

Unschooling Science

Science is an intimidating subject for many homeschooling parents and kids. In these stories, two parents write about how real, interesting, important science doesn't always require textbooks and expensive lab equipment.

Young Child Intrigued with Anatomy

Erik Frankwich of New York writes:

My daughter Wenona has been interested in biology since a very young age. She would spend a lot of time, even at an early age, looking at human anatomy books with me, pointing to the different anatomical structures and asking me what they were. The first time she did this, it took me by surprise. Here was a kid, still potty training herself, wanting to know what the names of organs, bones, and muscles were. Half jokingly, I told her the actual names (instead of dumbing it down) and to my surprise, she would not only repeat them back but also remember them. Her interest in anatomy in particular and the life sciences in general has not waned since that first time when her tiny little finger pointed to the coccyx in *Human Anatomy* by Frank Netter and said, "What's dis?"

She has spent hour upon hour poring over Netter's book asking me questions, drawing the different anatomical structures, and feeling for muscles and bones in her own body and the bodies of her parents. Because my wife and I have studied and practice alternative medicine and various forms of Acupressure, our interest and enthusiasm for understanding the human body and mind must have been impressed upon Wenona from an early age. She is frequently and enthusiastically present when my wife and I do

healing work on each other or other family members. She's also never been averse to getting a massage herself. Recently, she was an active and adept facilitator in the healing process of her great grandmother's rotator cuff.

Over the past two years, we have focused a great deal on the life sciences. One resource that we have found to be invaluable has been the dissection alternatives from the Anti-Vivisection Society's free lending library. Since Wenona is a very stalwart vegetarian, she would most certainly balk at the idea of cutting up a once-live animal. We have borrowed some truly indispensable materials from AVS. They have models, CD ROMS, and videos for fish, amphibian, and mammal dissection. We have used many of these materials to compare the anatomy of various classes of animals as well as to

look at their evolution.

For us, the big prize from AVS was called The Manikin, which is a two-foot tall skeleton that comes with modeling clay and tools to actually build your own model of the human musculature. Wenona spent hours meticulously building the muscles from Frank Netter's book into three dimensions. Since another of her passions is pottery (both using the wheel and hand building), this was heaven.

Another resource (besides the library) that has been invaluable to us in our scientific exploration of the world is the local science museum. The staff has been very accommodating in letting me organize unschooling activities that I tailored from their school programs (which are very good but can often be a little too school-like). We have used their microscopes,

water lab, docents, and an entire panoply of mostly unused science materials. The science museum has also enlisted our help by asking that we homeschoolers preview their exhibits and provide them with feedback (I guess they know that homeschoolers will jump at the chance to express their opinions!)

Last fall, a group of us got together to do an in-depth study of water with our kids. We visited the local water treatment plant, went on a tour boat along the Erie Canal, and measured the health of a local stream with the help of another homeschooling father who volunteers with the county to do this. With the resources from the science museum, we were able to use the microscopes to explore microscopic life in the water as well as use the water lab to explore the macroscopic water cycle.

We have been very fortunate to live in a community with so much to offer. With all that is available, the only thing we've lacked is time! There has really been no need to use textbooks or prepackaged curricula. Everything we've needed to explore the world through the eyes of science has been readily available in the community. Where interest flows, resources seem to follow!

Interest in Animals Leads to Work With Veterinarian

Cecilia Robello of New York writes:

Five years ago, when we brought our son home from very "wanting" public and private school experiences, I had no doubt that we were making a good decision. But in the back of my mind a voice kept repeating, "But what will you do about science as he gets older?" Even with my degrees in chemistry and biology in our family, I could not imagine providing our son Bart (now 14) with a good science education. Didn't science come from a textbook with accompanying time in a lab? Needless to say, I had much to learn.

Five years and many paradigm shifts

later, that nagging voice has been silenced. Science does not come from textbooks riddled with incomplete or wrong information, presented in detached, disjointed, and sterile fashion. Lab work occurs every day by observing, questioning, testing, and drawing conclusions or forming new questions just by being present in and aware of the giant lab in which we live. Science is not about the memorization of "facts." My son has unknowingly taught me a new definition of science.

