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# The Science Educator

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## 800 Attend the VAST 2012 Professional Development Institute



Three teachers were recognized during the VAST Awards dinner as the Virginia's state finalists for the 2012 Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST). Dr. Linda Wallinger, Assistant Superintendent for Instruction, Eric Rhoades, Acting Director - Office of Science and Health Education, and Barbara Young, Science Specialist presented the awards. Pictured are Barbara Adcock, Pocahontas Elementary School, Powhatan County Public School, Elizabeth Miller, Maude Trevvett Elementary School, Henrico County Public School, Anne Richardson, Cora Kelly School for Math, Science, and Technology, Alexandria City Public Schools, and Eric Rhoades.



VAST recognizes exemplary contributions to science education through its annual awards program. Awards are presented to outstanding educators at all levels. In addition, school administrators and businesses are eligible to be recognized for their support of, and contributions to, quality science education. Please congratulate Outstanding Elementary Teacher Ann Collet at Westside Elementary, Isle of Wight County; Outstanding Middle School Teacher Walter Quick at Nelson Middle School, Nelson County; Outstanding Earth Science Teacher; Kristen Coolbear at Kecoughtan High School, Hampton City; Outstanding Biology Teacher Eboni J. Powell at Hampton High School, Hampton City; Outstanding Chemistry Teacher Stacy L. Fraid at Hampton High School, Hampton City; Outstanding Physics Teacher Joseph Mahler at Saint Catherine's School, Richmond; Outstanding University Science Educator Dominic Swayne at James Madison University, Harrisburg, and Dominion of Richmond who was awarded the Community Partnership Award.

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From the Executive Director



## It all begins at home....

We want to take the time to thank you for supporting VAST through the year whether by participating or donating. Like every organization we seek to improve our ability to inform, inspire and educate. As we awaken with a new website and e-blasts to alert you with current information and issues of concern, we strive to produce the best newsletter and journal digitally.

The ability of VAST to strive forward with great accomplishments is due to your support so we can continue in the forefront of science education in the Commonwealth. With support, VAST can continue playing a vital role in science advancements.

We welcome you to help us move forward by helping support VAST successes in 2013! If you feel that you can support these efforts financially please donate to our 501C3 non profit tax exempt status. Every bit helps!

*Susan Booth*

### **2013 VAST PDI will be in Norfolk on November 13-16, 2013**

The VAST PDI committee is already hard at work planning the 2013 PDI under the leadership of president-elect Shirley Sypolt and PDI chair John Kowalski. We intend to provide the same high level of professional development that our members have participated in in the past. There will be a full range of field trips, workshops, concurrent sessions, exhibitors, and general session speakers. Mark your calendars for the November dates. As the program is developed information will be posted on the VAST website and in the newsletter. It's never too early to plan a workshop or concurrent session that you would like to present. The online presenter proposal site will be open soon. The committee welcomes your comments and suggestions. Email them to Shirley (shirleysyp@aol.com) and John (jkowalski@rvgs.k12.va.us).

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## Scientific Greetings and Happy New Year!

Please allow me to introduce myself . . . I am Brita R. Hampton, the newly elected President of the Virginia Association of Science Teachers. I have been a teacher for the past 17 years. I started teaching in Newport News, Virginia, 4th grade at a Catholic school. After two years, I moved to public schools to teach 6th grade Science and Math. After 5 years there, I moved to Virginia Beach and taught 6th, 7th & 8th grade Science at another Catholic School. After 14 years in the classroom, I needed a break so I went on sabbatical . . . It was wonderful! When I returned to Virginia, I started working at The Thomas Jefferson National Accelerator Facility (Jefferson Lab) in Newport News, Va. I work in the Lab's Science Education Department. I teach here in our classroom . . . local 5th, 6th and 8th grade students come for the day to learn about science. I also go out to visit schools and do fun hands on activities with students of all ages. In addition to teaching here at the Lab and at local schools, I run an evening program for 5th grade teachers every other week. (We also have programs here at the Lab for teachers in grades 6 and 8.)

I became involved in VAST when I presented at the PDI ages ago. It was such a wonderful experience that I looked into how I could be more involved in the organization. I eventually became Region II Director, then President-Elect/PDI Chair and now . . . President. It is an honor to be a part of and lead this amazing organization.

Now that you know my story, you will understand where these two goals of mine come from. 1.) Push to get more classroom teachers on the VAST Board. 2.) The concerted effort to support high quality, hands on, and appropriate Science Education in the Elementary Grades.

VAST is an organization for Science Teachers. Classroom teachers should be as active as possible in the decision making and leadership of this organization. The way that happens is by being a part of the VAST Board. So here is your invitation . . . Join Us! There are oodles of committees you can choose from. Simply email me and we can find the best spot for you! You being on the Board is what VAST needs!

As for the concerted effort to support high quality, hands on and appropriate Science Education in Elementary Education, VAST has always been committed to this! Our Mission is to promote excellence in science teaching and learning in Virginia. We will continue to work on your, our members, behalf to remind our policy makers of the importance of Science Education in the primary and elementary grades. We will work tirelessly to support you, our Science teachers, and make sure you have what you need to do your job well. We have lots to do . . . so let's get to work!

*Brita Hampton*  
VAST President



# Tidewater Alliance of Chemistry Teachers – A Look Back

Established in 1975, The Tidewater Alliance of Chemistry Teachers (TACT) was a professional organization of chemistry educators from Hampton Roads high schools and colleges who enjoyed meeting together to share and learn new ideas for the improvement and more effective teaching of chemistry. TACT's activities in early years were very informal consisting of group discussions, occasional demonstrations, tours of local industries and laboratories, and hosting chemistry open houses for the public at Old Dominion University's (ODU) Chemistry Department. In 1993 a newsletter, "The Erlenmeyer",

was started as a way to communicate with chemistry teachers in the Hampton Roads area, provide announcements of TACT meetings, conferences and summer opportunities, and as a forum for sharing teaching ideas for the classroom and laboratory. During that same year a group of 18 TACT members formed a steering committee to host the ChemEd 95 conference at ODU in August of 1995. This biennial conference attracts teachers from across the US and Canada. ChemEd 95 was very successful and provided TACT with funds to expand to a new level. TACT grew from an organization supported by the Chemistry Department at ODU into a non-profit one that was financially self-sufficient run by its 10-member Board of Directors. An annual scholarship of \$1,000 was given to one deserving high school senior who demonstrated a high level of achievement and the desire to pursue a career in chemistry. The newsletter was expanded and membership grew.

TACT held at least two to three events for local teachers each year involving nationally recognized teachers, professors, or scientists. Events included public lectures, teacher workshops in lab safety,



Juanita Jo Matkins, VAST Preident 2012, recieves a check from John Wass, founding member of The Tidewater Alliance of Chemistry Teachers (TACT).

make-and-take demos, AP Chemistry teaching, graphing calculators and improving student comprehension through classroom demonstrations. TACT also hosted a summer Flinn Scientific weeklong workshop for East Coast chemistry teachers at ODU and members helped judge the annual Tidewater Regional Science Fair. A popular attraction was the annual "ChemMusical" demo show produced and performed by the TACT demo team for students from local schools.

As with many organizations, the founding members of TACT have retired and,

in the mean time, teaching has become more demanding, traffic and distance have increased, and access to the Internet allows for easier discovery of many new and innovative ways of teaching chemistry. Since attendance at TACT events has steadily declined in the last five years, the Board voted to dissolve the organization. In keeping with its mission of helping chemistry teachers expand curriculum activities in the classroom, the Board decided to endow a VAST mini-grant. The grant "*TACT Mini-Grant to Enhance Chemistry Learning*" will give Virginia teachers the opportunity to develop innovative K-12 chemistry activities for their classroom.

*John Wass*

A Founding TACT member

**Chemistry teachers note: This is a New Mini-grant just for you! See VAST Website for more information!**

## New Elementary Science Resources

Visit <http://www.doe.virginia.gov/instruction/science/index.shtml> for these new resources.

**Practices for Science Investigation Progression (PDF)** – The Practices for Science Investigation Progression chart identifies the grade level at which specific science skills/practices are formally introduced and how they progress throughout the 2010 Science Standards of Learning.

**K-3 Science Progression (PDF)** – Shows the progression of standards from kindergarten through third grade and how they relate to reporting categories on the Grade 3 Science SOL Test Blueprint.

## Smithsonian Education Digs Into Earth's Soil

Smithsonian Education offers a fascinating exploration of Earth's soil with its "Dig It! The Secrets of Soil" exhibition. For information, videos, expert instruction, and activity sheets, visit <http://forces.si.edu/soils>.

For example, a "Root Words" word-search sheet combines science and language arts with insights into the origins of related scientific terms. Download a PDF at [http://www.smithsonianeducation.org/families/point\\_click/activitysheets.html](http://www.smithsonianeducation.org/families/point_click/activitysheets.html).



## UPDATED Virginia SOL Practice Items for Earth Science, Biology, and Chemistry

In preparation for the fall 2012 SOL test administration, additional practice items have been added to the End-of-Course (EOC) Biology, Earth Science, and Chemistry practice item sets located at [http://www.doe.virginia.gov/testing/sol/practice\\_items/index.shtml](http://www.doe.virginia.gov/testing/sol/practice_items/index.shtml). The number of additional items varies by test, but in all cases the additional items have been added to the end of the existing practice items.

More practice items will be added to the existing grades 3-8 mathematics, grades 3, 5, and 8 science, and the grades 3-8 reading practice item sets in early 2013. School divisions will be notified when additional practice items for these grade levels are available.

In addition, each practice item set has now been updated to reflect changes in how student responses to technology-enhanced items will appear on the section review screen within TestNav, the online testing software used in Virginia. Furthermore, all practice item guides have been updated to reflect the inclusion of the additional practice items and/or the changes in how student responses to technology-enhanced items will appear on the section review screen.



