mathematics at school using manipulatives and games) became essential tools. I let the boys choose any two pages in the books to complete and we checked them together. For writing, we sent postcards to friends, made jigsaw puzzles, and brainstormed ideas for new comic books. I decided they would learn science by living with me.

Context and Assumptions

I acknowledge that I was in a very privileged position as I began my new role as my sons' teacher. First off, my two children are the same age and quite similar academically. Second, I am a science educator. For my work, I spend much of my time in elementary school classrooms. My children's school world, language, habits, and culture (and their teachers' jobs) are familiar to me. To add to the ways in which I was fortunate, I was on a sabbatical leave for the academic year. My project was to write a science teaching methods textbook, and I sent my completed draft to the editor about a week before the pandemic started affecting my day-to-day life. Though other projects were looming and a new grant was about to start, I was not tied to a teaching schedule or as many meetings as I normally have during a typical semester.

I also needed to wake up extremely early to get anything done without interruption. My work bled into my weekends and was shoehorned into whichever pockets of time I could manage to find. I was exhausted all the time. I was a teacher, mother, tour guide, chef, and therapist.

The context in which humans interact began changing almost immediately. Estranged friends and family began connecting with one another. Passing neighbors and acquaintances on long walks could be found chatting over six foot gaps, and these chats became highlights in everyone's days. Working parents-turned-teachers (myself included) began posting regularly on social media: schedules, resources, activities, and photos of their children quarantining and acclimating to a new life. Everyone wanted ideas and solutions immediately. Within a matter of days, meetings were set up via video conference to celebrate birthdays, reminisce the near and distant past, and simply commiserate.

Media was being consumed and commented on quickly. Musicians started playing live stream concerts, museums offered virtual tours, and television programs were streamed and binged at a very fast pace. I found myself thinking often about the way in which Netflix Docu-series, *The Tiger King*, might change the kinds of discussions teachers and students would have in their remote classes about ethics and animal welfare. But for me personally, the best new piece of media was AMC's *Dispatches from Elsewhere*. In it, an unlikely group of characters play an ongoing interactive game and are introduced to the idea of *divine nonchalance*, or the act of thinking creatively, looking carefully, and seeking beauty in everyday life. This concept was demonstrated throughout the first few episodes as characters took the time to revel in wonder at day-to-day tasks. After watching several episodes (which I could not binge-watch because the program is new and on a cable network), I began to connect my own ideas about science teaching and learning to this concept.

Walking my Talk

When asked to give a statement about my philosophy for a bio I often say, "Advocating for scientific literacy and the health of our planet through teaching and learning." In recent years, I have focused more intently on advocating for science. In an essay titled *Teaching Science is a Sacred Act* (Madden, 2018), I argued for the importance of addressing science in the early years. This essay, and its philosophy of advocating for science, became the foundation for the textbook I have spent the lion's share of the last year writing. I believe firmly in honoring and recognizing all children's science capital, or the thoughts, knowledge, ideas, and connections an individual has related to science (Archer et al., 2015). But above all, I believe that science is a way of explaining the way our world works, and we must recognize, celebrate, and appreciate the science in our everyday lives. As much as 95% of what we know about science is learned and experienced outside of school through visits to museums, stays at summer camps, and casual observation and exploration (Falk & Dierking, 2010). Not all children have equal access to adults who can help them connect their everyday scientific experiences to science content and process. My children do, and through social media and other means, I was well

prepared to share our own sensemaking with the world around us and perhaps build a community of everyday science explorers, or even aid in building the science capital of others.

Science Teaching During a Pandemic

Hannon (2019) wrote about a *pedagogy of love*, or the idea that teachers must come from a place of love and understanding to really know the children in their classrooms and teach them well. This type of pedagogy also requires teachers to be vulnerable. To really know and love one another, we must be willing to show ourselves – our likes and dislikes interests and curiosities – to our students. A teacher cannot simply assume her students know that she likes science. In a recent edited volume about teaching science to individuals with disabilities, a clear message that came across throughout multiple authors' work was that their students felt their teachers did not like science and they did not like children (Koomen et al., 2018). As educators who want to connect with our students, we must share our curiosities and wonder with the children we teach. I would start with my own children during social isolation.

