

**WPAFB
Educational
Outreach Office**

W.O.W! Words

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Special points of interest:

- Looking for a GREAT resource? Tune into LabTV
- Updated Website!
- Summer highlights

Next Newsletter—
November 1, 2010

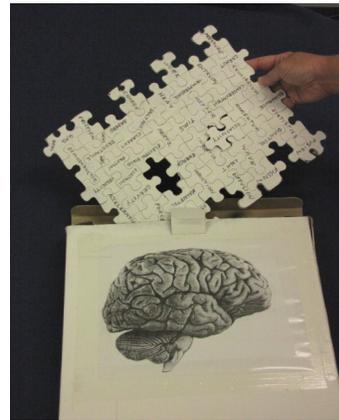
The BRAIN Box

As the 2010-11 school year gets underway... please remember the very important role we all play in developing young students' minds. Students are inquisitive by nature. Foster that curiosity, and provide your students with the very textured, puzzle pieces they all deserve.

The following snippet is reprinted with permission from our very own resident engineer, Bob Gemin.

Have you ever asked yourself, "Why would I want to learn science over any other subject?" Science is unique in that science facts are not determined by man, it is not a language or history of man, it is not governed by the rules of man. Science is not subjective since the facts of science would be true without their discovery. Yet learning science is not the memorization of facts. Allow me to explain why I believe science is an *adventure* and a puzzle...

It is the teacher's job to provide good puzzle pieces that can link to other pieces. It is the student's responsibility to fit the puzzle together. If the student only memorizes, the student only has a stack of facts, just a collection of puzzle pieces. This is not solving the puzzle—is it not learning. It is only when you connect the puzzle piece with your present knowledge puzzle picture are you capable of critical thinking. A teacher cannot place a piece within the puzzle picture for the student. The teacher only helps develop that piece—viewing it from different perspectives. Only the student can place the



fact within their knowledge base. EUREKA! Learning this way is satisfying.

...We can never have the complete picture. There will always be more pieces to add and holes in our understanding that challenges us. The most difficult part of the puzzle is the pieces that are misplaced or forced into our picture because of faulty understanding or due to theories subject to later clarification. As our knowledge increases and our puzzle is more complete, what were once imperfections give new insight...As learners, we must stay open to questioning our understanding and maintain a willingness to rethink our understanding—like refitting a puzzle piece.

Learning science has a similarity with putting a puzzle together, a game, but more than a game, since the results of science affect our lives dramatically—Science is an adventure! Every science fact is a puzzle to understand. If it wasn't, it wouldn't have taken the thousand of years of recorded history to develop the science puzzle pieces we have today. These science facts or theories are now recorded and available to those who want to read, think, and start putting their own puzzle picture of science together. We can be a part of daily science explorations by not

only doing, but also by reading newspapers and science magazines. The unexplored mountains and valleys on earth are few, but there are ever-increasing new science related fields to explore. Most of us probably missed the chance of exploring new areas in Africa or uncovering ancient Egyptian tombs...there are still adventures in science!

To be part of this adventure, we need to understand how to fit the recently discovered science puzzle pieces into our existing puzzle picture, doing so we become science literate. I know of no other adventure of less physical risk, yet more intellectual rewards! Science rewards man with a better life and those that better their lives through science, gain meaningful employment as scientists and engineers. In summary, give learning science a try. It's a puzzle, it is fun, and there are great rewards. **Learn science and be part of the adventure!**



The entire presentation can be viewed at:

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

Note: During the W.O.W! website construction phase find and click on *The Brain Box* which is located within the W.O.W! box under programs.

Please feel free to share with students, parents, and colleagues.



Bob Gemin, WPAFB Educational Outreach

A Puzzle and an Adventure

Wizard Spotlight— Sam Walker

If you are a fourth grade teacher and have scheduled a W.O.W! demo, chances are you have seen Mr. Sam Walker in action. Sam is our ONE and ONLY weather wizard. Unlike the other demos that have multiple wizards for each—Weather Wizard Sam Walker stands alone! The popularity of the W.O.W! Weather demonstration is due to the fact that the Ohio State Academic Content Standards lists weather as a fourth grade indicator and Sam hits them all.

His presentation includes an in-depth look at weather. His briefing illustrates the basics of understanding weather locally, nationally, and globally—along with weather safety. It also includes weather experiments to demonstrate temperature, pressure, and how rain is formed.

