



Teaching Sensible Science

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A Letter from a Participant

To the Teaching Sensible Science (TSS) teachers—Michael D'Aleo, Lylli Anthon, Gary Banks, and Barbara Richardson:

This letter is both a letter of sincere appreciation for the course the four of you have created and a letter of earnest request that TSS be integrated into Waldorf teacher training centers throughout the country.

As you recall, I had the good fortune to attend TSS during the three-week session that began in June 2006 and finished in February 2007. Having just completed fourth grade with my class, I questioned whether attending this preparatory course for teaching upper elementary science (i.e., physics and chemistry) would be premature. But given that I was a new teacher on the threshold of the upper elementary grades, and given that I had a strong conventionally-taught science education (I received both Bachelor's and Master's degrees in engineering), my school's faculty strongly encouraged me to attend.

In just the first few days of that first session, I quickly realized that what I had anticipated as simply a sixth grade physics prep course was actually an experiential course in phenomenology that would affect not only how I would eventually teach physics, but also how I would teach everything else. In that first session, we teachers, as adult students, observed phenomena and then, through our own sense-based experience, searched for patterns, found relationships, and discovered lawfulness. We had a visceral experience of what it was like to have to trust in our senses and what it was like to think, really think, about how the “visible and the invisible work together to produce the miraculous.” This process

of working from phenomena to lawfulness is what really made TSS meaningful for me.

This was not razzle-dazzle science by any means, or a parade of continuous Oooh! and Ahhh! experiments. This was a course in which simple and seemingly mundane experiments were approached with awe and reverence. It was a course in which quiet subtleties often led to the most profound revelations. Placing a warmed hand and a cooled hand in the same tepid water bath so simply, so elegantly, revealed sensations of hot and cold to be relative to the human experience. Slowly illuminating a dark room revealed the essential conditions for seeing to be a human being, an object to be seen, and a luminous body.

Not only did TSS teach me that “less is more,” but also that, in teaching science, what we are trying to cultivate is the ability for students to enter into a reverent sense-based relationship with the world in such a way that they can bring meaning to that relationship through their own thinking and experience. It was the epistemological work of this course—the constant conversation about how science is a way of understanding the world, how we live in our preconceptions and not our actual perceptions, and how the only way to get beyond the concepts we already know is to come back to our senses—that I found so profound and foundational for my subsequent teaching.

I finished the third TSS session during the middle of my fifth grade year. The three sessions spread out over eight months seemed at first unreasonable, but now I see the wisdom in that arrangement. Time between sessions enabled the seeds of ideas to germinate and take root. We teachers had an opportunity to take our TSS lessons back to our classrooms and our lives. We then returned to the next session with more refined questions and an intimate sharing of our

experiences, our struggles, our epiphanies. With each session we deepened our understanding of how sense-based teaching cultivates a meaningful relationship with the natural world, an active interweaving between the individual and the world, without the alienation that can arise when materialistic models of the world are brought as reality.

The time between sessions helped us work with phenomenology, and it also helped us to begin to relinquish the ingrained mechanistic, materialistic paradigms we had all learned from our own science education. Words, phrases, and concepts like molecules, beams of light, and flowing electrons had to be supplanted with words, phrases, and concepts that actually described the phenomena perceived. I realize now how fortunate it was that I had a year before bringing physics to my class in sixth grade to loosen the hold of my past scientific training and to build my confidence in phenomenological teaching.

When I brought physics at last to my class, I doubted at first whether children of this generation could actually experience simple phenomena richly while living in such a fast-paced, technologically alluring world. How wrong I was. My doubts were quickly vanquished after our first experiment. For our first physics experiment the students had to sit silently and listen to the sounds around them and then to sounds I created with different materials. They were utterly transfixed by the phenomenon of sound. This simple experiment led to a rich conversation in which they eagerly shared their observations and appreciation for sound. They then earnestly worked together and thought through their experience until they could articulate the conditions for sound. Then a stroke of brilliance—we'd go on to have many of these—brought them all to the conclusion that one must have the intention to hear in order to be aware of sound.

Each experiment that followed built in a meaningful way upon the one before it. We explored acoustics, optics, warming and cooling, and magnetic and electrical phenomena. Each day we thoroughly reviewed the simple yet profound experiment from the previous day. Each day was an opportunity to practice the process of thinking. The students' confidence in their ability to perceive even subtle phenomena grew. Like

Leonardo, they sought to observe what others might have overlooked. A highlight from the block occurred when a student attempted to attribute the movement and eventual dissipation of a drop of ink in a beaker to molecular movement.

Another student vehemently rejected her assertion declaring, "Don't you get it? We're supposed to figure this out for ourselves and not give an answer like a brainy scientist." The class subsequently went on to wrestle with the relationship between the movement of the ink and the quality of the water.

Another pivotal moment for me occurred when we explored electrical phenomena with a pith ball. Again, a simple everyday occurrence for Michiganders during the dry winter—static electricity—utterly captured their imaginations. How could rubbing a rod with a cloth bring about movement in a pith ball? They were fascinated, and many stayed in at recess to rub every possible pairing of materials together to test for this phenomenon. They made a chart of their findings. The next day they earnestly sought a pattern. What was the relationship? After much discussion a quiet child in the middle row said, "It seems like for this to occur man-made stuff like plastic works really well when rubbed closely with something else and then separated from it."

My class is now in seventh grade, and we've just begun our seventh grade physics block. When asked to share what they remembered from sixth grade, I was impressed by how confident they were when describing the phenomena we had experienced and the conclusions we had reached. They seem completely comfortable this year in approaching the new, confident in observing phenomena, and willing to think for themselves as they wrestle with concepts. When we reviewed the camera obscura, not a single one said anything about light beams. Instead, they immersed themselves in the wonder of the phenomenon and were delighted when they made the connection between the upside-down images they saw and the mirror experiments they had explored earlier.

So, Michael, Lyli, Gary, and Barbara, thank you for creating and teaching a course that has so greatly influenced my teaching. I've had science teacher training courses the past two summers in preparation for sixth and seventh grades, and these have provided ample experiment demon-

strations and suggestions. Neither course, however, formally addressed the epistemological importance of sense-based science teaching. I believe that, without your course, I would not have been able to guide my students from phenomena to conclusions reached by their own effort. I also doubt whether I would have been able to nurture their confidence in their own perceptions and to help them so readily to put aside materialistic models. From what I see in my students, I believe TSS has helped me to help them develop a meaningful connection to the natural world and a sincere desire to understand it through their own experience. I hope you can find some way of integrating your work into Waldorf teaching centers around the country.

I have just one more thing to share, and that's how TSS has affected me personally. Ever since that first experience we had of walking down to the pond to observe the rain on the sur-

face of the water, I've been different. My eyes had seen it before, my ears had heard it, my skin had felt it, my nose had smelled it, but until that moment, I had never known rain. That simple experience of sitting by a pond in the rain made me realize how we walk around in these bodies of ours with these amazing sense organs, yet we overlook and "underlook" all the time. "How many times must a man look up before he sees the sky?" Now when I go out into the world, I strive to seek that experience again—that meeting of the outer and inner world of my existence. I am forever delighted in observing phenomena—the sundogs around the sun, the antennae of a moth, the spirals of a spruce cone....

Thank you for enlivening my teaching and thank you for enriching my living.