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## Children of Light

A man crosses the street in rain,  
stepping gently, looking two times north and south,  
because his son is asleep on his shoulder.

No car must splash him.  
No car drive too near to his shadow.

This man carries the world's most sensitive cargo  
but he's not marked.  
Nowhere does his jacket say FRAGILE,  
HANDLE WITH CARE.

His ear fills up with breathing.  
He hears the hum of a boy's dream  
deep inside him.

We're not going to be able  
to live in this world  
if we're not willing to do what he's doing  
with one another.

The road will only be wide  
The rain will never stop falling.

— Shoulders <sup>1</sup>  
Naomi Shihab Nye

It has happened again  
We thought it would not,  
Could not – not in our school:  
Colorado, maybe  
Virginia, maybe  
Not here in our little town  
Some place, any place, yes,  
Somewhere else – it's a big world –  
Not here in our town  
Dear God, not my child  
Not our children –  
Their children...  
Our children,  
My child,  
Me.

A president wept.  
Fathers,  
Mothers,  
Sisters,  
Brothers –  
Strangers wept.  
WHY?  
Someone else...  
Their children...  
Our children,  
My child,  
Me.

On ne voit bien qu'avec le cœur.  
L'essentiel est invisible pour les yeux.

— *Le Petit Prince*  
Antoine de Saint-Exupéry



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## Science For All

His walk to the high school where he taught led across the adjacent elementary school playground that afternoon. In the usual rush to get there, his thoughts were shattered by a familiar voice, “Uncle Joe!” as Susannah hurled herself at him in surprised delight. After a mutual embrace and smiling words, they parted on their ways – he to planning and grading, she to her play. Twenty-seven years later her son now attends her school and her uncle, still at the high school, recalls the experience as one of the highlights of his life. Why, he wondered, why, especially following the report from Sandy Hook Elementary School in Newtown, Connecticut that fateful Friday December morning. WHY?

In cruel irony in the season when several religions celebrate the coming of light into the darkness, when the Christian tradition celebrates the birth of a child, our sense of security is shaken by the news that twenty children and six adults lost their lives in a school to the madness of a well-armed young man. Our minds can only imagine the scene and the emotions by those school doors between Principal, Dawn Hochsprung, and teachers and the mad man who confronted them. For each of us, as parents and as teachers, as persons committed to the education and safe-keeping of our children of all ages, this has to have shaken us to our core.

It violates our own sense of personal and professional responsibility toward those to whom we entrust our future – our love and determination that our world, even a very small piece of that world, might be better for our having lived there. For many of us, teaching is not merely a profession, but a way of life, growing and becoming, not simply being. Is it not our task to nurture and inspire – to lead and to learn – rather than simply to train? As some would have it, to ask the right questions rather than provide solutions?

Yet, this has to be done in an atmosphere of caring, of trust, of vigilance – not only for the individual needs of our children, but for their safety and security. We see repeatedly the unwavering maternal instinct in the wild, for example, as told here:

Sadhu Sundar Singh passed a crowd of people putting out a jungle fire at the foot of the Himalayas. Several men, however, were standing gazing at a tree, the branches of which were already alight.

“What are you looking at?” he asked. They pointed to a nest of young birds in the tree. Above it a bird was flying wildly to and fro in great distress. A man said, “We wish we could save that tree, but the fire prevents us from getting near to it.”

A few minutes later the nest caught fire. The Sadhu thought the mother bird would fly away. But no, she flew down, spread her wings over the young ones, and in a few minutes was burned to ashes with them.<sup>2</sup>

Is this any different from Dave Sanders who gave his life getting Columbine High School students to safety; or Liviu Librescu, a Holocaust survivor, who perished shielding his students from the gunman at Virginia Tech; or Mary Sherlach, Victoria Soto, Lauren Rousseau, Rachel Davino, Anne Marie Murphy and Dawn Hochsprung who gave their lives protecting their children at Sandy Hook; or, in happier circumstances, teacher Marie Bell, a white woman, who donated a kidney to the black father of one of her kindergarten children?

As parents daily entrust their children to us in our schools and classrooms, this instinct takes on an even greater significance. For we focus upon much more than a child’s material safety. We are guardians of their future and ours, in all its fearsome and splendid potential.

Two days after the shots had ended 28 lives, President Obama stood before the parents and friends of those children. He reminded us all that that school could have been any school, that town any town in America. He commented, “...you’ve looked out for each other. You’ve cared for one another. And you’ve loved one another.” Speaking of parenthood, he continued, “It comes as a shock at a certain point where you realize no matter how much you love these kids, you can’t do it by yourself. That this job of keeping our children safe and teaching them well is something we can *only* do together...Can we say that we’re truly doing enough to give all the children of this country the chance they deserve to live out their lives in happiness and with purpose?” And finally, “There’s only one thing we can be sure of, and that is the love that we have for our children, for our families, for each other. The warmth of a small child’s embrace, that is true.”

The caring and the vigilance we have for one another show themselves in infinite and varied ways. Arriving with my 11 packages at the Post Office at 8 PM the other day, too close to the mailing deadline, I wheeled all but four to the curb. After one of these fell from my arms to the roadway, a Latino man rushed forward from the door, stooped down saying, “Here, let me help you.” Thereupon, he took the packages from my arm and the road and walked them inside to the counter. Before I knew it, he’d smiled, “Have a merry Christmas,” and vanished out into the darkness. His light still shines.

My sister once asked me, “What keeps you going?” This sense of mutual love and caring for those in family, school and community would have to top my personal list. And yours? Despite our preoccupations and fears and the masks we think will hide us, here is Anne Morrow Lindbergh’s statement of what binds us to each other and to our children:



It is the man in us who works;

Who earns his daily bread and anxious scans  
The evening skies to know tomorrow's plans;  
It is the man who hurries as he walks;  
Finds courage in a crowd; shouts as he talks;  
Who shuts his eyes and burrows through his task;  
Who doubts his neighbor and who wears a mask;  
Who moves in armor and who hides his tears.  
It is the man in us who fears.

It is the child in us who plays;  
Who sees no happiness beyond today's;  
Who sings for joy; who wonders, and who weeps;  
It is the child in us at night who sleeps.  
It is the child who silent turns his face,  
Open and maskless, naked of defense,  
Simple with trust, distilled of all pretense,  
To sudden beauty in another's face –

It is the child in us who loves.

—The Man and the Child <sup>3</sup>  
Anne Morrow Lindbergh

Naomi Shihab Nye's poem says it all: "We're not going to be able to live in this world if we're not willing to do what he's doing with one another." The co-director of the Center for Courage and Renewal in Washington State, Marcy Jackson, commented after sharing this poem with teachers

in Singapore: "Our multiple roles and realities merged in a moment of grace when we recognized that we share common dreams for the children entrusted to us." And that most certainly includes Charlotte, Daniel, Olivia, Josephine, Ana, Dylan, Madeline, Catherine, Chase, Jesse, Grace, James, Emilie, Jack, Noah, Caroline, Jessica, Benjamin, Avielle, Allison, Dawn, Mary, Vicki, Lauren, Rachel, and Anne Marie.

The virtue of the candle lies not in the wax  
that leaves its trace, but in its light.

—*The Wisdom of the Sands*  
Antoine de Saint-Exupéry

#### Acknowledgments:

1. "Shoulders," from *Red Suitcase*, copyright 1994 by Naomi Shihab Nye, BOA Editions, Ltd., [www.boaeditors.org](http://www.boaeditors.org).
2. Excerpted from *Springs in the Valley*, copyright 1939 by Mrs. Charles E. Cowman, Zondervan Publishing House.
3. "The Man and the Child" from *The Unicorn and Other Poems*, copyright 1956 by Anne Morrow Lindbergh, Pantheon Books, Division of Random House.

*George*

A VAST Life Member, George Dewey is a former VAST President and former NSTA District VIII Director. He teaches physics in Fairfax County, NBCT since 1999. He can be reached at [george.dewey@fcps.edu](mailto:george.dewey@fcps.edu).



## New NASA Online Science Resource Available for Educators and Students

NASA has a new online science resource for teachers and students to help bring Earth, the solar system, and the universe into their schools and homes called NASA Wavelength, the site features hundreds of resources organized by topic and audience level from elementary to college, and out-of-school programs that span the extent of NASA science.

Educators at all levels can locate educational resources through information on educational standards, subjects and keywords and other relevant details, such as learning time required to carry out a lesson or an activity, cost of materials and more.

"NASA Wavelength not only lets users find nearly everything they want to know about NASA science, but it also allows them to provide direct feedback to NASA to enhance our products," said Stephanie Stockman, education lead for NASA's Science Mission Directorate (SMD) in Washington. "This truly is a living, digital library of resources that will allow educators to find and share the best of NASA science education resources to advance their teaching."

NASA's SMD funds a nationwide community of education and outreach professionals that develop and deliver resources for all levels of formal and informal education and public outreach activities using NASA content, expertise and facilities.

NASA Wavelength features peer-reviewed resources developed by this community, including award-winning curriculum tools, activities that allow students and teachers to learn about and participate in NASA missions, exhibits and planetarium shows and more.

NASA's Science Mission Directorate seeks new knowledge and understanding of Earth, the sun, solar system and the universe from the vantage point of space. The directorate also constantly looks for inventive ways to reach out to the public using museums, classrooms, science centers and home schools.

For access to NASA Wavelength, visit:

<http://nasawavelength.org>

For information on NASA's Science Mission Directorate, visit:

<http://science.nasa.gov/>



## Earth, Biology and Environmental Science

### James Madison University Summer Opportunity in Ireland

This summer, James Madison University is offering a unique learning experience for teachers of science. The course will allow you to explore field applications of Earth science and biology content in a unique field setting – Western Ireland. One of the most picturesque and remote parts of Ireland, Connemara includes Counties Galway and Mayo. The site of the classic movie, “The Quiet Man” and the more recent “The Guard,” this area is also noted for a unique combination of geology, ecology, and history that intersects that of the eastern United States of the last 1.1 billion years.

