October Newsletter | 2013

SAN FRANCISCO WALDORF SCHOOL

Using Art to Teach Chemistry in a Waldorf High School

Caroline Alba, SFWHS Chemistry Teacher

When I introduce myself as a Chemistry teacher, I typically get two reactions: "Oh, I failed chemistry in High School" or "I loved chemistry: I was really good at balancing equations!" My own answer would be more like "I hated chemistry but was very good at balancing equations!" What is it about chemistry, or rather about the way chemistry is traditionally taught that generates these reactions?

Piaget observed that to learn, students need to engage with the material through four stages: the concrete, semi-concrete, semi-abstract and abstract. Yet often a typical chemistry lab is at best semi-concrete and often semi-abstract.

Ira Remsen, who founded the Department of Chemistry at John Hopkins University in the late 19th century, describes this problem:

"While reading a textbook of chemistry I came upon the statement, ***Nitric acid acts upon copper.*** *I was getting tired of reading such absurd stuff and I was determined to see what this meant……. I put one of the few copper cents then in my possession on the table, opened the bottle marked nitric acid, poured some of the*

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How to Make a Zinc Etching by Claire Carges

Candle Flame by Sofie Harriman

Integrating Art and Science in 7th Grade Chemistry

Tamar Resnick, Grade 7 Class Teacher

Starting the Seventh Grade year with the study of combustion, during the first chemistry block, is an excellent way to capture the attention of twelve and thirteen year olds. Every Waldorf grade school student is familiar with that homely object, the candle. The sweet smell of melting beeswax, the warm golden glow of the flame, the flowing, twisting, upward curl of the "smoke fairies" rising from beneath the candle snuffer, are an integral part of the sensory experience in a Waldorf classroom. However familiar candles may be, how many students have spent time closely observing a candle flame, and how many can describe the colors and behavior of that flame? What better way to train the powers of observation than by asking students to observe and draw a candle flame, as precisely as possible, with colored pencils. (Objective observation is an antidote for the emotional roller coaster ride of seventh grade.) When we made these drawings, students were surprised to notice that the outer edge and point of the flame is a more radiant orange than the interior yellow, and that the bottom of the flame, closest to the wick, is dark and blue. Beautiful, precise drawings of a candle and its flame became part of the the chemistry main lesson books, along

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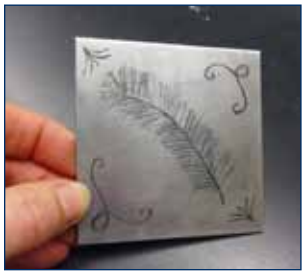
liquid on the copper and prepared to make an observation. A green-blue liquid foamed and fumed over the cent and over the table. The air in the neighborhood of the performance became colored dark red. A great colored cloud arose. This was disagreeable and suffocating".

The related equation is found in any chemistry textbook:
Cu(s) + 4HNO3(aq) → Cu(NO3)2(aq) + 2NO2(g) + 2H2O(l).

But it is hard to understand from this equation that "nitric acid acts upon copper".

My job as a chemistry teacher is to bring the students to a level of abstraction that will allow them to picture the penny, the blue green foam, and the suffocating dark red gas as they read the equation and to write the equation when they observe the reaction. I try to engage the four stages of learning in my labs. For example, in 10th Grade Inorganic Chemistry I have designed the following lab that teaches oxidation and reduction:



1. **Concrete level:** The students draw with a needle on to a zinc plate that has been covered with an acid resistant ground. When the plate is immersed in acid, the bare metal exposed by the lines of the drawing, is eroded. The depth of the 'etch' is controlled by the amount of time the acid is allowed to `bite' the metal. The students then make a paper print of the design.

2. **Semi-concrete level:** The students perform a lab where they test which acid (including water) will dissolve which metals. They then refer back to their etching: What metal did they use, what acid did they use? Could they have chosen a different acid or metal? What were the bubbles they observed?

3. **Semi-abstract level:** Using their results, they add the acids on the metal reactivity chart that they had constructed in an earlier lab.

4. **Abstract level:** Students use their table to predict the results of experiments they have not performed and understand how this table can be expanded and used.

Finally, the students are asked to present their thought process in an artistic way.

Occasionally, some of my most academically inclined students complain that it is not fair to be graded on an artistic assignment in a chemistry class. However, artistic integration important for two reasons.

