BIODIESEL CURRICULUM

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BACKGROUND

- Heritage High School – Rockdale Co. Georgia
- Teach AP Chemistry, AP Environmental Science, and Honors Chemistry
- Science department co-chair
- Certified Biofuels Educator thorough the American Biofuels Council

TIMELINE

- Personal interest and use of biodiesel about 10 years ago
- 2004-2005 students started researching how to convert a car to run on vegetable oil
- Summer of 2005, 2006, 2007 part of GIFT program at University of Georgia

TIMELINE

- Fall 2005 participated in Agriculture & Energy Tour of the West/Midwest with dignitaries from Georgia
- Fall 2006 given Learn and Serve Grant from Georgia DOE
- Wrote curricula for chemistry class
- Continue to use curricula every year
- Now travel the state teaching workshops for teachers and students

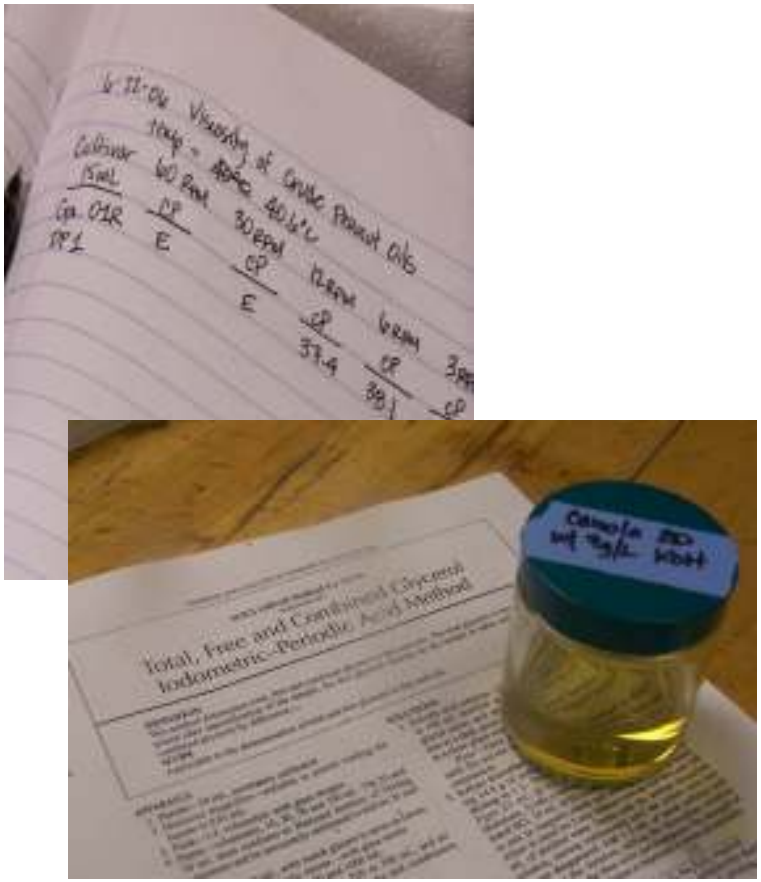
GIFT PROGRAM

- Researched biodiesel at University of Georgia
- Worked with Dan Geller in Engineering
- Looked at biodiesel feedstocks, properties, quality and engine testing

LEARN & SERVE GRANT

- Helped provide funding for equipment and lesson development
- Many teachers of different subjects involved
- Laid the foundation to research biofuels all year long
- Projects culminated in a Biofuels Expo to educate the community

LESSON OVERVIEW



- Have one lesson for every chapter in chemistry book
- Joint projects with other classes
- Spend time talking about engines and what fuels they use
- Directed study students doing research
- Lessons culminate in our annual Expo