Building on the experience of the JMU Field Geology course, we are offering Earth & Environmental Science in Ireland in the same locations. Completion of the course experience and requirements will provide you with six credit hours of graduate credit – three in Geology and three in Biology. The course will take place during the first two weeks in July, preceded by four evening sessions during the spring semester and an overnight camping trip to Dolly Sods Wilderness Area.

The base site will be the Petersburg Outdoor Education Centre (<http://www.petersburg.ie>). The graphic is a Google Earth file. This site is centrally located to a range of beach, mountain, woodland, lake, and peat bog environments. It is also a focal point for the Celtic history of Ireland. Students will stay in en-suite quad dormitory rooms, with meals provided). On-site attractions include hiking, caving, rock-climbing, and kayaking. Excursions to Galway City, the Aran Islands, Kylemore Abbey, Neolithic and Bronze Age sites, and the Connemara National Park are also part of the course. Costs include tuition (6 credit hours) plus a supplemental fee (approximately \$850), as well as airfare to/from Shannon Airport in Ireland.

As this course is specifically designed for teachers, tasks and assignments in the class will be built around a model of pedagogical content knowledge, which provides not only content but also a means and rationale for organizing that content for the learning benefit of others. The class as a whole will interact with residents in the

area to generate a “Community Atlas”, while at the same time designing and sharing instructional materials on specific topics of their interest. All products will be included in the growing collection of instructional materials for the Joyce Country Geopark, currently under development for this region.

A student that participated in the course in 2011 had this to say about the experience a year later:



*I remember being thrilled about studying abroad because of the awesome adventures, people, food, oh and that thing called school, that I would get to experience in another country, all while earning credit for my undergraduate degree. This trip was so much work and so not what I was expecting. By the end, I was exhausted physically and mentally. However, all those expeditions, field work, research, etc. was*

*going to be used for something greater than I realized; the hopes for future geoparks in Ireland. The experience and trip to Ireland was so meaningful and honestly one of the few times that I felt I learned so much in such little time. It was meaningful 1. because it was so hands on and 2. because we had the pressure of presenting to an audience- not just any audience either! People of community that we would be educating about findings that could be in their own backyards! And now, to think, that our hard work is hanging up as an example for a hopeful future. Amen to being a part of making a (hopeful) difference in the lives of others because of this experience, and also to the continued learning from this trip.*



If you would like to learn more about this course, including the specific topics, itinerary, and costs, please visit the Office of International Programs website for the course at [http://www.jmu.edu/international/abroad/jmu\\_ireland\\_earth.shtml](http://www.jmu.edu/international/abroad/jmu_ireland_earth.shtml). Look for us on Facebook, too! Please email me at [pyleej@jmu.edu](mailto:pyleej@jmu.edu) if you have any additional questions. Space is limited to 16 students.

[http://www.jmu.edu/international/abroad/jmu\\_ireland\\_earth.shtml](http://www.jmu.edu/international/abroad/jmu_ireland_earth.shtml)

### “Energy as a Unifying Concept”

Jim Disbrow gave a session at this last PDI on the topic of energy as a unifying concept. He would like to share more information with you on the topic at:  
[http://semanticcommunity.info/Energy\\_Community\\_Pilot\\_Wiki](http://semanticcommunity.info/Energy_Community_Pilot_Wiki)



## Partnering to Solve Saturn's Mysteries

By Diane K. Fisher

This false-colored Cassini image of Saturn was taken in near-infrared light on January 12, 2011. Red and orange show clouds deep in the atmosphere. Yellow and green are intermediate clouds. White and blue are high clouds and haze. The rings appear as a thin, blue horizontal line.

From December 2010 through mid-summer 2011, a giant storm raged in Saturn's northern hemisphere. It was clearly visible not only to NASA's Cassini spacecraft orbiting Saturn, but also astronomers here on Earth—even those watching from their back yards. The storm came as a surprise, since it was about 10 years earlier in Saturn's seasonal cycle than expected from observations of similar storms in the past. Saturn's year is about 30 Earth years. Saturn is tilted on its axis (about 27° to Earth's 23°), causing it to have seasons as Earth does.

But even more surprising than the unseasonal storm was the related event that followed.

First, a giant bubble of very warm material broke through the clouds in the region of the now-abated storm, suddenly raising the temperature of Saturn's stratosphere over 150 °F. Accompanying this enormous "burp" was a sudden increase in ethylene gas. It took Cassini's Composite Infrared Spectrometer instrument to detect it.

According to Dr. Scott Edgington, Deputy Project Scientist for Cassini, "Ethylene [C<sub>2</sub>H<sub>4</sub>] is normally present in only very low concentrations in Saturn's atmosphere and has been very difficult to detect. Although it is a transitional product of the thermochemical processes that normally occur in Saturn's atmosphere, the concentrations detected concurrent with the big 'burp' were 100 times what we would expect."

So what was going on?

Chemical reaction rates vary greatly with the energy available for the process. Saturn's seasonal changes are exaggerated due to the effect of the rings acting as venetian blinds, throwing the northern hemisphere into shade during winter. So when the Sun again reaches the northern hemisphere, the photochemical reactions

that take place in the atmosphere can speed up quickly. If not for its rings, Saturn's seasons would vary as predictably as Earth's. But there may be another cycle going on besides the seasonal one. Computer models are based on expected reaction rates for the temperatures and pressures in Saturn's atmosphere, explains Edgington. However, it is very difficult to validate those models here on Earth. Setting up a lab to replicate conditions on Saturn is not easy!

Also contributing to the apparent mystery is the fact that haze on Saturn often obscures the view of storms below. Only once in a while do storms punch through the hazes. Astronomers may have previously missed large storms, thus failing to notice any non-seasonal patterns.

As for atmospheric events that are visible to Earth-bound telescopes, Edgington is particularly grateful for non-professional astronomers. While these astronomers are free to watch a planet continuously over long periods and record their finding in photographs, Cassini and its several science instruments must be shared with other scientists. Observation time on Cassini is planned more than six months in advance, making it difficult to immediately train it on the unexpected. That's where the volunteer astronomers come in, keeping a continuous watch on the changes taking place on Saturn.

Edgington says, "Astronomy is one of those fields of study where amateurs can contribute as much as professionals."

Go to <http://saturn.jpl.nasa.gov/> to read about the latest Cassini discoveries. For kids, The space Place has lots of ways to explore Saturn at <http://spaceplace.nasa.gov/search/cassini/>.

*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*



Using student data to improve education

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**Programming for Prizes?  
 Coding to Compete?  
 Developing with Data?**

Virginia Department of Education's **Apps4VA** program was created to raise awareness about the state educational database, the Virginia Longitudinal Data System, VLDS (<http://youtu.be/MlxJqNqrAuc>).

Virginia public high school students are **invited to create either apps or concepts of apps** with opportunities to win prizes for themselves and their schools! The teacher who sponsors the most submissions will also win a prize!

**Competition closes January 31, 2013.**  
 For more information, go to [www.apps4va.org](http://www.apps4va.org) or contact Brooke Bell ([brooke.bell@cit.org](mailto:brooke.bell@cit.org)).

Apps4VA's **HAC4EDU**  
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*Calling all middle and high school physical science teachers!! Check out this great opportunity – it's just for YOU!*

Participants will:

- Attend a ten-day summer workshop held at the US Department of Energy's Jefferson Lab in Newport News, Virginia;
- Complete 15 hands-on electricity/magnetism experiments consistent with the Virginia Standards of Learning;
- Participate in 30 hours of pedagogy and enrichment activities with UVA professors and Jefferson Lab staff;
- Earn 3 credit hours from the University of Virginia; and
- Receive a stipend of \$1500, free housing, electricity/magnetism kits with a mini VDG, electroscopes, textbooks, textbooks, HD video camcorder, and free registration for the 2013 VAST PDI!

For more information, please visit:

<http://people.virginia.edu/~ral5q/classes/UVa-JLabsummer13/>

**U.Va. School of Engineering and Applied Science (SEAS) Open House**

Saturday, March 23, 2013 9a.m. to 3p.m. <http://www.seas.virginia.edu/events/openhouse.php>

**PHYSICS & PHYSICAL SCIENCE  
 Courses at the University of Virginia**

We offer graduate credit professional development online courses for science teachers of grades K-12. All online courses include web-based instruction, and WebAssign for homework and exams. You can earn recertification points and/or credit towards a Master of Arts in Physics Education degree (30 cr-hrs.).

**Spring 2013 Jan. 14 – May 10, 2013**

**How Things Work II, PHYS 6060, 3 cr**, is a non-calculus, conceptually based physics online course with video taped lectures, simulations, homework and multiple-choice exams. Topics include objects from our daily life and environment and focuses on electricity, magnetism, light, radiation, and nuclear energy. Appropriate for physical science and high school physics teachers.

**Light & Optics III, PHYS 6253, 3 cr**, is a non-calculus home-lab based course with videotaped instructions on Virginia SOL based Lab activities, lecture notes, and lab reports on light propagation, lenses, interference, and diffraction. A lab kit for home activities is required. Appropriate for physical science and high school physics teachers.

**Classical and Modern PHYS II, PHYS 6320, 4 cr**, is a calculus-based introductory physics online course with video lectures and video problem solutions. Topics include electricity, magnetism, waves, sound, and optics. Appropriate for high school physics teachers.

**Physics Pedagogy, PHYS 6410, 3 cr**, is a course in teaching methods that explores current results from physics education research and especially recent curriculum design and instructional strategies in teaching physics. Appropriate for high school physics teachers.