Normally, I purchase and plant marigolds in a bed next to our house in the springtime and tomatoes, greens, and herbs in a planter on our deck. Soon after school announced the switch to remote instruction, I purchased a seed starter tray, seeds, and potting soil to grow the plants from seed with my children. I also purchased worms and a vermiculture composter – another project I had been hoping to start. These are the sort of tasks that I enjoy, but never have the time to dedicate to them. I wanted my children to have a chance to explore with me, troubleshoot ways to prevent our cat from attacking the plants we were nurturing so carefully, and see the lifecycle of these plants from start to finish, up close. I posted about this plan on Facebook (Figure 1), and ended up with 18 comments, many of which asked for guidance and recommendations on what to buy, where from, and how to get started.



Figure 1. Excerpt from a Facebook thread sharing plans to begin planting seedlings.

A short time later, our seedlings sprouted. But we also started hearing from friends who decided to begin similar planting projects of their own (Figure 2). Several friends reached out to share

photos of their own planting explorations with first graders, such as this mom and educator who jumped in head first growing seedlings with us. She started growing seedlings in paper cups and later moved on to regrow celery and lettuce on her kitchen counter (Figure 3). Another friend, who is also an educator, shared similar photos; she and her first grader also attempted to regrow vegetables on a countertop and then put a terrarium gift set to good use, as shown in Figure 4.



Figure 2. Seedlings several weeks after planting.



Figure 3. Seedlings planted by a friend along with celery re-growing on her countertop.



Figure 4. Re-growing vegetables and a recently set up terrarium.

However, a few weeks into social isolation, our most exciting experiment began. Baking has always been my hobby, and I have made it a point to talk frequently with my children about the importance of good measurement, the role each ingredient plays in the final baked good, and the way in which changing temperature affects the chemistry of cooking. I came across a viral tweet by Sudeep Agarwala, a yeast biologist who offered advice to the general public about growing wild yeast at home, as pictured in Figure 5.



Figure 5. Excerpt from Agarwala's viral Twitter thread about growing wild yeast.

Agarwala described the process one could use to cultivate wild yeast on our countertop by mixing everyday kitchen items with flour and water and leaving the jar in a warm place. The webpage *Bored Panda* picked up his story and laid out the steps for growing wild yeast more neatly for readers to follow along (Lisickis, 2020). Agarwala was later invited to write a piece for the *Washington Post* (Agarwala, 2020) detailing specifics of yeast biology and clearer step-by-step instructions for growing yeast on a countertop.

This was my golden opportunity. After reading the articles, my sons and I dug in and designed an experiment comparing yeast grown from three different materials, all of which were suggested in the initial article: dried fruit, dregs from the bottom of a beer can (obviously not suitable for school), and crumbs from an old loaf of bread. We also included a control group using only flour and water. I made due with what materials I had on hand (as can be seen in Figure 6), and I created lab sheets to help my sons organize predictions and observations.



Figure 6. Day 1 of our experiments growing yeast.

A multitude of friends and colleagues followed suit growing their own yeast cultures and subsequently baking bread. One ran a similar experiment to the one I designed and even used the lab sheets with her own children, seen on the left side of Figure 7. About a week after completing the experiment, she shared her own yeast starter with a friend who began growing and baking with her children. A teacher friend reached out to me via Facebook Messenger requesting specific guidance on culturing yeast on his own counter. My sons and I asked for a photo and helped him identify some good news: bubbles were forming (right side of Figure 7).

