

Seeing in Physics and Chemistry

Grades School Science Training for Waldorf School Teachers

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In true perception – nothing
No thing is present
Present to the possibility of sensation
Sensation that requires inner awareness
Awareness that yields subtle understanding
Understanding that knows relationship
Relationship is the world.

A world that requires inner participation.

– Michael D'Aleo

What Is Being Asked of You

Science teaching needs ... a combination of kindling the sparks of imagination, quieting the soul ... and presenting intellectual material so that intuitive truths can be experienced. When we do this we attend to both content and character. We help students move from apathy to wonder, from wonder to knowing, and from knowing to gratitude.

– David Mitchell, *The Wonders of Waldorf Chemistry*

Twelve years ago, I attended a weekend workshop on the essence of teaching physics and chemistry to Waldorf upper elementary school students, led by Michael D'Aleo at the Lexington Waldorf School. He signed his book, *Sensible Physics Teaching*, which I had purchased that weekend, and asked if I would be interested in taking a course he was developing, along with Gary Banks, Lylli Anthon, and Barbara Richardson. Two years later, the first Teaching Sensible Science (TSS) course for Waldorf teachers began in 2006, sponsored by the Saratoga Natural Science Research Institute (SENSRI) and the Research Institute for Waldorf Education (RIWE). At that time I was teaching fourth grade at the Meadowbrook Waldorf School and could think

only of how necessary this course would be to me, an English Literature major, in order to teach the sciences in a true, meaningful, and appropriate way during the sixth, seventh, and eighth grades. I was inspired to take this new course, as was my colleague, Judie Sky, who joined me for the inaugural session. We were so moved by our first class that we began a “teachers-teaching-teachers” session once a month on Tuesdays to share what we had learned. We brought the methods and techniques of this phenomenological science to our students with as much enthusiasm as they had been brought to us by Michael, Lylli, and Gary.

This past year, Michael D'Aleo came to speak to the faculty and parents of the Waldorf School of Garden City, where now I am a class teacher. Ten years have passed since my taking the TSS course. Michael spoke to the faculty at an entirely new level regarding phenomenological science. Again, I was inspired. What was I hearing now? I spoke to Michael after the lecture and asked him how the science course had developed since the time I had taken it. Needless to say, after listening to Michael's lecture to faculty, and then later to parents, it was evident to me that it was time for me to refresh and develop further what I had learned through my first experience of the TSS course.

So, there I found myself in the 2016 TSS course, hosted this time by the River Valley Waldorf School in eastern Pennsylvania. One of the main developments I found in this year's course was the enhanced use of Socratic dialogue. The daily activity of living into the phenomena before us, of using our thinking and feeling actively, enlivened these forces within us. This was evident in our dedication to pulling out of ourselves both what each of us was seeing and

what language we could agree on to describe what we were seeing. Out of this consistent work, with Michael continually asking us questions about what we were seeing and describing, our own thinking opened to the natural world and its life forces. It was as if we became the phenomena themselves, actively empathic to their existence, and as a result, coming to understand them deeply. We were fully living with the questions “What is the truth of what I see before me?” and “How true is my language, am I, to what is before me?” This experience was completely transforming.

The course was divided into three sessions, each focused separately on grade, 6th, 7th, and 8th grade physics and chemistry, with some months in between to practice the ideas developed in each session. We presented experiments to each other, then wrote these up with the developmental phases of the students in mind. We struggled to be clear and precise in our descriptions, speaking out of what we were actually seeing rather than from what we thought we might be seeing. Interspersed with this work was the practice of eurythmy with Barbara Richardson, who provided the foundation from which Michael, Lylli, and Gary worked to integrate science and art in a single unified experience.

The hands-on work of this TSS course allowed us to see the nuances of how an experiment can be successfully presented. For instance, the seventh grade physics experiment of taping a long string to the center of a mirror, pulling it taut at different angles, and looking into the line of vision could have easily gone awry without the aid of the course. It helped us develop language that avoided the dead, materialistic concepts presented in textbooks. When later I put the principles taught in the TSS course into action in the classroom, I found the students enthralled by both the experiments and the subsequent conversations. A particularly important experiment—the “camera obscura”—engaged my students deeply in an experience starting with absolute darkness in which nothing could

be seen until a pinhole punctured in the window shade immediately lightened a white sheet placed in front of them. Inevitably resounding in the room was “I love physics!” Because of the length of time between each of the 6th, 7th, and 8th grades sessions, we were able to put what we had learned into practice and then bring our experiences back to the course for sharing and review.

Setting up the conditions for the students to experience the phenomenological truth is fundamental to the teaching of the sciences. Through this Teaching Sensible Science course, we have come to see that this practice of both observation and language usage is critical to the outcome. The combination of how we elicit from the students what they see and how they write about what they see was taken to a new level of understanding based on the activity of both the course presenters and the participants in the course. Practicing precise language in our course dialogues gave us the tools to learn how to lead the students through the ensuing stages of writing their main lesson books: the steps we took, what we did, what we saw, where we see this in life, what phenomena we could identify that had specific patterns, and what truth could be stated about these patterns. We engaged our life forces heartily and our enthusiasm endearingly to come to consensus about the Truth before us, putting ourselves entirely in the shoes of the students as they would come newly to this practice.

Articulating these stages stirred my own capacity to engage in a true science, one that is actively asking for my presence, for my releasing of abstractions and old thoughts, for my confidence and inspiration, and for my looking with new eyes, new speech, and new ears. If I am interacting in this way and practicing this seeing and listening, then I am a living and active teacher, which is what is asked of us as Waldorf teachers. Being in this TSS course ten years ago had already opened me to science in a new way, but now, ten years later, it opened new capacities

in me that are transforming my thinking and how I relate to the world.

The TSS course not only provided the foundation and capacities for teaching physics and chemistry, but also enhanced other areas of a Waldorf teacher. That same conscious seeing and use of language in our science experiments can be applied in the social realm as well. Child Study, faculty discussions, and decision-making are but a few of the areas where this phenomenologically active and engaging thinking can create clarity and where together, through the commitment to come toward the truth, the human being, the child before us, and the content needed to make a decision can each be enlivened. Courage is basic, imagination is fundamental, and enthusiasm underlies it all.

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