For detailed course information visit [www.k12.phys.virginia.edu](http://www.k12.phys.virginia.edu) or email [PhysicsEducation@virginia.edu](mailto:PhysicsEducation@virginia.edu)

Paid ad



## Come Register, Recycle and Win with Al the Can



Al the Can extends an invitation to your school to earn money, recycle and party. Registration is now open at [www.cancentral.com](http://www.cancentral.com). During the second annual event, schools recycled over 4.5 million cans, raising more than \$100,500 in Great American Can Roundup School Challenge. Expedition Academy in Green River, Wyoming not only was number one recycling school in the state, but continues to celebrate as the national winner for a second year. We encourage you to challenge your school to see how many beverage cans they can recycle per student between America Recycles Day (November 15) and Earth Day (April 22), 2011. It's an extraordinary opportunity for schools to show their true green spirit and environmental leadership by stepping up to the Great American Can Roundup School Recycling Challenge.

The Can Manufacturers Institute, the national trade association of can manufacturers and their suppliers, is giving away a \$1,000 per state to the top per capita school and an additional \$5,000 to the top recycling school for a total of \$56,000. Your school could win up to \$6,000, plus the value of the cans and the chance to win \$50 pizza cards. Put your school in contention by going to : [www.cancentral.com/RoundUp](http://www.cancentral.com/RoundUp) and register by December 15 to be eligible for the School Recycling Challenge. There you will find everything needed to build recycling enthusiasm and rally the community for the win.

At [www.cancentral.com/RoundUp](http://www.cancentral.com/RoundUp) you will be able to compare your schools' recycling progress. Environmental educators will appreciate grade appropriate, free interdisciplinary curricula and worksheets for the classroom to continue the discussion of the positive impact on the environment through aluminum can recycling.

We look forward to seeing your schools on the Great American Can Roundup School Challenge leader board. Please contact Jenny Day at 202/232-4677, or by email [jday@cancentral.com](mailto:jday@cancentral.com) with any questions or ways we can help.

## Biology and Life Science, Grades 9 to 12: USA Biology Olympiad (USABO)

The USABO is a four-tier competition sponsored by the Center for Excellence in Education (CEE) and Purdue University. The competition tests students Grades 9 to 12 on their theoretical and laboratory knowledge of biology. The top 20 students from these tiers of competition are designated National Finalists and attend a 12-day training session at Purdue University from June 2 to 14, 2013. The top four students at the National tier of the competition will represent the USA at the International Biology Olympiad (IBO) in Bern Switzerland July 14 to 21, 2013 as Team USA. Every member of Team USA has medaled since the USA first competed in the 2003 IBO.

The Center for Excellence in Education (CEE) encourages teachers and schools to register at <http://www.usabo-trc.org/>. AP courses are not required. The registration fee of \$75 includes full access to the Teacher Resource Center (TRC), an online set of tools for teachers.

Registration is open but will close  
**January 18, 2013.**

Kathy Frame  
VABT President/VA OBTA Director  
CEE, USABO Director



### New Moon Cookie Activity

The New Moon may become kids' favorite Moon phase after they have done the new Cookie Moon activity on NASA's Space Place. That's because they get to lick off all the creme filling on an Oreo® cookie. This is a fun way for kids to learn why the Moon has phases and why it looks the way it does throughout the month—not an easy concept for anyone! This activity will be a sweet experience for all! Go to <http://spaceplace.nasa.gov/oreo-moon>.

## Teacher Resources:

### Virginia Outdoor Writers Association and Bass Pro Shops Sponsor 20th Annual High School Writing Competition

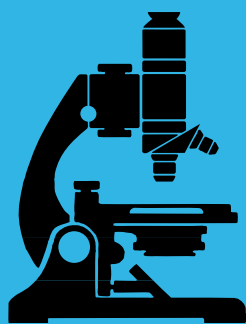
The Virginia Outdoor Writers Association, Inc. (VOWA) and Bass Pro Shops are sponsoring the 20th Annual High School (Grades 9-12) Writing Competition for 2012-13. The goal of the competition is to reward high school students for excellence in communicating their personal experiences in the outdoors. The competition is open to all Virginia students in grades 9 through 12. Home-schooled students are welcome to enter. The theme of this year's contest is based on a memorable outdoor experience. Any experience by the writer with hunting, fishing, camping, canoeing, hiking, birding or other outdoor activity should be the predominant subject matter. No athletic event or competition is an eligible subject matter.

The three top winners will be published on the VOWA Web site, and may be in other publications or web sites. Submissions can be made between now and February 7, 2013. Bass Pro Shops has agreed to again cosponsor the contest, and is providing gift cards of \$150, \$100, and \$50 for purchasing any merchandise at Bass Pro Shops. There will also be gear from outdoor sports businesses and Supporting Members of VOWA. Winners will be announced and awards presented at the joint Mason Dixon – Virginia Outdoor Writers Association Annual Meeting on March 14 – 17 in Staunton, VA. The winner's parents, a mentor, or a teacher may be guests of VOWA for the presentation event. The winning entries will be read by the students at the awards program during the Annual Meeting. Go to [www.VOWA.org](http://www.VOWA.org) to find the competition rules and guidelines.

### NEW - Using Significant Digits in Chemistry (PDF)

This technical assistance document provides some basic rules for determining significant digits and using significant digits in calculations. Visit [http://www.doe.virginia.gov/instruction/science/resources/tech\\_assistance\\_significant\\_digits.pdf](http://www.doe.virginia.gov/instruction/science/resources/tech_assistance_significant_digits.pdf) to download or view this document.





# ASSOCIATED MICROSCOPE

**Associated Microscope Inc is on Virginia State Contract for sales of the following brand of microscopes:**

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## World of 7 Billion Video Contest

Bring technology and creativity into your high school science classes by incorporating the World of 7 Billion video PSA contest into your syllabi. Challenge your students to create a 30- to 45-second video PSA illustrating the connection between world population at seven billion and one of the following: food security, wildlife habitat, or the global status of women/girls. Students can win up to \$1,000, and their teachers will receive free curriculum resources. The contest deadline is February 21, 2013. Full contest guidelines, resources for research, past winners, and more can be found at [www.Worldof7Billion.org](http://www.Worldof7Billion.org).



NOAA Fisheries Service, an office of the National Oceanic and Atmospheric Administration (NOAA), recently published online the Fish Watch Lessons and Activities. This set of 16 teacher tested, science standard correlated, lesson plans challenges high school students and their teachers to use the NOAA Fisheries Service's FishWatch website to locate, manipulate, and analyze data to make informed decisions about sustainable seafood consumption.

Students examine catch data and correlate trends with fisheries management measures to understand overfished, overfishing, and the stock rebuilding process for various species. Habitat uses and impacts found on the FishWatch website are compared with fishing gear use and improvements to add to the understanding of ecosystem-based management. Students also participate in simulated fishing seasons and modify their gear to reduce bycatch. By the end of the activities, students are informed seafood consumers and can share their knowledge with their families and friends.

Any and all feedback to improve the usefulness of the product for teachers is appreciated [http://www.nmfs.noaa.gov/stories/2012/10/10\\_12\\_12noaa\\_fisheries\\_lesson\\_plans.html](http://www.nmfs.noaa.gov/stories/2012/10/10_12_12noaa_fisheries_lesson_plans.html)

## VIRGINIA SCHOOLYARD HABITAT PROGRAM



### Your School Can Request a Teacher Workshop

The VA Department of Game and Inland Fisheries offers six-hour workshops for K-12 teachers on planning and using a schoolyard habitat as an outdoor classroom to teach the state Standards of Learning. Workshops are usually arranged for the faculty at one school. Go to [www.vanaturally.com](http://www.vanaturally.com) and click on "WET, WILD... WORKSHOP REQUEST FORM."



### Do You Already Have a Schoolyard Habitat?

Apply for a Habitat Partners® Certificate! A good habitat has food, water and cover for a variety of wildlife species. If your school qualifies for a certificate, you can receive a Habitat Partners® sign. Application available at [www.dgif.virginia.gov/habitat/schools/](http://www.dgif.virginia.gov/habitat/schools/)

# Space Junk in Virginia??

By: Jeremy Ferrara

Fourth-grade teacher in Arlington County.



Jeremy Ferrara is a 4th grade teacher at Taylor Elementary School in Arlington, VA. He is participating this year in a one-year professional development program with the Virginia Initiative for Science Teaching Achievement (VISTA) focused on helping teams of 4th-6th grade teachers improve the teaching of science and student achievement. For information or to apply, visit [vista.gmu.edu](http://vista.gmu.edu).

## Introduction:

One of my major professional development goals while participating in the VISTA program this summer was to learn how to make my science lessons more challenging and more engaging. I am lucky enough to have a school population of very high performing and motivated students that I sometimes feel like I'm not challenging enough. We study many exciting areas of science such as physics, electricity, and space, yet I still felt something was missing.

Throughout the VISTA program, we explored and learned about Problem-Based Learning (PBL). PBL is a curriculum model that develops problem-solving skills and helps students earn the necessary content knowledge and skills in the context of a larger scientific or social problem. It is in the process of dealing with real problems that students learn both content and critical thinking skills. Using a PBL structure, students also obtain life long learning skills by building their ability to find and use appropriate learning resources. The VISTA program also emphasized the concept of explicitly teaching "The Nature of Science". Together, these concepts help students understand that science demands evidence, and that science is ever changing.

During the VISTA program, a group of 12 of us spent over a week, developing an interesting and engaging problem, designing lessons and research for a group of students to embark upon. This project also included an assessment piece to make sure students were not only engaged and excited, but also learning the high level science concepts.

