

**WPAFB
Educational
Outreach Office**

W.O.W! Words

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INSIDE THIS ISSUE:

Pumpkin Science

W.O.W! News	2
Lab TV	3
What's New	3
Wiz Stuff	2
Wizard Spotlight	2
DIY Science	4
Job Shadow Highlights	3

Special points of interest:

- Looking for a GREAT resource? Tune into LabTV
- Updated Website!
- Fall Job Shadow a Success!

Next Newsletter—
January 1, 2011

Pumpkins are fun! Their size, color, smell and taste make them perfect for student observation and exploration. Whether it's a self carving, glow in the dark, or puking pumpkin they are just plain fun! This is the time to get your pumpkins for pennies. Lucky for teachers, most retailers are looking to rid their left-over supply of Halloween stock. Just ask your neighborhood grocer/hardware/superstore if you could purchase pumpkins for classroom use. Chances are they will deeply discount your total or better yet, let you have the orange orbs for free!

Now that you have your pumpkins ...here are some great activities to share with your students. For the younger students consider using the abundant supply of pumpkins for data gathering, predicating and estimating. Have the young ones collect data on height, weight, number of lines, amount of inside fiber, number of seeds, etc...the student combine mathematical procedures and scientific observation to learn more about this seasonal delight.



Glow in the dark pumpkins can be just as educational. Take this opportunity to teach about the "science of things that glow" - fluorescence and phosphorescence. The step-by-step instructions can be found at

www.stevespangler.com

Similar to elephant toothpaste, the puking pumpkin uses hydrogen peroxide, a squirt of Dawn and yeast. The yeast serves as a catalyst, which makes the peroxide molecule release the oxygen atom faster. The result is an exothermic reaction that generates lots of foam!

Consider a new way to carve a Halloween pumpkin...you actually carve the pumpkin as you would normally. For the purpose of this demonstration, you must keep the carved pieces and push them back into the face of the jack-o-lantern. A chemical reaction is triggered inside the pumpkin and the previously carved pieces are literally blown out of the pumpkin. This incredibly visual demo utilizes the tremendous amount of energy that is released when the triple bond breaks in a molecule of acetylene.

NOTE: The self-carving pumpkin is a demonstration that should only be performed by a trained professional! Ask your high school chemistry teachers for their assistance.



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Wizards of Wright Program

The Wright-Patterson Air Force Base Wizards of Wright (W.O.W!) Program is offered to area schools free of charge. Utilizing portable science kits, the WPAFB scientists and engineers bring science excitement to the classroom!

The goal of the W.O.W! Program is to excite and recruit the next generation of scientists and engineers by getting kids fired up about math, science, aviation, and aerospace.

Check out our many science topics available on our website -

<http://edoutreach.wpafb.af.mil>

To schedule a W.O.W! demonstration, email or call the W.O.W! Program Coordinator, Krista Gerhardt.



Wizard Spotlight — The Buckeys

I'm delighted to introduce the W.O.W! dynamic duo...Caroline and Bill Buckey!



This pair of wizards, joined in wedlock, volunteer a tremendous amount of time to many educational outreach programs. Bill and Caroline are active with Boy Scouts, FLL Robotics, Fairborn Marching Band, 4-H, and their church's youth group—to name a few. With Bill serving as a W.O.W!'s Rocketry Wizard and Caroline as an Egg Drop Wizard, the Buckeys keep busy with their many activities.

As Bill eloquently said, "it takes a team effort to get some stuff accomplished".

Now, I wish I could report that these Wizards met through the wizard program and said WOW! - but they did meet here at WPAFB. For a combined total of 50 years, the Buckeys have been a viable force here at Wright-Patt.

Both with advanced degrees in Engineering, can you imagine the precision and expertise in completing household projects? Bill earned a BS in Aeronautical & Astronautical Engineering in the early 80's from OSU. Shortly after, he completed his masters in Aerospace Engineering from the University of Dayton. As a Michigan State Alum, Caroline earned her BS in Packaging Engineering in the mid 80's and an additional Business degree from Wright State in the early 90's.

Q: *When asked who/what inspired the two to pursue engineering fields, they both had unique answers.*

Bill: I was inspired by my cousin who flew C-5's in the 70's and 80's and from the TV Show-My Three Sons (Fred McMurray was an Aero Engineer) - and who says watching TV is bad for young people?!

Caroline: I was inspired to pursue math and science because my father was a computer programmer and my grandmother was a math teacher.

Q: *You both generously volunteer for many organizations, why do you believe educational outreach/volunteering is so important?*

Buckeys: We believe that education starts at home and is enhanced in the schools. Parents have a huge responsibility to give their kids a "leg-up" so they can do well in school. Providing a solid base of understanding is the most valuable gift you can pass along to anyone.

The most important thing we can do as engineer/science aficionados is to instill our passion to a new generation of kids that will develop and design products that will allow the United States to prosper.

We are also inspired by the kids we help. It is really exciting to see the scientific spark of interest when a kid gets to break an egg in school or when their robot finally makes it up the ramp for the first time. Once you start helping kids in science and math, you are hooked and want to help more!

Q: *What is most memorable experience as a volunteer?*

Bill: Seeing kids have the "light-bulb" turn on when they initially understand something or when a kid asks a new question and sees a concept in a new way that we as teachers can learn from!