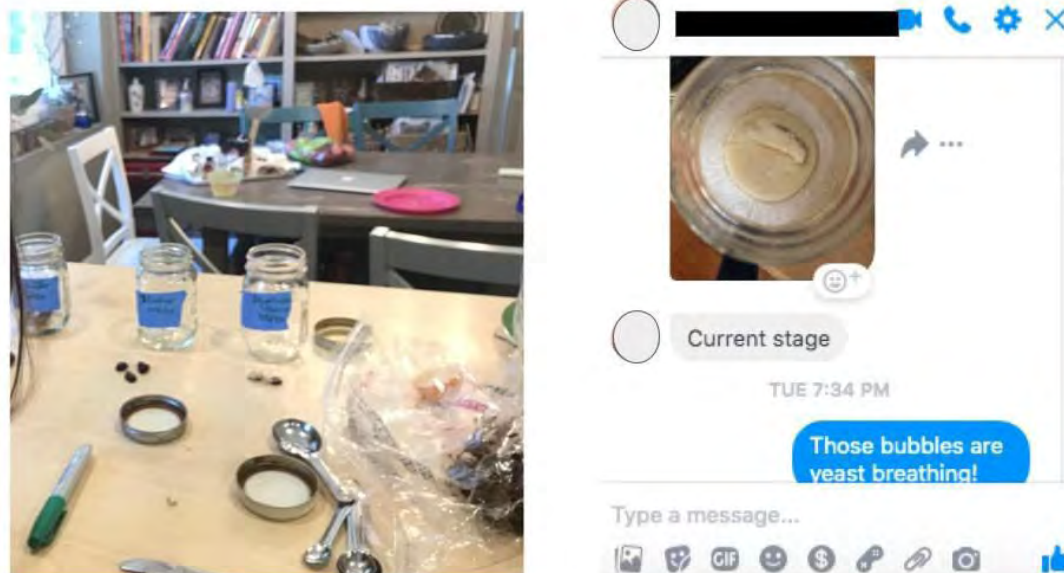


Figure 7. A friend's daughter on day 1 of their own yeast experiment (left) and some troubleshooting messages with another friend starting his own culture (right).

My sons and I watched several videos about how yeast grows ([example](#)) and baked many loaves of bread. We were especially surprised when the control group yeast grew and when the dried pineapple starter resulted in a lovely sourdough which we used for French toast the next day. We learned that French bakeries often use just the yeast found naturally on flour to start their own loaves. We learned that kneading was essential and using our hands had different results than kneading with our stand mixer. We also learned that wild yeast was less predictable than the powdered instant yeast I normally used and sometimes the very same yeast used in the very same recipe could need more or less water for the dough to come together and a longer or shorter time to rise after kneading. We found that small differences in temperature and humidity led to great differences in the sticky-ness of dough. Figure 8 shows some of the differences we observed. My children started checking jars, asking to “feed” our yeast, and demonstrating patience waiting for dough to rise. All the while they checked on our seedlings and made predictions about when to re-pot them. Our friends also began sending notes and sharing photos of baked goods in comments on social media, in their own posts, and via text and email, like the ones shown in Figure 9. The science we were learning together was simply part of our lives worth exploring. This was absolutely divine nonchalance.

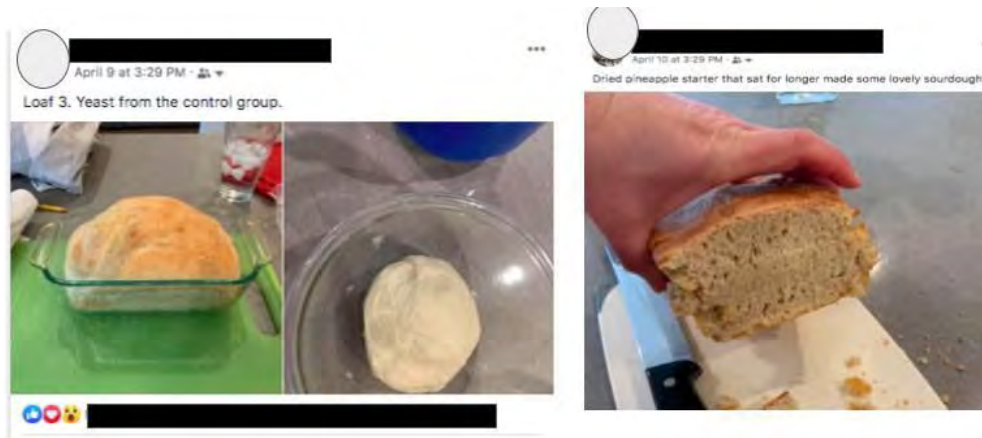


Figure 8. Some of our final loaves.