## The Problem:

The problem we developed was focused on space junk or space debris. Space junk/debris is the collection of natural and human-made objects in orbit around Earth. Our problem was: What problems could be caused by space junk and how can we mitigate the possible effects? The students were assigned the role of Space Pollution & Environmental Conditions Specialists (SPECS). One of the areas that my group was assigned to teach was what happens if space junk enters our atmosphere. Our underlying questions that we would be answering throughout this lesson were: What will be the impact of space junk hitting land? How will changing the ground composition, height, and mass of the space junk affect the width, depth and surrounding area of the crater? We split the lesson into three parts: research, exploration, and then my favorite part, a hands on assessment!



## Part 1 (Research):

Before the students could explore the impact of a crater hitting land, they must understand the composition of the ground throughout Virginia. Being a fourth grade teacher, this fit perfectly into the 4th grade social studies and science SOL's about Virginia regions and natural resources. We had the students use computers to research the 5 regions of Virginia and the composition of the land within each. They discovered that the coastal plain/tidewater region was made up of a rock base but mostly sand and soil; the piedmont region is made up of a rock base and very hard clay-soil, and then the blue ridge mountain region is made up mostly of rock. The students decided to use these 3 regions since they are the biggest and the most important when looking at where space junk would fall.

## Part 2 (Exploration):

After students learned about the land makeup of Virginia, we then had the students explore crater formation from impacting space junk. To start, the teachers created a demonstration bin filled with soil, sand and pebbles to mimic the ground



composition at our current location, the Piedmont Region. Students made observations of the layers and compared them back to their research. Teachers then showed the students the tennis ball that they would be dropping from a height of 1 meter. Students were asked to predict what would happen when the tennis ball strikes the earth. The tennis ball was dropped and the students compared their predictions

to their observations in the demonstration bin.

We then asked the students to think of questions or variables we could change in the demonstration that would cause the space junk to have a different impact on the last. The students determined that the size and mass of the space junk, the land composition, and the height that it fell from all could

continued....

impact the size of the crater. After this brainstorming, students were given the opportunity to inquire by filling a clear bin with a soil composition of their choice, and testing how the mass of different objects and land composition would effect the crater size. Students were instructed to only change one variable of the lesson each time to make sure they knew which variable was affecting the crater. The students were very excited and engaged in this exploration part of the lesson.

### Part 3 (Assessment):

At this point in the lesson, students had learned a lot and enjoyed exploring and sharing their findings, but we were missing an effective assessment. We came up with a hands-on assessment where students were instructed to create a complete bin of their choice trying to make the smallest crater they could and then another bin to make the largest crater they could. To create a large crater, most students chose the softest land composition, the tallest height, and the most massive object. To create the smallest, most chose a combination with the opposite parameters. The results were exciting and students expressed concepts they had learned in a way that I had not seen before during an assessment. Instead of students sitting in front of a test, worksheet, or writing a lab, students were engaged in solving the very problem we had encountered from the beginning.

### Reflecting:

This lesson was so exciting for me as a teacher because we were able to connect so many different areas of our curriculum. We were also able to take a simple hands-on science lesson and build more inquiry into it by allowing the students to build the



final part of the lesson. I had never seen students so engaged in something that they knew they were being assessed on. This lesson used the highest levels of inquiry because students were collecting and analyzing data to then use that evidence to solve the much larger space junk problem. Students were also very socially engaged when finding evidence to support or disprove what they believed to be true.

Even though I am a fourth grade teacher, this lesson went far beyond the Virginia SOL's in fourth grade. These students were not just learning science concepts but they were experiencing what it is like to be a scientist. I have used this PBL model I learned about during the VISTA program in my classroom throughout this academic year and my students are by far the most excited and engaged they have been in my four years of teaching.


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Roxie Godfrey, Regent Graduate  
Virginia FCS Teacher of the Year, 2009

EDU120757 \*Source: [www.usnews.com/education/online-education](http://www.usnews.com/education/online-education).





## Three Virginia Science Teachers Selected For Fellowship Program in Prestigious NSTA New Science Teacher Academy

The National Science Teachers Association (NSTA), the largest professional organization in the world promoting excellence and innovation in science teaching and learning for all, in collaboration with The Dow Chemical Company, the Amgen Foundation; Astellas Pharma US, Inc.; the American Honda Foundation; the Bayer USA Foundation; and Lockheed Martin, today announced that three out of the 244 science teachers chosen as Fellows in the 2012-2013 NSTA New Science Teacher Academy are from Virginia. Selected from hundreds of applicants nationwide, the Fellows (listed below) will participate in a year-long professional development program designed to help promote quality science teaching, enhance teacher confidence and classroom excellence and improve teacher content knowledge.

### Dow-NSTA Fellows

- **Jeannine Bagnall**, Belmont Ridge Middle School, Leesburg, Va.
- **Lacey Jeffreys**, Transition Support Resource Center, Fairfax, Va.

### Amgen-NSTA Fellow

- **Jason Betzner**, Hampton High School, Hampton, Va.

“We are thrilled to provide these teachers with the resources and support needed to help them feel confident and passionate about the critical work they do in inspiring today’s youth to become tomorrow’s leading STEM professionals,” said Gerry Wheeler, interim executive director, NSTA.

“Dow believes the future of successful STEM related careers for our youth is heavily influenced by passionate science teachers who are encouraged and mentored in their profession,” said Bo Miller, president of The Dow Chemical Company Foundation. “The New Science Teacher Academy engages early career teachers in an impactful way and Dow is proud to support them as they develop their teaching skills.”

The 2012 Fellows were selected on the basis of several criteria, including showing evidence of a solid science background and displaying a strong interest in growing as a professional science educator. Each Fellow will receive a comprehensive NSTA membership package, online mentoring with trained mentors who teach in the same discipline, and the opportunity to participate in a variety of web-based professional development activities, including web seminars. In addition, each Fellow will receive financial support to attend and participate in NSTA’s 2013 National Conference on Science Education in San Antonio.

For this academic year, The Dow Chemical Company, the primary sponsor of the program, will fund the participation

of 195 science teachers as Dow-NSTA Fellows. The American Honda Foundation will support three science teachers as Honda-NSTA Fellows and the Amgen Foundation will support 11 science teachers as Amgen-NSTA Fellows. Astellas Pharma US, Inc. will support 14 science teachers primarily from the Chicago area as Astellas-NSTA Fellows and the Bayer USA Foundation will sponsor six science teachers as Bayer-NSTA Fellows. The remaining 15 science teachers will be supported by Lockheed Martin and named Lockheed Martin-NSTA Fellows.

Launched during the spring of 2007, the NSTA New Science Teacher Academy, co-founded with a grant from the Amgen Foundation, was established to help reduce the high attrition rate in the science teaching profession by providing professional development and mentoring support to early-career science teachers. Since its inception, the Academy has provided high-quality professional development to more than 800 science teachers nationwide.

For a list of the 2012-2013 Fellows or to learn more about the NSTA New Science Teacher Academy, please visit [www.nsta.org/academy](http://www.nsta.org/academy).

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## Carbon Connections Curriculum

Carbon Connections is an inquiry-based, three-unit, online curriculum for students in grades 9-12. The course was designed to improve students’ understanding of the carbon cycle and the science of Earth’s climate. Each unit includes five lessons. The concepts covered in the lessons span all science disciplines.

The three units follow carbon in past, present, and future contexts. Each lesson is designed to engage students by allowing them to manipulate NASA data in a controlled, online environment. This will enhance their understanding of the carbon cycle and the science of global climate change. See: <http://carbonconnections.bsccs.org/>



# Poochies

## by Design Ethical Issues



By Kathy Frame

Papillion Education Services, LLC

*Portions based on "A Recipe for Traits,"*

*University of Utah, Genetic Science Learning Center,*

*15 North 2030 East, Salt Lake City, UT 84112*

### Student Groups

Organize students into groups of 4 to aid in discussions on the ethics of designer dogs.

Handle scissors with care.

### Introduction

Labradoodle, Golden Doodle, Pekapoos, Puggles, Morkies... Designer dogs sometimes referred to as Boutique dogs and hybrids. The names are cutesy and it is fashionable to have a designer dog. A designer dog is the result of mating two purebred dogs to obtain the best traits of both in one dog. Unfortunately, this is not necessarily the case. Some are guaranteed to be allergy-free, intelligent, and playful and with body size and type, hair color, and other traits of choice. It possible to have the designer dog receive the worst traits of both purebreds if the breeder is not ethical and is not knowledgeable. It is a buyer beware situation. Remember designer dogs are not breeds and be sure to know the breeder and his/her ethics!

Since the number of harmful, recessive genes in one dog may be as high as 20, proper breeding is crucial. Genetic problems for specific purebred dogs are known, but considered to be low due in the breeds due to ethical breeding practices. The exception is the breeder who is interbreeding and breeding dogs with known genetic problems and the puppy mill breeders. The problem is magnified in rare breeds due to their small gene pools.

In this activity, you will simulate the establishment of a purebred dog breed and name it. For the purposes of this lab activity, assume that your breed has been established for 200 or more years and has a known pedigree of good and bad traits. The ones selected during the simulation and found on the Purebred Dog Genome Template.

You decide that you would like to design a dog that would increase the vigor of your dog's pedigree by breeding it to another purebred dog. You know that others are making designer poochies solely for profit. As a breeder of purebreds, you know it is important to breed to improve and to know your genetics. Your fellow breeders argue you designer poochies are just mutts with a cute name and that you would be doing more good by going to the local animal shelter to purchase the dog with the desired traits that you want. This will be less expensive and help reduce the pet overpopulation. What will be your decision?

### Purebred Simulation

#### Materials

- 1 DNA Dog envelope per person
- 1 Roll of scotch tape per group of 4 students
- 1 Key to Traits per person
- 1 Purebred Dog Genome Template

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### Synopsis

Students will do a paper simulation to develop a fictional dog genome by selecting DNA nucleotides randomly for a given set of traits and compare outcomes with other students in the class.

### Level

Grades 9 and 10

### Key Concepts

Sequence of DNA nucleotides determines various traits. These combined sequences make up the dog genome.