Caroline: The Powerstackers Lego Robot Team, which I am the assistant coach are now the Ohio Ambassadors for the First Lego League. Our team actually was able to attend the World Festival and interface and display gracious professionalism with teams from around the world. I also have enjoyed watching the kids on the team volunteer and become leaders as ambassadors for the FLL. You really know that the kids understand what you have been teaching when you see them teach others.

As the W.O.W! Program Manager, I have had the opportunity to meet many gracious and talented people. The Buckeys are just that ... gracious professionals! They graciously volunteer their time and talents encouraging young people to discover their potentials and look to the future with hope and optimism. Thank you Bill and Caroline!

Wiz Stuff: Multimeters ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦



With a class set of multimeters and an electrical engineer on staff, can only mean one thing...yes, a demonstration using multimeters.

You may ask yourself—What is a Multimeter? Referred to as the Swiss army knife for geeks. It's a device that is used to measure continuity, voltage, current and resistance. This handy piece of test equipment can also be used to check various electronic components such as: fuses, wires, light bulbs, switches, batteries, speakers,

resistors, transformers, diodes, transistors, and much more. Learning how to use this multi-functional tool will be a skill that students will benefit from for a lifetime.

The W.O.W! Program Manager foresees the students constructing and testing their own simple circuits with a trusty multimeter.

Stay tuned for the availability of "Multimeters and You!"

What's New? **W.O.W!'s Website**

Thanks to the talents of Kris Kiser at UTC and Kim Stultz at Educational Outreach the W.O.W! website is live and active. Kris listened to my ideas and interpreted crude sketches, while Kim continues to post and link everything for a finished product that far exceeds my website dreams.

Complete with descriptions, content standards, activities, and photos, the website contains everything teachers need to schedule their wizard visit.

For all of you that have provide feedback—thank you. I also appreciate those of you that have notified me of the glitches found on the site and the scheduling form. It continues to be tweaked to make it perfect. Keep your comments rolling in.

If you haven't checked out W.O.W! in awhile go to:

<http://edoutreach.wpafb.af.mil>

Click on Programs, click on W.O.W!



Kris and Kim assures the W.O.W demo page can grow as the number of demonstrations expands, offering more and more exciting learning opportunities for your students!

2010 WPAFB Fall Job Shadow

The skies over WPAFB were filled with shadows... Friday, October 22nd, 71 high school juniors and seniors arrived at WPAFB for a day of job shadowing base professionals. With 28 mentors hosting the students, the day was packed with a variety of different experiences.



If it was climbing aboard a C-5, touring the Fuel Farms, or working with the Security Forces' K-9 unit, these students walked away with a memorable experience.

Mentors and students alike, were asked to complete a post experience survey. In hopes of making future Job

Shadow experiences more meaningful for students, feedback including likes and dislikes will be considered in planning the Spring event.

One mentor said, "The students were great! Students were very receptive to the short time available seeing the full gamut of what the base offers."



Spin Cycle— "Training for High G Flying"

In addition to the LabTV webisodes filmed here at WPAFB, we welcome the talented men and women from Brooks AFB 711th Human Performance Wing. *Spin Cycle* takes the viewer into pilot training at Brooks AFB San Antonio, Texas.

Preparing Air Force pilots for G forces while going at mach speeds is no easy task. With the aid of a human centrifuge, the pilots can learn and practice techniques to handle the "High G" environments they experience when flying aircrafts.

Teachers and students alike will enjoy this snippet of video illustrating the concepts of acceleration, centrifugal force and G forces. The



same forces simulate those felt on many roller coasters and amusement park rides.

To watch this and many other video stories in our nation's defense labs, tune into:

www.labtvonline.org

Next newsletter—FIRST Lego League.



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Our Mission: To facilitate partnerships with the K-12 educational community to increase student awareness and excitement in all areas of science, technology, engineering and math (STEM) and related careers!

Wright-Patterson Air Force Base, near Dayton, Ohio is one the nation's most important military installations. The base is headquarters for a vast, worldwide logistics system and is the foremost research and development center in the U.S. Air Force. Steeped in tradition, WPAFB has been a leader in military aviation development from the time of airplane inventors Wilbur and Orville Wright, who lived in Dayton, to today's aerospace age.

The Wright-Patterson AFB Educational Outreach Office was established in 1999 to share the base history, experience and capabilities with the K-12 educational community through internal programs, partnerships and individual involvement.

It is the only program of its kind within the Department of Defense!

D.I.Y (do it yourself) Science — Krista Gerhardt

Here's a new twist on an old favorite—
"Dripping Gak"!

Many of us have made gak, slime, silly putty, whatever you call it, out of white glue and borax. Have you ever suspended it from the ceiling and watch the polymer stretch to the floor to be recaptured in a basin?

I had the opportunity to see this very visual display in my summer ASM Materials workshop. The instructor simply used a 2-liter bottle, an inverted ring stand tucked into a ceiling tile and a batch of gak. The inverted ring stand served as the perfect device to hold the upside down 2L-bottle that contained the gak. The polymer behaved as polymers do...the slow, steady thin stream of goo found its way from the ceil-

ing to an awaiting pail. The gak pools neatly in the awaiting vessel, to be used again and again.

This simple polymer is not that simple after all. Polymers can be natural or syn-



thetic. These super, long strands of molecules flow. If the molecules stick together at a few places along the strand, the substance behaves like a rubbery solid. Borax is the cross-linker. It hooks the glue's molecules together forming the putty-like material. This is a great way to observe the many the properties of polymers.

Next issue: "Motorized Toy Cars"