Sam's love of everything weather is relayed through his life experiences. Sam has travelled far and wide

through his 22 years of service in the United States Marine Corps. Starting right out of high school, he has served all over the globe. From South Carolina, the Middle East, to Japan and Korea, to Panama...Sam has seen a lot of weather. He is able to convey these experiences to the students through his enthusiasm and positive attitude. A common phrase to many marines "another day to serve the Corps." Sam lives it to the fullest!

When asked, "When did you know you wanted to pursue a career in meteorology?" Sam replies, "It found me." While in high school, he was introduced to interpreting weather maps and charting weather. Upon enlisting in the Marines for the Avionics and Electronics field, Sam received duty orders for the weather career field in which he was able to turn a love of weather into a profession.

Here at WPAFB, Sam, a civilian contractor with Control Systems Research, provides minute to minute weather observations for pilots and ground personnel. Upon visiting his office, Sam is surrounded by multiple computers that allow him to see changing global weather systems as they happen. Fielding questions about cloud decks and fog presence were just a few conversations I overheard during our chat. Since weather never



sleeps, weather at the 88th Operational Support Squadron is a round the clock operation. While many of us are sleeping, Base Weather personnel are keeping a watchful eye on the ever-changing weather.

On a personal note, Sam lives in Fairborn with his wife Bonnie and his two children—Jacob and Katie. Active in Boy Scouts—(as what other than???) *Weather Merit Badge Counselor* and a Fairborn H.S. Marching Band Dad. Sam even finds time to work one day a week at the Dayton International Airport.

Today, with an entire channel devoted to weather and the state science standards dictating the importance, the need for understanding this daily occurrence is crucial. Sam's dedication and commitment to the Wizards of Wright is insurmountable. Impressive are his W.O.W! numbers. Totals for the previous school year include 18 demos, 678 students, and 46 volunteer hours!!! WPAFB Educational Outreach is honored that we have another day for Sam Walker to serve his country and the Airmen of Wright-Patterson,

- and with that we salute you!



Wiz Stuff— * Magnetic Levitation * Modeling and Simulation

The Wizards of Wright Program is looking to add exciting new demonstrations to the 2010-11 line-up. After a summer meeting discussing details, 2ndLt Cynthia Savell and her team plan to construct a model that illustrates the principle of *Magnetic Levitation* (Maglev).

Maglev is a very interesting field of science. Magnetic suspension is a method by which an object is suspended with no support other than magnetic fields. With the use of superconductors, objects can levitate against the force of gravity. This super-cool

principle is used in maglev trains and magnetic bearings. With Maglev train systems currently being used in Europe and Ohio considering a high-speed rail system



for the state, this is a timely topic for the *Science in Society* Ohio content strand.

Also in the works,

Colonel John Franz envisions a demo that focuses on *Modeling and Simulation*.

With a growing demand in the industry, students need more exposure to the field of M&S. Most people think of flight simulators or even driving simulators, but there is so much more. Simply, simulations are the specific applications of models to arrive at some outcome. Basically, there are three types of simulations - live, virtual and constructive. There can also be a combination of two or more styles. Simulations are science-based where interactions of things are observed or measured. Our mission is to investigate ways to incorporate Modeling and Simulation into a classroom demo,

That's a W.O.W! Stuff preview of what's to come...



W.O.W!'s Summer Highlights—

Can you say a summer of fun? Call me silly but I enjoy professional development—always have. Okay, maybe I should specify... I enjoy **good** professional development. Here are the highlights...of **good** PD!

Summer 2010 started with a trip to Marietta College for a 2-day workshop sponsored by the **Ohio Oil and Gas Energy Education Program (OOGEEP)**. The workshop was quite topical as the Gulf Oil Spill still monopolized headlines. There were numerous questions addressed to the professionals from the industry. This high-energy workshop included hands-on sessions, tours of the Petroleum Engineering Program, Stern-wheeler dinner cruise, and a field trip. Field trip stops included Ohio's oldest well site, the tallest drill site, and various other local pumping locations.



A Saturday **American Chemical Society (ACS)** Workshop was jammed full of great ideas and suggestions to use in the science classroom. Thirty minute presentations by chemistry teachers kept the workshop moving. The teachers shared their successes and best practices for the science classroom. Each and every participant walked away with a great deal of resources and materials.