First, from the point of view of the student, the artistic representation can be a great studying tool. As one student notes, "Chemistry is one of my favorite classes because even though it is a complicated subject the experiments, projects, and practical arts really do make the class easier to understand."

Second, and most important, Rudolf Steiner, the founder of Waldorf Education, wrote that humanity needs to develop, in addition to intellectual intelligence, what he termed a "spiritual" intelligence. Artwork is that deeper level made visible by the artist to the observer. Steiner pointed to the need to balance the intellect with these other aspects of ourselves and we certainly see that need manifested in today's students. Therefore artistic activities incorporated into intellectual ones have the potential, in addition to being a great way to study and absorb material, to allow for the possibility of this other intelligence.

From the High School Parent Council

The mission of the Parent Council (PC) is to strengthen Waldorf's parent-to-parent network, facilitate communication between parents and the administration, provide support for student activities, and create opportunities for parent education.

The PC leadership and steering committee is comprised of at least two parents per class. We meet monthly with each other and with the high school administration. We have an all-parents general meeting at least once a year. Some of our current projects include: increasing high school involvement in Spring Night; organizing a staff appreciation event; exploring the creation of a "parent portal" on the school website; and working jointly with the grade school Parent Association to discuss school-wide issues.

Please reach out and let us know if you have an issue you'd like us to discuss, or want to get involved!

Parent Council Representatives:
12th Grade: Marilyn Chism and Martha Luna

11th Grade: Jim Stearns, Lorraine Woodruff-Long, and Margaret Grisz-Dow

10th Grade: Karen Staller and Tammy McMillen

9th Grade: Margo Engels and Jen Wallace

Winter HS Block Schedule

October 21 - November15

9th Grade	Revolutions/Geology
10th Grade	Classical World Lit/Embryology
11th Grade	Chemistry III/Projective Geometry
12th Grade	History of Architecture/Optics

November 18 - December 16

9th Grade	Geology/Revolutions
10th Grade	Embryology/Classical World Lit
11th Grade	Parzifal/Chemistry III
12th Grade	Optics/Faust

High School Steering Report (HSSC)

The High School Steering Committee holds the broad perspective on pedagogical activities at SFWHS. This work often begins in a Steering conversation, filters out to either the full faculty or a task group for input, and then comes back to Steering for a final decision. This year, we have focused on formalizing the Professional Development Committee, a committee that ensures that processes are in place to allow regular education, mentoring and evaluation of our teachers. Also this fall, the HS Steering crafted a proposal (approved by faculty on October 9) to make course material available online, and we are in the implementation phase of this project. There are also always the ongoing scheduling questions that Steering addresses, including so far this year, rescheduling the 9th grade trip, finding a new graduation venue, and envisioning a Senior Project festival weekend (March 21-23, 2014). Upcoming topics for HS Steering Committee discussion include the role of the Academic Advisor, a review of our Community Service Program, and a review of the Individual Learning Committee (ILC)' s support and procedures at the high school.

From the Grade School Parents Association

** New this year ** Special Guest Speaker series! We start off each monthly meeting with an exceptional guest speaker on a topic of great interest to the community. Upcoming agendas and minutes for prior meetings are available in the weekly bulletin. Hard copies available in the office. Prior special guest Speakers:

In September, Craig Appel, president of the Board of Trustees, met with parents to discuss the new governance framework, including the role of the newly formed Administrative Council. The October meeting featured Judith Kutney, Educational Support Director, who discussed milestone testing and also protocols for students who need additional academic support.

Upcoming special guest speakers: November 6th: Sheila Schroeder, parent and member of the Boardof Trustees Finance Committee, and Gerhard Engels, Finance Manager and Administrative Council member, will discuss the school budget in layman's terms. Included in this discussion will be the financial health of the school, tuition, and future directions. December 11th: TBA. January: Dagmar Eisel, Co-Chair College of Teachers, will answer all your questions on what is the College of Teachers in a Waldorf school and its role in our community.

Please send a note to sfwspa@sfwaldorf.org for speaker suggestions. We hope to see you soon!