Bart has been immersed in science all along just by living in our family. I remember a very cold January day when he and I were on our hands and knees in the middle of our cul-de-sac, magnifying glass in hand, oohing and aahing over snowflakes frozen in layers of black ice. He was three and I was transported back to viewing the world through young eyes of wonder. I remember spending two entire days during our trip to Toronto at the city's Science Center. I'm sure there would have been a third day if we'd had time, but our trip was over. Our house at times felt like a natural history museum as leaves, insects, worms, frogs, and other natural wonders that caught Bart's eye made their way inside our home. I knew the next day we would be making a trip to the library to learn more about his finds. The following week he would be arranging and labeling his specimens in what he coined his museum boxes. Even when we had books on the subject, his thirst for knowledge had us checking out yet more books from the library. PBS science and nature shows were recorded on our family calendar as appointments not to be missed. Our science museum's list of lectures were all circled to attend. Model rockets were built and launched. Broken household appliances were taken apart and studied and a junk box became Bart's mind's playground for inventing new gadgets. Our kitchen became his lab as he added a little of this or that. I never asked what he was making so that I wouldn't disturb his work, but I did make myself available.

Fish, guinea pigs along with their litters, rabbits, and a cat were added to the menagerie. All the time that Bart's thoughts, observations and questions continued, I worried about how we would teach him science.

Bart's fascination, wonder, and awe were preserved because we didn't travel down the narrow road of curriculum. Soon his questions surpassed my knowledge and I found myself guiding him to resources including books, people, and the Web. Often I found that questions were asked in order to ponder them – not to immediately find the answer. At first I fretted about this turn of events, but with time learned it was just another stage in Bart's development. Sometimes, I secretly found myself digging for the answer to one of his questions because I wanted to know. Our mutual love for and fascination with the world around us continued as Bart grew older, oftentimes with role reversals as Bart shared an article from a science magazine or book that he thought would interest me. He learned that the world was his classroom when an archeologist invited him to be part of a dig and a microscopist refurbished a research-grade microscope for him to own. Both of these opportunities presented themselves when Bart attended events offered in the Rochester community. A local bookstore hosted a talk about an archaeological dig at Susan B. Anthony House. As we drove home from the lecture Bart was alive with excitement imagining participating in the second part of the dig. I encouraged him to write to the archeologist. He first said that because he was just a kid he'd be told no. I then asked him what he had to lose by writing and what he had to gain. The next day a letter was in the mail, and he wasn't told no.

His interest in the microscope occurred when our science museum held youth/adult classes in microscopy, with a world-class microscopist retired from a local company. This time it was the teacher who approached Bart, seeing his keen interest in the subject. From

these two experiences, Bart learned that mutual interests and passions can bridge the span of years.

Bart's interest in science has covered many areas, but he has had a constant underlying love of animals. As our little zoo keeper grew, we often turned to *him* with our questions about animals. Last year at our cat's annual vet's appointment, Dr. Tim Vleutin picked up on Bart's way with animals and invited Bart to shadow him. Once again I learned a lesson in patience and trusting my child. While Bart politely thanked Dr. Tim for his offer, I was jumping up and down inside. My mind raced with all the opportunities for learning that an internship at a vet's would hold. Eleven months passed and then, apparently out of the blue, Bart nonchalantly inquired when our cat was due for her physical. He told me he was interested in taking Dr. Tim up on his offer. While I calmly walked to the phone to make an appointment, I was cheering inside. The receptionist informed me that our cat wasn't due in for another month.

"This is better timing for our family," I told her. I was striking while the iron was hot! This summer I have driven Bart twice a week to the vet's where he spends one morning observing surgery and the other in office hours. He now translates Latin for his mom who had six years of it in school, looks up diseases on the computer, tells me he dreams of neuters and spays, and now knows all the breeds of dogs. And this is just a small fraction of what he has learned. Independently, he has set up his own project in the cat room at the vet's. Most important to me, though, is the enthusiasm that I see in his face and hear in his voice. My role will continue this fall as his taxi – supporting Bart and allowing him to act in his own time in his quest for knowledge. While I know that eventually the textbooks will be opened and lab courses taken, these things will be done not because they are part of a state's curriculum, but because they are my son's passion. ♦

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