### Directions for Instructors

Preparation Time: 1 hour to gather materials and make photocopies and make Dog DNA envelopes.

### Materials

- 24 envelopes
- 1 pair of scissors
- 1 paper cutter
- 1 Key to Traits Master
- 1 DNA Nucleotide Sequences Master
- 6 rolls of tape

### Safety

### Directions for Setting Up the Activity

#### Dog DNA Envelopes

1. Label 24 envelopes Dog DNA  
Make 10 photocopies of the DNA Nucleotide Sequences Master
2. Cut each strip into the four DNA nucleotide sequences.
3. Place 10 DNA nucleotide sequences in each envelope. There should be 6 unique nucleotide sequences and 2 sets of 2 that are the same.
4. Photocopy 24 copies of the student pages.

### Key to Traits

Make 24 photocopies of the Key to Traits master

### Materials

For each class of 24, provide the following:

- 24 Keys to Traits sheets
- 24 Dog DNA sets of sequences
- 6 rolls of tap, shared

### Directions for Purebred Dog Genome

Each student should work separately and complete the following steps to assemble their purebred dog genome.

1. Obtain a DNA DOG envelope, a Purebred Dog Genome Template, and a Key to Traits.
2. From the DNA DOG envelope, select one set of nucleotides for the trait eye color.
3. Match the set of nucleotide sequence to that found in the Key to Traits to determine which eye color your dog will have.
4. Tape the set of nucleotides you selected in the area provided for eye color on the Purebred Dog Genome Template, and enter the eye color that matches the nucleotides in this area provided to the side.
5. Repeat this procedure for each trait in the Purebred Dog Genome Template.
6. When you have completed all 10 traits, name your breed of dog.
7. In your group, you now have four distinct breeds. Compare your dog genome to others in your group. If you were to mate your dog with another dog, do you see traits that would improve your dog's genome? Potentially harm it?

### Directions for Designer Poochie

1. Read the following Guidelines for Dog Breeding by the American Kennel Club (AKC) and the second article on the thoughts of one professional breeder and a veterinarian:

#### A Guide to Breeding Your Dog ©2007 American Kennel Club

1. Prepare Yourself for Breeding a Litter
2. Breed to Improve
3. Understand the Commitment
4. Choose A Suitable Mate
5. Know Your Genetics
6. Finalize Stud Contract
7. Perform Pre-Breeding Health Checks
8. Mating
9. Pregnancy and Whelping Preparation
10. Puppies Are Born
11. Consult Your Veterinarian if Complications Arise
12. Keep Your Puppies Warm, Fed, and Clean
- \*13. Register Your Litter with the AKC Soon After Whelping
14. Wean Puppies from their Mother
15. Sending Your Pups to Their New Homes
- \*16. Encourage New Owners to Register Their Puppy with the AKC
- \* Do not apply. Designer dogs cannot be registered with the AKC.

2. Each member of your group should select one of the four Poochie by Design Breeder Profile:
  - a. *Professional Breeder*. Breeder is concerned with increasing the quality of the dog by design to temperament and appearance of their purebred parents.
  - b. *Inexperienced Breeder*. Breeders hope to profit from crossing two breeds to create designer puppies without the health problems but with the temperament and appearance of their purebred parents.
  - c. *Puppy Mill Breeder*. Breeds purely for profit and keeps dogs in cages for breeding purposes their entire lives. These dogs do not have human contact and are often

kept outdoors even in extreme weather.

- d. *For Profit Breeder Only*. Breeders hope to profit from crossing two breeds to create designer puppies without the health problems but with the temperament and appearance of their purebred parents with profit as the main goal and in it short term.
3. From the perspective of your Poochie by Design Profile, how would you respond to the following:
    - a. Review the traits of your Purebred Dog and select the ones you would like to maintain and the ones you would like to improve.
    - b. Look at the possible traits on your Key Traits form and select the ones that you would like your designer dog to have.
    - c. Review the traits in your dog's genome and find another purebred in your classroom that would be a desirable mate.
    - d. Find a breed in the class that would be a good choice for your designer dog.
    - e. Support your choice.

#### PUREBRED DOG GENOME

NAME \_\_\_\_\_

TRAIT	EXPRESSION
EYE COLOR	
COAT COLOR	
HAIR TEXTURE	
EAR SHAPE	
LEGS	
TEMPERAMENT	
HEAD MORPHOLOGY	
OCD	
SHEDDING	

Label Envelopes:

# DOG DNA

Table of Contents

# DOG DNA

DNA Nucleotide Sequences Master

<b>Key</b>			
<b>EYE COLOR</b> Dark Brown	Light Brown	Blue	Green
ACCCAAGCCTAC	CAAACCTAGGCC	GCCACCTACCAA	TACCAAGCCACC
<b>COAT COLOR</b> Black	Red	Cream	White
ACCCAAGCCTAC	CAAACCTAGGCC	GCCACCTACCAA	TACCAAGCCACC
<b>HAIR TEXTURE</b> Wiry	Smooth	Wavy/Curly	Hairless
ACCCAAGCCTAC	CAAACCTAGGCC	GCCACCTACCAA	TACCAAGCCACC
<b>EAR SHAPE</b> Button	Folded	Rose	Cropped
ACCCAAGCCTAC	CAAACCTAGGCC	GCCACCTACCAA	TACCAAGCCACC
<b>LEGS</b> Extra short	Short	Medium	Long
ACCCAAGCCTAC	CAAACCTAGGCC	GCCACCTACCAA	TACCAAGCCACC
<b>TEMPERAMENT</b> Sound	Unsound Submissive	Unsound Overaggressive	Unsound Temperamental
ACCCAAGCCTAC	CAAACCTAGGCC	GCCACCTACCAA	TACCAAGCCACC
<b>HEAD MORPHOLOGY</b> Apple-headed	Mesocephalic	Dolichocephalic	Brachycephalic
ACCCAAGCCTAC	CAAACCTAGGCC	GCCACCTACCAA	TACCAAGCCACC
<b>OCD</b> Affected	Not Affected	<b>SHEDDING</b> High Level	Low level
GCCACCTACCAA	TACCAAGCCACC	ACCCAAGCCTAC	CAAACCTAGGCC
<b>DNA (Envelopes)</b>			
ACCCAAGCCTAC	CAAACCTAGGCC	GCCACCTACCAA	TACCAAGCCACC
ACCCAAGCCTAC	CAAACCTAGGCC	GCCACCTACCAA	TACCAAGCCACC
ACCCAAGCCTAC	CAAACCTAGGCC	GCCACCTACCAA	TACCAAGCCACC
ACCCAAGCCTAC	CAAACCTAGGCC	GCCACCTACCAA	TACCAAGCCACC
ACCCAAGCCTAC	CAAACCTAGGCC	GCCACCTACCAA	TACCAAGCCACC

These DNA nucleotide sequences are reduced in size by 50% by the editor.



## Two Views on Designer Dogs

### Professional Breeder

Designer dogs tend to be a touchy subject in the show world and among show breeders so many people would disagree with my philosophy because I personally don't have a problem with the designer dogs. However, that being said, I do have one exception to that statement and that is the quality of the two dogs being bred. I think this is where many quality breeders have a problem, but some take it to the extreme, thinking it is an absolute sin to produce cross breeds and will be on their soap box when the subject is mentioned.

When looking at it from an open perspective there are advantages to these types of breedings because with many breeds you have breed specific health concerns and when crossing the lines to other breeds you lessen the chance of those health concerns coming to light, genetically speaking, basically because you are diluting it. For instance, Cavalier King Charles Spaniels are known for having heart issues. When crossing them with a breed that does not have this issue commonly in their lineage, you are lessening the likelihood of producing pups with heart problems. Of course, that goes back to the quality of the breeding stock you start with. The same testing should be done on the parent dogs that is done on purebred dogs before breeding or at least the lineage should be known, meaning you should have experience with the lines behind the dogs being used. The problem arises because many breeders of the so-called designer dogs do not follow these basic guidelines, like starting with quality stock and healthy stock.

One reason could be the fault of the quality breeders because they, like myself, require their companion pups be spayed or neutered meaning their quality lines are never available for producing designer dogs. Not to mention many breeders put in their show contract that pups being placed for showing, with breeding rights, can't be used for designer production. Now sometimes, depending on the quality of the companion pup in question, it is best they are neutered as they have faults that should not be passed on and for that reason I would not change my practices. Not to mention you don't want your lineage falling into irreputable hands. However, many of those faults are faults specific for the show ring and would not otherwise affect a pup for companion quality so could potentially be a benefit for producing the designer dogs, but to protect lines and their good name these pups will never become available to the designer breeders. A big reason for this is quality breeders don't want their names mixed up with what is considered the pet market or the "pet shop" market and in many cases with good reason.

The other reason is because the designer market is specifically geared towards the pet industry (not breed specific confirmation) meaning there are few guidelines to follow other than health testing and because these breedings are done for monetary gain rather than breed quality, corners are often cut on health testing and, therefore, inferior specimens are often chosen for breeding stock. Now, I understand these breeders can't easily get their hands on the best of the best because show breeders aren't going to sell to them without a neuter contract, however, that does not mean they can't acquire the best they can get and then do health testing before adding the specimen to their breeding program. This is the area I have a problem with in regards to designer dogs. While you do reduce the chances of breed specific genetic ailments cropping up in mixed lines, you do still need to know the specific dog you are breeding is healthy. For instance, the Cavalier mentioned earlier: Typically they are an expensive breed, even in the pet market so for profit breeders tend to buy cheaper specimens. If you are breeding a Cavalier with a heart issue to a healthy dog of a different breed you are still lessening the chances of producing the heart issue when compared to breeding the unhealthy cav to another cav, but if the cav being bred is unhealthy then the pups produced have a 25-50% chance of being afflicted or carriers of the affliction and therefore even the healthy offspring could produce the affliction in their own offspring. It's like dominoes. This is where knowing your lineage as well as the health of each individual dog being bred is important and yet because you are dealing with less than the best and likely don't have access to pedigree information, it is often impossible to track lineage.