Figure 9. Images of bread made by friends.

In the end, I can say that these few weeks of science-ing with my children and sharing our experiences on social media allowed me to harness my divine nonchalance and helped my children to do the same. I was not teaching my children content for a test or because it was required. I was making my own curiosity explicit and, as a result, their curiosity became explicit too. By modeling the experimental design process, they internalized much of the practice of doing science themselves. My non-scientist friends who also pursued similar experiments helped to build their own children's science capital as well.

Recommendations for Others

If you find your role in your own children's lives has changed or you are preparing to give advice to parents of children within your classroom, here are some ideas for helping harness divine nonchalance in the way we understand the world scientifically.

- Make your own hobbies and interests obvious to your children, and explore them deeply. If you are a music enthusiast, study the way sound waves alter with changes in pitch, tempo, and volume. Listen to this season's *Invisibilia* podcast (by NPR) and try to hear the sounds of nature and humans in the world carefully.
- Dive deeply into something you are curious about. If there were a time to wonder, that time is now. The internet has a wealth of information about all topics, but more than that, it allows us to connect to one another and learn together. For instance, friends making reusable masks can help us to see how the shape, texture, and materials that make up fabrics lend themselves to good masks, or not.
- Follow the curiosity and interests of your children. This morning, while eating some (admittedly out of season) cantaloupe at breakfast, my son asked, "Can we plant cantaloupe seeds? How long will they take to sprout? How long before they'll have flowers? How long before there are cantaloupe on the plants? How many melons will each plant grow?" I promised him that we would save some seeds from the next melon we buy and try to answer these questions together.
- Leverage social media as a tool for community learning. The connections built with friends over science built a community of practice and fostered science capital in children and parents alike. As our world changed, we taught and learned science together.

To take the time to wonder and appreciate the way we see and experience the world is a gift, and a way to truly engage in meaningful learning.

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References

- Agarwala, S. (2020). Think you're out of baker's yeast? Think again. *The Washington Post*. Retrieved from <https://www.washingtonpost.com/opinions/2020/04/05/think-youre-out-bakers-yeast-think-again/>
- Archer, L., Dawson, E., DeWitt, J., Seakins, A., & Wong, B. (2015). "Science capital": A conceptual, methodological, and empirical argument for extending bourdieusian notions of capital beyond the arts. *Journal of Research in Science Teaching*, 52(7), 922-948.
- Falk, J. H., & Dierking, L. D. (2010). The 95 percent solution: School is not where most Americans learn most of their science. *American Scientist*, 98(6), 486.
- Hannon L. V. (2019). Engaging my whole self in learning to teach for social justice. In J. Kitchen, A. Berry, H. Guðjónsdóttir, S. Bullock, M. Taylor, & A. Crowe (Eds.), *2nd International Handbook of Self-Study of Teaching and Teacher Education*. Singapore: Springer.
- Koomeen, M., Kahn, S., Atchison, C. L., & Wild, T. A. (Eds.). (2018). *Towards inclusion of all learners through science teacher education*. Boston, MA: Brill.
- Lisikis, R. (2020). Biologist Is surprised to see yeast being hoarded, decides to teach people how to make it at home. *Bored Panda*. Retrieved from https://www.boredpanda.com/yeast-shortage-life-hack/?utm_source=google&utm_medium=organic&utm_campaign=organic.
- Madden, L. (2018). Teaching science is a sacred act. *The Educational Forum*, 82(3), 303-308.