Upcoming GS Block Schedule

1st Grade	Langauge Arts - Fairy Tales
2nd Grade	People of Virture & Cursive Writing
3rd Grade	Math - Liquid/Volume Measurements
4th Grade	Animal Stories - The Human Being & Animal
5th Grade	Ancient Civilizations - *Gilgamesh*
6th Grade	Geometry
7th Grade	Physiology - Digesgtive, Respiratory, Circulatory, and Reproductive Systems
8th Grade	Meteorology

Grade School Steering Report (GSSC)

As August came to a close, the classrooms suddenly filled with the energy and enthusiasm of our students. Since the first days of school the days and weeks have passed quickly and suddenly we feel the first autumn chill. Throughout the school year the Grade School Steering Committee (GSSC) meets every Thursday afternoon afterschool to hold the pedagogical working of the school. The current members include: Mary Barhydt, Diane David, Dagmar Eisele, Corinne Fendell, Monique Grund, Laurence Jaquet, Erin Kemp, Karen Nelson, Tamar Resnick, and Lisa Sargent. The GSSC will expand in December when new members are set to join. As we find ourselves fully immersed in the school year, some of the tasks the GSSC has been undertaking include organizing opportunities for teachers to receive professional development, and visits from mentors like Eugene Schwartz, Susan Goldstein and Johanna Steegmans. The GSSC is also shepherding the expansion of the nursery program due to be completed in early 2014. Some of the items under discussion include: establishing budget priorities for the next school year; reviewing personnel policies and procedures; and developing communication protocols. We are also working to finalize the Discipline and Media Policies.

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with many other drawings that illustrated the transformation that occurs during the process of combustion.

Lab Drawing by Sarah Cuyler

The seventh grade students observed many objects being burned, some brought from home: steel wool (like a 4th of July sparkler), feathers (peuuw!) a ping bong ball (ignites with a great whoosh, big flame), a small bonfire, metal salts, and many candles. Over time, with careful observation, they discovered lawfulness in the combustion process: smoke moves upward, ash falls downward. Another experiment: Place a different substance on each of the four corners of a metal plate (a lump of sulfur, a tiny piece of magnesium tape, match heads and headless match sticks). Hold a blow torch under the center of the metal plate and observe the order in which each substance ignites, the color of the flame and smoke, and the nature of the ash. A conclusion was developed: a substance must be heated until it reaches its "kindling temperature" in order for it to burn. There were other laws discovered while burning candles under different conditions: Light a candle, invert a jar over it and observe the flame grow smaller and smaller until it winks out and smoke fills the jar. Conclusion: Fire uses up air. Take the same jar that had been inverted over the first candle, and gently lift it and place it over a second lit candle and the flame immediately dies. The "used-up air" remained in the jar. Conclusion: Fire needs air to burn. Without air fire cannot exist. From those experiments the students determined that there are three conditions necessary for a fire to burn: air, fuel (substance to burn), and kindling temperature (spark or fire). Remove any one and the fire cannot burn. The seventh grade students then immersed themselves in the colors of combustion by painting a picture of a lively bonfire.

The arts of speech and poetry also enlivened the study of combustion. Students were asked to recall stories from their study of ancient civilizations in fifth grade, and were given a verse from the Vedas about Agni, the Indian God of Fire, to learn by heart and to illustrate. In sixth grade eurythmy class they had moved to a poem about flint during the mineralogy block. Now they were given the poem to learn, because flint is not just a rock – it "holds fire." Finally, each student was asked to write a poem about fire. Laughter, applause, and appreciative "ohh's" filled the room when the poems were read. The seventh graders thinking had been kindled as they learned about the lawfulness of combustion and the great transformation of substance and they had been warmed and touched by the inner transformation that occurs through artistic activity.

Fire by Tallulah Taylor

Alumni Corner

Alumni Profile

Joseph Lacap graduated from SFWHS in 2010 already knowing that he wanted to major in physics in college. Learning how the universe works has always been enjoyable for him and he loves knowing how and why things he uses in his daily life operate. He is currently studying at Beloit College in Wisconsin and is in his senior year. One of his main reasons for choosing Beloit was the excellent staff in the physics department. Last summer he did research at Bucknell University under the NSF's REU (Research Experience for Undergraduates) on the effect of biogenic atmospheric aerosols (not the stuff in cans) on cold formation with the goal of improving data used in climate models. After graduating from Beloit, he is continuing on to graduate school to focus on mechanical or electrical engineering.

The following is a letter that he wrote in response to last months article about teaching physics in a Waldorf high school by Dr. Paolo Carini.