A great resource to share is the Journal of Chemical Education website. This website is published by the division of Chemical Education of the ACS. The JCE classroom activities are hands-on activities that can be conducted in a classroom, lab, or take home project. Each activity is intended to be fun or thought-provoking introductions to new ideas or topics, to spark discussion, and to lead to further study and experimentation.

WPAFB Educational Outreach partnered with the **Akron Global Polymer Academy** to host a 2-day event in June. The workshop reached a diverse population of local educators. The workshop allowed WPAFB Educational Outreach to showcase the many resources available to teachers. Taking a "field trip" to the

WPAFB Recycling Facility and providing participants with materials for their own classroom vermicomposting bin were just a few of the highlights.

Travelling to Cincinnati **CSI: Climate Status Investigations** was a spectacular 2-day session. The workshop brought teachers from a variety of disciplines to develop the knowledge, skills and confidence to explore global climate change with their students.



ASM—Society of Materials Science

highlighted the month of July. The week-long workshop provide numerous resources to engage all students in the study of material science. If it's metals, ceramics, polymers or composites there are plenty of hands-on lesson to excite any student about the ever-growing field of material engineering.

What's New? - Website Updates!!!

Summertime in the EO office includes the staff gearing up for the upcoming school year. If it's hosting teacher workshops, conducting robotic camps, completing inventories, or seeking professional development the WPAFB Outreach office never rests.

One summer task included updating the existing WOW!

website. Long overdue for an overhaul, you will find the site user friendly. The colorful, eye catching layout leads the user to the various tabs of useful information. Complete with descriptions, content standards, activities, and photos, the website contains everything you need to schedule your wizard visit.

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



Various areas of website are "under construction"

On My Wavelength — "Air Force Engineers are sending the Right Signals"

This LabTV webisode features the Air Force Research Labs here at Wright-Patterson. Focusing on the concepts of frequency, wavelength, and the electromagnetic spectrum this snippet of video highlights the technology of antennas.

Antennas are the eyes and ears of everything we do, transmitting radio waves that enable cell phones, TVs, and many other electronics to operate. The radio waves carry the energy through the air between multiple antennas.



long way.

The engineers at AFRL are designing, building, and testing antennas of many shapes and sizes—to go on airplanes, inside radios, and even on huge

For those of us that remember adjusting rabbit-ears on top of a TV set, or better yet, turning a knob that rotated the outside antenna for better reception, antennas have come a

towers.

This webisode coupled with the W.O.W! Wave demonstration, would provide you with a great overview of this old, yet new technology—*antennas*. To watch this and many other video stories in our nation's defense labs, tune into:

www.labtvonline.org

Next newsletter—*Spin Cycle*.



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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

For this back to school issue... no science teacher can resist starting the school year with the basic laboratory safety followed by the signing of the "safety contract". What is one of the many safety expectations? That's right—EYE Protection! No matter how many times you say it, there will always be one or two students that would rather protect their foreheads or chins before protecting their eyes. The following is an effective way of solving this problem!

Years ago, I incorporated the Flinn Scientific Cow Eye demonstration into my science safety lesson. By adding acid to a cow eye and then quickly rinsing it off, students observe the immediate and irreversible damage that occurs to eye tissue when strong chemicals are splashed in the eyes. This simple, unforgettable demo reinforces the importance of wearing eye protection.

Begin by modeling for your students proper safety gear—goggles, gloves and apron. Use one cow eye

as a control—note the color and clarity. With the second cow eye, add several drops of sulfuric acid. Rinse the eye and observe the damage. The deterioration is quickly visible. Discuss the importance of wearing goggles and other protective equipment. This is a great time to demonstrate how both the eyewash and safety shower work. All students should know what to do in the event of a chemical splash.

Where can you get cow eyes? All it takes is a phone call to your local meat processor and a really



nice thank you on school letterhead and you have yourself a dozen or so cow eyes for FREE. I always used 2 eyes each class period to show comparisons.

Talk about WOW! factor...timed just right, your cow eyes can be available for *Meet the Teacher Night*. Students love showing parents and siblings the results of the acid on the cow eyes.

If you are in a high school setting and students are issued their individual goggles—bedazzling is fun! Challenge students to decorate their goggles. Students have ownership of their goggles and enjoy sporting their creativity.

For the full lab, google—

SF#10062 Cow Eye Demonstration

The appearance of these hyperlinks does not constitute or imply endorsement by the U.S. Air Force