The other major problem with designer dogs is the temperament. Part of this is genetic and part of it environmental. Don't get me wrong as there are pet breeders who do a good job caring for their animals with top of the line facilities, care and handling. However, the pet breeders who do not do a good job of this tend to keep dogs in less than ideal quarters, often over-crowded where territory and food disputes erupt etc...These issues lead to temperament problems and if the breeding dog has a genetically inclined temperament issue on top of that, not only is it passing this on to their offspring genetically, but also environmentally. While the moms are often moved to individual whelping crates or areas to raise their pups there is less likely of a chance of territory disputes between mom and any other dogs so at least that is kept away from the pups, but if this same mom has learned she must fight for her food, toys, territory etc...with other dogs then she will likely be territorial with the pups

over these same things as they begin weaning so there you have the environment and genetic temperament issue coming into play and passing on to the pups.

So, over-all I don't think designer dogs are bad. I think many breeders of designer dogs are bad. And I'm not necessarily speaking from a care standpoint, but mostly from a health and genetic standpoint. Another thing I did not mention that I like with the designer breeds is the genetics of coat. When ever you breed a shedding dog to a dog with a non-shedding coat or what is often considered hypoallergenic like Poodles, maltese etc...you get those benefits in the offspring produced. For instance, breeding a lab to a standard poodle gives what the market calls a Labradoodle and the majority of the time they end up with a non-shedding coat and often with less dander. So people what want a big dog like a lab, but can't handle the coat shedding and dander can enjoy some of those same lab qualities without the coat issues.

Other than the bad breeders who do not do health testing or breed poorly representative specimens there are genetic benefits to designer dogs. From a show breeder standpoint I wouldn't be well liked for saying that in many circles, but from a genetic standpoint there are benefits. Personal communication to Kathy Frame from breeder.

### Veterinarian

...designer dog, also known as a "dog hybrid".. (are) a deliberate crossbreed between two pedigree breeds of dog, with the intention of obtaining the best of both breeds. The resulting breed-mixes have carefully coined names to add to their appeal: Labradoodles, Peke-apoos, puggles, Labradingers and cockapoos. The theory behind designer dogs seems logical: if you mix two different pedigree breeds, you hope to produce puppies that have the best qualities of each of their parents, and a lower likelihood of the inherited diseases that plague some breeds. The term "hybrid vigour" (or "outbreeding enhancement") describes the extra health and vitality that is hoped for. However, there is a risk that is often forgotten. You may end up with the worst of both breeds – a phenomenon known as "outbreeding depression".

If a pug was crossed with a Pekinese, you could end up with puppies whose eyes protrude so far that they literally all out. Or if a Newfoundland was crossed with a St Bernard, the huge progeny could have debilitating heart disease or crippling arthritis. The problem with designer dogs is that genetics is a complex game of chance. You could be taking a big gamble, especially if you are mixing breeds, which



## Two views on Designer Dogs continued:

represent the extremes of the normal range of domestic dogs. In the world of pedigree breeding, there is always the risk of a puppy developing diseases inherited from its parents. If you open a standard veterinary textbook, you will find a long list of the conditions that are common in different breeds. Examples include arthritis, blindness, non-functional kidneys, liver disease, heart failure, breathing problems, psychiatric disorders, itchy ears and skin disease.

Why are purebred animals prone to these diseases? The answer lies in the genetics of breeding. In nature, "survival of the fittest" is the basic law. Individuals that are stronger, healthier and more vigorous than their siblings are more likely to survive and breed. As a consequence, the "weak" genes that make animals prone to disease are weeded out. In the dog-breeding world, humans have taken over nature's role. Dog breeders select the animals that are used for breeding, and their criteria may be very different from the simple "survival of the fittest". To produce puppies with a

particular physical appearance and personality, you need to deliberately breed from dogs that possess those qualities. However, as well as possessing the desired attributes, the resulting puppies may have other, less desirable qualities, such as vulnerability to inherited diseases that may not become obvious for several years.

The authorities which represent the dog-breeding world (such as the Irish Kennel Club) are very aware of breed dispositions to certain diseases, and they are working hard to solve the problems. There are screening programmes in place, with the aim of removing some of the worst inherited diseases from the breeding pool. If you plan to breed from a golden retriever, you should have her hips and elbows X-rayed and analysed by experts. If she has healthy joints, she is given a good rating, and if she has joints that are more likely to develop arthritis later in life, she is given a bad rating. If you choose a golden retriever puppy from parents which both have good ratings, then you are much more likely to have a dog that matures with healthy, arthritis-free joints.

Similar screening programmes are in place for other breeds with a tendency to arthritis, and for certain types of inherited eye problems. The latest genetic technology is now being introduced to develop even more advanced methods of screening. An international research programme known as the Dog Genome Project has mapped out a detailed genetic analysis of the domestic dog.

Recent screening trials involve analysing the genetic make-up of a large number of animals to try to pinpoint the genetic background to known inherited problems. If this information can be obtained for a particular disease, the best animals for breeding can be identified through a simple laboratory test carried out on a blood sample or a mouth swab. Already, more than 15 diseases can be screened out using the latest DNA tests. Many breeders already have a good understanding of genetics. If you look at any purebred dog's pedigree, you will see a map of an individual's genetic background over half a dozen generations.

Reading for "Poochies by Design"

10 THE IRISH TIMES MAGAZINE  
APRIL 15, 2006



## *Encourage New Science Teachers by Supporting the Eduware "First Timers" Awards!*

Your contribution to the Eduware "First Timers" Awards Endowment for excellence in science education will make a difference. VAST hopes to honor and support those whose accomplishments enhance science education. A donation from Bill Stevens of Eduware, Inc., has made it possible for VAST to award to new teachers the cost of the registration to a VAST PDI. By contributing to these efforts, you are supporting the attendance of new, vibrant members to our professional development institute, (PDI). This fund supports those PDI registrations from teachers who have three years of experience or less.

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In order to increase the endowment's principle, we need your support for this program. VAST members and non-members may make a voluntary pledge to the endowment. Together we can all make a difference by helping to support the expenses of the new educators so that they may continue in the field.

Please make a pledge today. This is just one way to support new science educators and quality science education for years to come. VAST is a 501c3 organization and is eligible to receive tax exempt donations.

and make your check payable to VAST. Please let Jimmy know that your check is a contribution for the "First Timers Award Endowment".

Thank you!!!

## **Thomas Jefferson Medal for Outstanding Contributions to Natural Science Education**

The Virginia Museum of Natural History Foundation invites nominations for its 26th Annual Thomas Jefferson Medal for Outstanding Contributions to Natural Science Education. This award will be given to a Virginia educator who has made significant contributions to natural history or natural science education at any academic level. The award will be presented during a special ceremony on March 14, 2013 in Blacksburg on the campus of Virginia Tech.

### **Award Criteria**

- Nominees must be individuals who have consistently made outstanding contributions to natural history and natural science education in either the formal or informal sectors. Preference will be given to those whose accomplishments have an obvious connection with natural history.
- Nominees must exemplify the best educational practices and stand as models worthy of emulation by others
- Nominees must be Virginia educators.

### **Nominations**

The letter of nomination should provide the following:

- Full description of the outstanding contributions to natural science for which the person is being nominated
- The nominee's full name, title, home and work addresses, telephone numbers and e-mail address
- Name, address, phone number, e-mail address, and signature of the person making the nomination
- Letters of support from individuals other than person making nomination

Materials that document the nominee's accomplishments can also be submitted but are not required. This normally includes a resume, newspaper articles, and other materials that support the nomination. We can only accept materials that can be readily photocopied for distribution to the selection committee. No materials will be returned. Contact Charlotte Harter at 276-634-4162 or [charlotte.harter@vmnh.virginia.gov](mailto:charlotte.harter@vmnh.virginia.gov) for additional information. Send the complete nomination package to:

Thomas Jefferson Awards Selection Committee  
Virginia Museum of Natural History Foundation  
21 Starling Avenue Martinsville, VA 24112

**Nominations must be received no later than January 18, 2013.**

The Virginia Museum of Natural History Foundation's Thomas Jefferson Awards were established in 1987 to honor individuals, associates, and corporations who have made significant contributions to the natural sciences in Virginia. The awards are named for Virginians, by birth or adoption, who have established traditions of excellence in the world of science and who have brought recognition and prestige to the Commonwealth.

# Two Wind Turbines Installed at Virginia Schools as Part of the Virginia Wind for Schools Program

On November 19th and 20th two SkyStream 3.7 small wind turbines were installed at Central High School in Woodstock and Thomas Harrison Middle School in Harrisonburg, respectively. These turbines were installed as part of the Virginia Wind for Schools Program and are intended to act as an educational tool to teach students about wind energy. Additionally, the turbines will expand the awareness and hopefully the acceptance of wind energy in their local communities.

The Department of Energy's Wind Powering America program sponsors the Wind for Schools project to raise awareness in rural America about the benefits of wind energy while simultaneously developing a wind energy knowledge base in future leaders of our communities, states, and nation. Schools participating in the program not only get an amazing new technology as a teaching tool but teachers are also trained on curricula to incorporate this technology and its data into the classroom.

The Virginia Center for Wind Energy (VCWE) at James Madison University (JMU) administers the Wind for Schools program for Virginia. In 2010, the first year the program was in place in Virginia, VCWE began working with Central High School in Woodstock and Thomas Harrison Middle School in Harrisonburg. Students and staff from JMU worked with each school closely to assist them through the project development process, including assisting with seeking funding, permitting, siting and resource analysis. The schools ended up taking very different paths through the process based on the challenges they faced.

