

# *Fiery Chemistry Captivates Students At Bainbridge High & Middle Schools*

Among the several road trips Bainbridge College Assistant Professor of Chemistry Eric Dueno made in the 2009-10 academic year to inspire students with the joy of science were special presentations at Bainbridge High School and at Bainbridge Middle School.



Assisting with experiments in Margie Nour's BHS chemistry class were Dr. Stephen Gibbs, BC laboratory assistant who holds a Ph.D. in chemical engineering from the University of Wisconsin- Madison, and Col. Hector Dueno, Dr. Dueno's father who sparked his interest in chemistry. Dr. Gibbs also assisted with the BMS presentations in two of Michelle Hufstetler's seventh grade classes.

BHS students watched intently as Dr. Gibbs created a miniature Hindenburg by generating hydrogen gas from aluminum and sodium hydroxide that he put into a flask. He placed a balloon over the flask and the hydrogen gas evolved and filled the balloon. Then he carefully held the balloon over a candle (*photo above*) to show how hydrogen gas reacts with flame. The students were amazed at the intense fireball from such a small object.

Dr. Dueno, who holds a Ph.D. in synthetic organic chemistry from the University of South Florida and has authored more than 30 scientific publications, began the BHS demonstration by igniting a small amount of isopropyl alcohol in a 5-gallon plastic jug.

“Ignited alcohol produces a tremendous flame, much like a jet engine,” he said, noting that a loud whistling noise is produced as the reaction proceeds to completion. The flame and noise grabbed the students’ attention.



Their amazement and interaction with the three presenters continued as Col. Dueno, US Army retired, demonstrated the properties of a salt solution conducting electricity. He began the demo with a beaker of distilled water into which he placed the cord of an open-circuit light bulb. When he plugged in the light bulb cord the bulb did not light. When he added table salt (sodium chloride) to the water the sodium ions completed the circuit and the bulb began to glow.

By mixing chemicals, Dr. Gibbs also showed how fireflies glow. “The chemical reaction is similar to the one seen in nature by lightning bugs and produced the characteristic glow we see on warm summer nights,” Dr. Dueno said of Gibbs’ demonstration.

Then Dr. Dueno showed the activity series for metals by burning a small strip of magnesium metal. He explained that, when burned, different metals produce different colors.

The BHS students crowded closely near the fume hood to see the action as he presented a demonstration of the varying amounts of copper in pennies. He explained that pennies minted after 1981 have a zinc core with a copper coating.

Eight pennies, four minted before 1981 and four after, were placed in flasks to which he added nitric acid. The pennies with high copper content reacted only slightly with the acid, but the acid consumed the copper-coated pennies, leaving only a blue-colored solution.

Dr. Dueno then neutralized the solution and recovered the pure copper pennies for the students to inspect.

**Photos and Information about the Presenters Below**

Before joining the Bainbridge College Arts and Sciences Division, Dr. Dueno served on the faculty at Eastern Kentucky University in Richmond, KY.



Col. Dueno (*below*), who holds a master's degree in education from Georgia State University, served 27 years in the US Army, including two tours of duty in Viet Nam.



Dr. Gibbs (*below pouring chemical*), who has conducted research in the United Kingdom at the Cambridge laboratory of the late Professor Laurance Hall, a world expert on magnetic resonance imaging, served as a faculty member at Florida State University before coming to BC.