Dear Dr. Carini,

It's been a long time, and after reading your article in the school newsletter I thought I'd send you an update. It's not often I read the newsletter, usually being too preoccupied to bother. This time, a few hours after I out of hand deleted the email, my mother sent it to me again, telling me that I really should read it this time because you had written an article about physics (what else?). So I went back and read it, and I'm glad I did.

Photo Credit: Joe Lacap

The first thing I saw was a picture almost identical to one I had taken in optics with you of a laser beam reflecting off the surface of the water in a fish tank, an experiment that I recently replicated in an optics class (without a fish tank though). As I read through your article, I was reminded of how useful your method of teaching has been for me. The basic understanding of mechanics, E&M, relativity and optics I learned in your classes has made physics in college much easier and more pleasant. When I hear Waldorf being accused of not preparing students for science in college, I'm bewildered why people think this is so. That understanding was by far more valuable than throwing equations and numbers at us. This was especially evident in my intro physics classes in college, where many students were swimming in 'alphabet soup' and unable to distil problems to their core, then search for a relevant equation.

While this is not as pronounced in advanced classes, probably because by then the class is self-selected to those who are good at/interested in physics, I can still see a difference in my level of understanding the concepts. It is not uncommon for me to be called upon to make sense of an expression or translate it into "what's actually happening?" The biggest advantages of Waldorf's approach to science for me have been that it I can step back, look at the problem, and determine if what I'm doing makes sense, and when I get to an answer, estimate if it's reasonable. For example, a group of us were recently doing a problem calculating the number of microstates of a system with 5 particles and 7 units of energy. The student writing on the board made a simple mistake of swapping the 5 and 7, resulting in us getting several thousand ways to organize the particles in a particular configuration. Everyone went along with this for a while, until I pointed out that there couldn't possibly be that many microstates, so then we looked back and saw the error.

I've stuck with physics, and anticipate graduating in the spring as a physics major, and hopefully going on to mechanical or electrical engineering school afterwards. Without your method of teaching science, I don't think I would have been inspired enough to take physics in college, especially when I compare my high school experience to my friends who went to public schools. So not only does Waldorf prepare students to do science in college, it does it in a much better, maybe the best way, through experiment and retracing the steps of the founders of the discipline.

Thanks for being a great teacher.

Alumni Updates

Michael Beleson (Class of 2012) is the student manager of the University of Washington basketball team and a member of the Phi Kappa Alpha fraternity. He is an engineering major and was accepted into the Mechanical Engineering program this summer. He is excited because "I've always been good at physics and math so I thought it would be a good program for me."

Austin Fusco (Class of 2012) is on the club baseball team at Seattle University where he is studying Business and Econ. He spent the summer working at Beerworks in Mill Valley, starting out as a dishwasher and moving to prep cook. "I've learned a lot about cooking and what it takes to run a restaurant and business in general." After he is out of school, Austin wants to start a tech investment company.

Mayela Gutknecht (GS Class of 1994) graduated from University of California, San Francisco in June 2013 with a Masters in Nursing in Advanced Public Health. She works as Public Health Nurse in Sonoma County and is actively involved in organizing Adelante!, a community health event taking place in January in the Mission.

Victoria Lowell (Class of 2009) will graduate from Wentworth Institute of Technology (in Boston, MA) with a Masters in Architecture in April 2014. She is currently working on her Thesis and recently discovered that her advisor was a Waldorf teacher in Lexington, MA, and his daughter goes to the Waldorf school there. "It is always fun to see how Waldorf is connected, and how we could instantly start talking everything Waldorf!"

Victoria Lowell

We love updates!

Send in your updates or find out more about our alumni program at www.sfwaldorf.org/alumni or contact Seraph White at swhite@sfwaldorf.org.

In Memorium

Roxanne Spring

May 26, 1958 - September 28, 2013

Former parent, teacher, & friend.

A Magic Lantern Beneath the Sea

by Michael Garrett

The Magic Lantern Marionette Theater debuted *The Mermaid Princess* on September, 22. The original story, written by Kindergarten teacher Monique Grund involves a fearsome octopus who, captivated by the Mermaid Princess' singing abducts her, and keeps her prisoner in his secret cave. The resolution offers a lesson for young viewers about sharing and fellowship.