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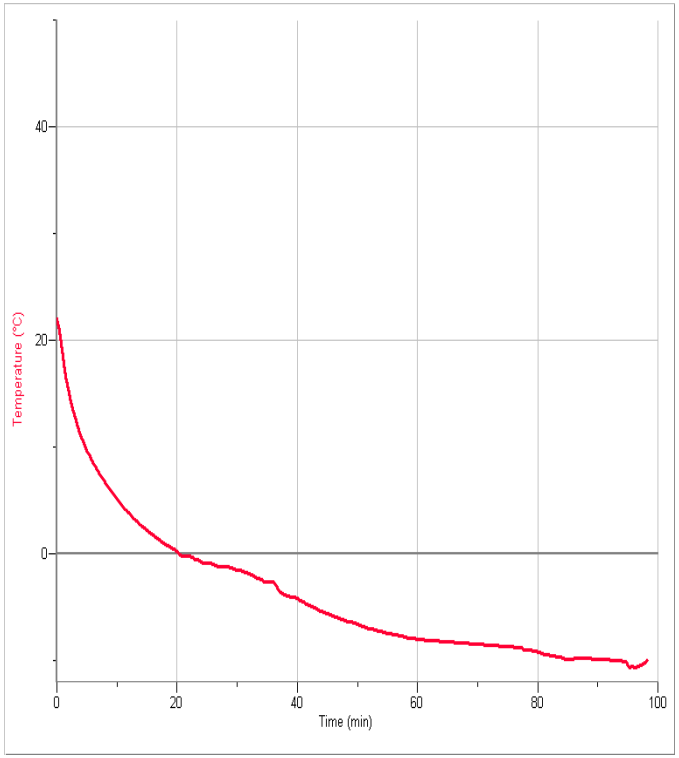
HONORS CHEMISTRY

- Make biodiesel, calculate limiting reactants, relate to equilibrium
- Test properties of the biodiesel, relate to intermolecular forces
- Make blends, relate to specific gravities and colligative properties
- Heat content of biodiesel

PROPERTIES TESTING



- Density/Specific Gravity
- Freezing Point
- Solvent Properties
- Viscosity
- Use probe-ware when possible

DIRECTED STUDY RESEARCH

- Research making biodiesel from different feedstocks – learning organic chemistry through the process
- Testing the glycerin content of biodiesel for quality
- Science fair projects relating the iodine value of vegetable oils with the emissions

EXTENSIONS BEYOND SCIENCE CLASS

- Several classes were involved in preparing for biofuels expo
- Students in both pre-engineering and chemistry built a biodiesel reactor from a water heater
- Language Arts classes created information brochures on biofuels
- Science, Technology & Society classes researched hydrogen fuel
- Drama classes created a skit
- Video production documented all projects and created a DVD

EXTENSIONS

- Part of the grant money used to convert Mercedes to run straight vegetable oil
- Engine from the Mercedes is now at Rockdale Career Academy taking on a 'new life'
- Students taking chemistry and automotive technology classes work as project leaders

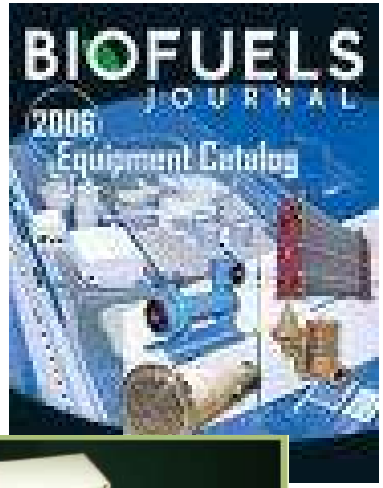
ETHANOL PROJECTS

ETHANOL PROJECTS

POSITIVE RESULTS

- Students have a sense of real-life examples of science, engineering and technology
- Students can become productive members of society
- Side note: was able to work with a former student as a peer during the summer at UGA

RESOURCES

- egawron@rockdale.k12.ga.us
- http://www.teachbiofuels.org

- http://www.biodiesel.org
- http://www.b100supply.com
- Biofuels Journal
- Soy Biodiesel Kit from biodiesel.org