the brain learns, Doug showed that there is a lot of debate about how best to address differences in students and he wondered if the emphasis on gender differences might be missing an underlying cause. Some students are comfortable dealing with two-dimensional representations of concepts. These students are generally good at reading and writing. Others are better thinking in three-dimensions and are "good with their hands." They are comfortable building things, moving around the room, using lab equipment and understand things best when they can see and manipulate objects. He concluded that using Piaget's approach might be the simplest and most practical way to distinguish between these general types of learners in a classroom setting.

A series of demos and experiments were given and he explained how to classify students into two- or three-dimensional thinkers by their reaction to those activities. Specific techniques were suggested in order to help the students develop both methods of thinking by assigning individual students different types of tasks while performing common experiments. He also suggested that since students come to school to gain new perspectives, it is important for them to try to learn new ways of doing things or at least to notice that there are other ways of thinking and doing things around us that are equally valuable. Too often, the 2-D thinkers have academic success while the 3-D thinkers become frustrated.

He pointed out that science classrooms are often the only sites in school where both two-dimensional activities (reading, writing, calculating, etc.) and three-dimensional activities (manipulating equipment, measuring masses and volumes, etc.) can have equal status. This explains why having students actually DO experiments is such an important practice. He urged us to organize our lessons so students who work best by thinking in three-dimensions are not disadvantaged by our dependence on two-dimensional "paper" activities.

For more information, visit Doug's website, *www.magma.ca/~dougdela*, and click on the ChemEd 2005 conference link.

Creative chemistry from Kansas City

Presenter: Rhonda Reist, Olathe North High School, Kansas
rreiston@olatheschools.com

Rhonda shared several dynamic glowing demos with us. She prepared a photography demonstration based on the photo-chemistry of silver halide salts. It had to stay under the sunlight for 20 minutes; after washing the results in the dark, she showed us, in the light, a blueprint of a picture she had previously taken. She suggested that this demo could be used in discussing the oxidation state of iron, or internet research on "Cyanotype", etc.

Next, she put three polystyrene foam cups with a little water into a pressure cooker and heated them for 10 minutes. When it was opened everything had shrunk. She showed us other materials that she had shrunk — a polystyrene head and a cooler. She suggested that this activity could be used to explain that polystyrene foam is actually filled with a gas that escaped when heated to a high temperature under pressure.

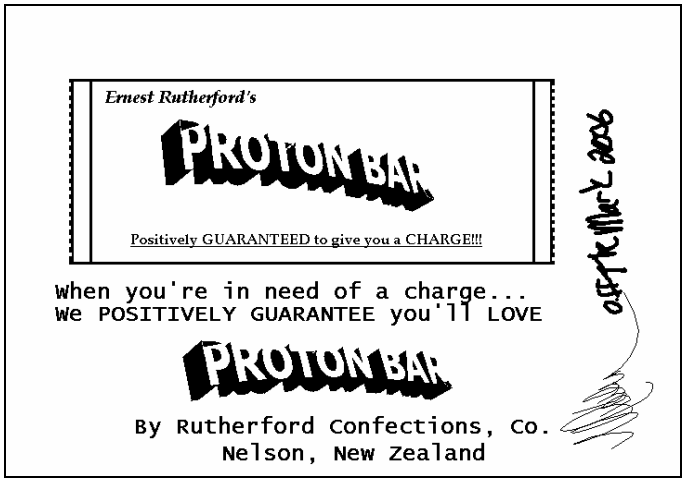
A small amount of liquid nitrogen was placed into a blue (painted with latex paint) polystyrene cup and the cup was then placed into a vacuum chamber. After the vacuum pump was turned on the liquid nitrogen boiled briefly and then solidified into a fluffy white mass of solid nitrogen (bp -195.8^{o}C, mp -209.9^{o}C). It was suggested that the demo could be used to discuss triple point, critical point, normal boiling point, normal melting point, Boyle's law, change in temperature and pressure.

She also shared that she had had very good results by asking students to "draw out" or "cartoon" the lab procedure. The students rebelled at first but their good results convinced them to do it again.

The demo that kindled her passion for chemistry when she was only a teenager was the instant light. Flinn Scientific sells it as a kit. It is an easy chemiluminescence demonstration.

Rhonda's last demo was called "Liquid Lightning Bug". Three liquids, two clear and one green, are mixed in a beaker. The color of the liquid begins to oscillate between orange and green with a period of about 10 seconds. When the room is darkened and a black light is shone on the container, the solution oscillated between dark and emitting a bright orange glow! The oscillations will continue for up to 3 hours. It is incredibly cool! The details are available from Rhonda, at her e-mail address (given above. ■

Off the Mark



Thanks to Mark Rosengarten,
Washingtonville High School, Washingtonville NY