"The fairy tale represents, symbolically, what we are as a human being" explains Monique. "Although there are many characters it deals with one human soul." As a child she was captivated by puppet shows; the goodness and kindness played out in these stories kindled in her a life long love of the art. Visible stories, with beautifully costumed characters, provide a portal for the children into a state of dream consciousness, serving as an anodyne to the constant tugging of the adult world. What is revealed on stage in these tales are the human being's inner qualities.

So why this challenging under sea adventure? Monique's Bay Area kindergartners live by the sea. The sea creatures — the crab, the turtle, the dolphins and the whale are familiar to them. They are the subjects of the children's daily conversation. *The Mermaid Princess* honors this unique place by anchoring the story in these familiar characters and settings.

Michael, theatrical lighting and scene designer, is a founding member of The Magic Lantern Marionette Theater..

Outdoor Classroom: 8th Grade at The Headwaters School

The thirteenth and fourteenth years of a child's life are a time of rich transition. Rudolf Steiner wrote about the changes at this stage; we also know that many cultures celebrate rites of passage to mark the inner transition. Developmentally, this is an age when students are moving from the immersive and feeling-oriented phase of childhood to the self-aware thinking that comes with young adulthood. Finding ways to mark this inner transition can be impactful and powerful for a young teenager.

This September, the Eighth Grade sspent four nights at The Headwaters School near Mt. Shasta. The students engaged had many memorable experiences that meet this particular developmental moment: night sits, sweat lodge, nature crafts, shelter building, medicine stick carving, fire building (without matches!), and nature stories.

Even though most of these students have been engaging nature their whole lives, these activities brought at thismoment them new appreciation for the natural world and their community. Upon their return they wrote of their experiences:

"Thank you for sharing your wonderful land with us. I especially enjoyed learning how to make fire without matches. I also like learning about nature camouflage and sitting out at night all by myself."

"Among the many activities we did, the sweat lodge was my favorite. I liked it so much because of how our class bonded to support each other. I also enjoyed how every evening we sat around the fire describing our feelings about the experiences we had had that day."

"I want to come back with my family some time. The sweat lodge was very challenging but I told myself I could do it and then I loved it."

"You helped me realize how important it is to fight and care for Nature and that is a lesson I will never forget."

Photos: Matt Hart

Fund-A-Need Gets Results!

We would like to thank everyone in the community who gave generously to Fund-A-Need last year at Spring Night. This funding enabled the school to complete needed renovation and beautification projects at both the Grade School and High School. If you haven't seen the results yet, feel free to stop by either campus for a look.

This work would not have been possible without the additional assistance of parents who provided their time and services. If you have a project that needs care and attention, consider using the services of these great parents in our Professional Directory (www.sfwaldorf.org/sfwspd)!

Grade School Project: Marc Ojanen (Architectural and Design Services), Sara Fusco (Interior Design), Adam Vanderwaard (Cabinet Construction), and Peter Carlstrom (Woodworking and Design) **High School Project:** David Bushnell (Architectural and Design Services), Noor Adabachi (Woodworking and Design)

SFWHS Varsity Volleyball Team

High School Athletics Program

Daily Schedules and Games:

SFWHS Facebook Page
sfwaldorf.org/athletics/daily-updates
or the Sports Hotline (415) 213-6197

Show your school spirit,
Wear your school colors to a game!

Public Events Coming Up

Saturday, November 2	**World Cafe** hs campus
Friday, November 8	**Dads' Night** Elks Club
Saturday, November 9	**Harvest Dance** gs campus
Sunday, November 10	**Golf Benefit** Presidio Golf Course
November 14-16	**Antigone** Brava Theater
Friday, December 6	**HS Winter Concert** Annunciation Cathedral
Sunday, December 8	**Winter Fair** gs campus
Friday, December 20	**Alumni Holiday Reuion** hs campus
January 28 & 29	**Eurythmy Troupe Performance** JCCSF

Visit our online calendars and news pages at www.sfwaldorf.org for more details about events.

San Francisco Waldorf School Celebrates Fall

Clockwise from left: Stern Grove All School Assembly (Games, Grade 5, Games, Grade 11, The Dragon, Grade 9); Sukkot, Grade 3; HS Soccer, Shun Takahashi; Hill of the Hawk Farm, Grade 4; St. George & the Dragon, Grade 2.

Photo Credits: Mona Nemetz, Aldyn Markle, Bryan Anderson, Jan Hammock, & Candace Tam