Central High School (CHS) in Woodstock contacted VCWE after two teachers attended a teacher workshop on wind energy where they heard about the Wind for Schools program at JMU. The first hurdle to overcome with the project is securing funding for the wind turbine – up to \$20,000. After much brainstorming the school submitted a proposal for funding from a county education fund, the Moore Trust Foundation. Unfortunately, their first proposal was not funded due to the lack of permitting that had been done for the project. The students from the CHS Ecology class presented to the county school board to get approval to proceed with the project and then the town of Woodstock was contacted about gaining the proper permits for the project. At that time, the town did not have a wind ordinance to guide them, so staff from the VCWE presented to the zoning committee



some suggested regulations for a wind ordinance. Using that information the zoning committee drafted a wind ordinance and held public comment periods, which the VCWE staff and CHS teachers and students attended. In the end, the school was able to gain the proper permits through the wind ordinance and a special use permit. With the permitting in progress, their second proposal to the Moore Trust Foundation was successful and they received additional funding from the Dominion Foundation for a total of \$24,550. With the permits and funds in hand, the school contracted with an experienced small wind turbine installer, Baker Renewable Energy, to install their wind turbine. The foundation was poured in October 2012 and the turbine was raised into place in November 2012. The students at the school gained a solid understanding of the work it takes to get a project done at the school and a firm grasp on the project development process for a small wind turbine.

Thomas Harrison Middle School (THMS) in Harrisonburg also came into the Wind for Schools program in

2010. Again, the first hurdle to overcome was finding funding. However, this project was lucky to stumble upon a funding opportunity from a local company, the Merck Foundation. Fortunately, the company was looking to support a project focused on education and the environment in the local area and the THMS wind turbine project was chosen. The school was awarded \$14,500 from the Merck Foundation with an additional \$1,000 donated by the local news station, WHSV, and LD&B Insurance and \$1,000 from a school fundraiser. This figure could not cover the entire cost of the equipment and installation so the VCWE staff and students encouraged the school to seek donations from the local community for equipment and services to get the wind turbine installed. The materials and services needed included an electrician, an excavator, and cement as well as an experienced small wind installer to manage all the donated services. The process of securing donations took a lot longer than expected. An article in the local paper started the process and the school was able to secure a couple of donations. However, as time progressed some companies backed out, others did not have the time, and some even went out of business. In the end, Baker Renewable Energy was hired for a modest fee to manage all of the installation logistics for the project and all the necessary donations were obtained. Although this was a very difficult and



logistically complicated way to get the installation completed, the school and the students learned a lot about the project development process. In addition to the funding issues, the THMS project also had some difficulty in siting their turbine. As with many schools, there is not always a lot of land on the campus that is open and not already being used for other purposes such as athletic fields. The turbine was initially sited on a small hill close to the road but it was found that this site was also home to many underground utility lines including a high pressure gas line. In order to avoid the utilities the project was moved closer to the school and school board approval was needed to relocate the project. Students from the Ecology Club at THMS presented to the school board and approval was granted. The foundation was poured in October 2012 and the turbine installed in November 2012.

On December 11, 2012 both schools held dedication ceremonies to commemorate their wind turbine projects and to excite the students about the opportunities it will provide. The dedication ceremonies featured a mosaic design contest, writing contests with readings by the winners, as well as slideshows of project pictures, and speakers from the U.S. Department of Energy, National Renewable Energy Laboratory, and the American Wind Energy Association.

Now that the turbines are up and spinning the students will have access to real-time wind energy generation data to use in the classroom. In addition, students in the CHS Ecology class plan to compare the use of solar panels to the data from the turbine to see if that is a viable next step for the school. The turbines will also be used to educate students and teachers in schools in near-by towns and counties through tours and through sharing of the data.

## Register Now for the 2nd Annual Virginia KidWind Challenge!

This year's Challenge will be held at Thomas Harrison Middle School in Harrisonburg, VA on Saturday, March 16th 2013 from 10 am-3 pm.

The Challenge: The Kid Wind Challenge is a wind turbine design competition for middle and high school students. Teams of 2-4 students incorporate engineering and science to build powerful small-scale wind turbines and compete with other students from around the state to generate the most electricity. This event is a chance to get students involved and excited about alternative energy and sustainability. On top of gaining teamwork, leadership, and problem-solving skills, students will

learn key scientific concepts during their constructions. This is a great opportunity that we hope you'll take advantage of! For more information about the challenge and the complete rules, click here.

New This Year: There is a new division called the Open Division where students build their own generator. More details will be posted here as we learn more from KidWind. In addition, this year the top three teams (one from each division) will receive an invitation to compete in the National KidWind Challenge in Chicago, IL in early May during the American Wind Energy Association WINDPOWER conference.

For more information go to: <http://learn.kidwind.org/challenge>



### Congratulations to the 2012 Virginia OBTA winner, Dr. Carol Stapanowich

Bishop Sullivan Catholic High School, Virginia Beach  
Kathy Frame, Virginia Outstanding Biology  
Teacher Award (OBTA) Director, presents the  
National Association of Biology Teachers (NABT)  
OBTA to Carol Stapanowich at VAST PDI.





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Next Deadline for *The Science Educator* for

articles, letters to the editor, or labs is:

**March 1, 2013.**

**The next issue of The Science Educator will be a Green Digital issue, sent to you by the middle of March. Please look for it at that time and check the VAST website if you do not receive your copy.**

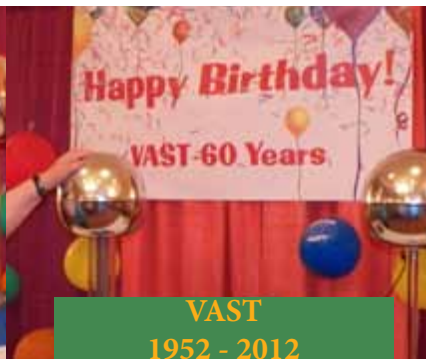
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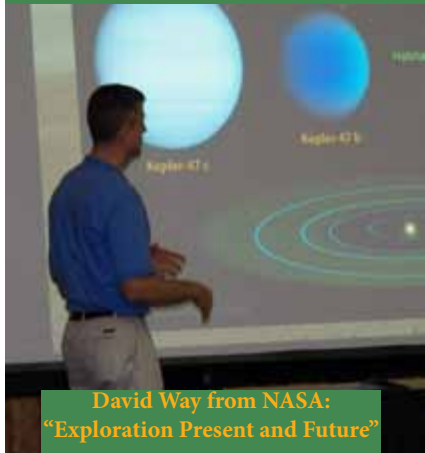
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*Designing Your Way  
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Van de Graaff Generator  
Experiencing Science "First Hand"



VAST  
1952 - 2012



David Way from NASA:  
"Exploration Present and Future"



Scientific Method Contest  
How Far will that Marble Go?



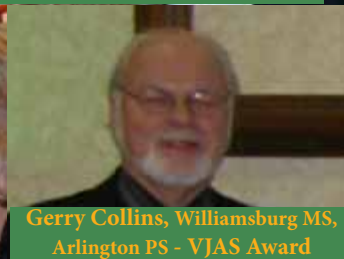
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Don Foss Presents VAST Awards



VAST PDI Registration



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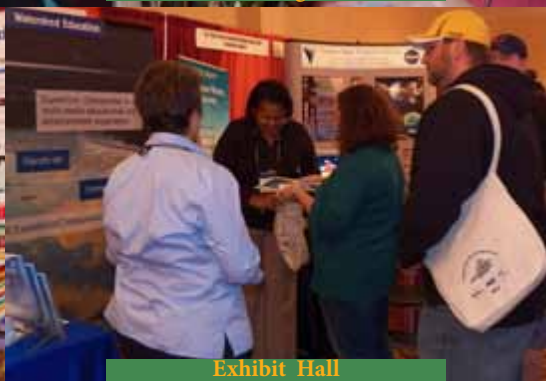


Exhibit Hall



Shirley Sypolt mans the VAST  
Store in the Exhibit Hall



Ron Shaneyfelt D-J for the VAST Auction-  
Dance



Scientific Method Contest  
How Many Teachers Does It Take?



Colleagues gather to decide  
where to go next.





William Kelso: "Explorations Past"  
Jamestown



VAST President 2012, Juanita Jo Matkins,  
passes the gavel to Brita Hampton, VAST  
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Kenneth Wesson: Next Generation Success:  
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Eric Pyle Calls the VAST Auction.  
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Teacher's participate in Wesson's Experiment  
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Jennifer Seydel: "Greening Schools  
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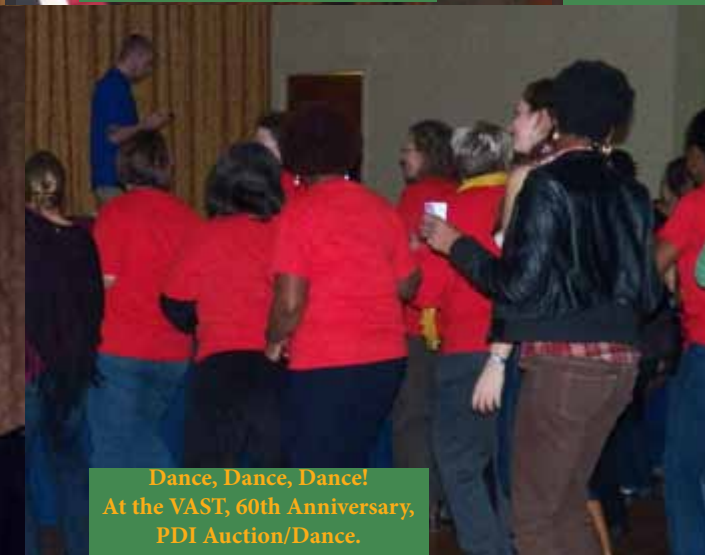
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