



The CRCST Quarterly

Volume LXVI No. 3

66 Years

Fall 2010

.....from the Editor

Norm Schmidt

CRCST's 40th Annual Fall Conference will be held on Saturday, Oct. 16 at the Zoo. The decision on a keynote speaker was made last Spring and turns out to be almost preternatural. Since inviting **Tim Harrison**, the exotic animal rescue expert from southeastern Ohio, we have experienced a caged bear mauling the man responsible for it's feeding. Another chimpanzee incident and a python found in a local park.

Those so inclined can find exotic animals for sale in the newspaper classified sections and of course on the internet. The cute little cubs or tiny little reptiles eventually grow-up and become, in many cases, unwilling or unable to be safely and happily kept in captivity. Often the irresponsible "owners" simply let the adult animal go in their neighborhood or in some cases the adult animals find a way to escape their confinement .

Some of us heard Tim talk at a SECO conference in Akron several years ago and felt it would be great, and the venue appropriate, to bring him to northeast Ohio again.

We are offering a \$10 rate for our non-science educator friends who wish to come and hear the keynote talk only. (See the registration form on page 7 of this document.) So, invite your friends and family to hear

"The Elephant in the Living Room"

"The Elephant in the Living Room" will be released at the Cedar Lee Theater on October 15th. The film focuses on the exotic animal situation and features Tim Harrison.

CEDAR LEE THEATRE
2163 Lee Road
Cleveland Heights, OH 44118

It will be a very exciting screening for the science teachers that are planning to attend the Fall Conference and hear Tim's keynote address. All are encouraged to join the face book group for updates and show times.

www.theelephantinthelivingroom.com/screenings.html

a great talk about a timely and critical topic. You can also attend a screening of the film featuring Tim on Friday, Oct. 15 at the Cedar-Lee. See above.

MORE RESOURCES for Teachers

Teachers can explore the many resources in University Circle and at the Cleveland Metroparks Zoo on two different evenings:

1. University Circle - Wednesday, Sept. 29, 2010 from 3:00 to 6:30 PM
2. Zoo - Tuesday, Oct. 12, 2010 from 4:00 to 6:30 PM

More about water resources: The Cleveland Metroparks, Rocky River Nature Center, 24000 Valley Parkway, North Olmsted (440-734-6660) is hosting a fall series of films and food. You can search their

website for the full series of events. One evening that may be of interest to those of us that oppose plastic water bottles and the continued depletion of world and national fresh water resources for profit should make a point to see the film "**Blue Gold: World Water Wars**," on Thursday, Oct. 14, 2010 at 7:00 PM. So, enjoy an educational long weekend: Rocky River on Thursday, Cedar Lee on Friday and the Fall Conference on Saturday. Cheers!



Presidential Column

Mark Waner, President

To paraphrase the Car Talk sign-off: Well you've done it again. You've wasted another perfectly good... Hopefully it just feels like your summer was just too short, and not a waste given the number of hours many have spent engaged in professional development, extra time with family and friends and maybe even a vacation.

The weather has become quite pleasant of late and we've welcomed new blood into our classrooms. It is a time of high energy and great possibilities. Though many of us have the increased cynicism and wisdom that comes with age, I find myself sharing the hope and sense of great opportunity that our students bring with them at the start of the year.

CRCST is at a similar end point and new beginning. It is nearing the **Continued on Page 4**

Science in the News

2011 SECO Conference

Mark your calendars and save the dates for the **New and Improved SECO Professional Development Conference** in Akron, Ohio February 10-12, 2011.

Remembering our Past: Preparing for the Future

The following strands will be highlighted:

- Engaging Students to Aspire to STEM Careers
- Building Excellence in Standard-based Education through Integration, Not the Addition of Technology
- "Going Green"—What Does that Mean?
- Transforming Science Teachers into Science Education Leaders

This year's conference will have a different format. Thursday, February 10 will be devoted to short courses for those who wish to pursue their professional expertise.

Concurrent sessions will be all day Friday and Saturday. One and two day registrations will be available for those who have time constraints.

Vendors will display all day Friday, February 11 and until 2:00pm on Saturday, February 12.

Opportunity to Explore the Poles

Now Accepting Applications
PolarTREC Teachers 2011-2012
Teachers and Researchers Exploring and Collaborating
Arctic Research Consortium of the U.S.

Teacher Application Deadline: Friday, 1 October 2010
For further information, please contact PolarTREC at:
Email: info@polartrec.com
Phone: 907-474-1600
Apply at the PolarTREC website:
<http://www.polartrec.com/teachers/application>

PolarTREC (Teachers and Researchers Exploring and Collaborating) is currently accepting applications from teachers for the fifth year of teacher research experiences. Teachers are invited to submit an application to participate in field research learning experi-

ences during the 2011 (usually Arctic) or 2011-2012 (usually Antarctic) field seasons.

ABOUT PolarTREC:

PolarTREC - a program of the Arctic Research Consortium of the U.S. (ARCUS) and funded by the National Science Foundation - pairs K-12 teachers with researchers for professional development through teacher research experiences in the polar regions. The program integrates research and education to produce a legacy of long-term teacher-researcher collaborations, improved teacher content knowledge, and broad public interest and engagement in polar science.

Through PolarTREC, teachers will spend two to six weeks in the Arctic or Antarctic, working closely with researchers in the field as an integral part of the science team. PolarTREC teachers and researchers will be matched based on similar goals and interests, and teachers will be trained to meet the program requirements prior to the field season. While in the field, teachers and researchers will communicate extensively with their colleagues, communities, and students of all ages across the globe, using a variety of tools including satellite phones, online journals, photos and other multimedia, and web-based seminars. Teachers and research projects will be selected and matched to fill the approximately 12 openings available. All major expenses associated with teacher participation in PolarTREC field experiences are covered by the program, including transportation to and from the field site, food, lodging, and substitute teacher costs.

APPLICATION DEADLINE

Teacher Application Deadline: Friday, 1 October 2010

ADDITIONAL INFORMATION

More information about PolarTREC, including program goals, requirements, expectations, and frequently asked questions, is available at: <http://www.polartrec.com>

More Cold Climate Explorations

Welcome to the 2010-2011 Adelie Penguin breeding season. Follow along as Adelie Penguin families raise their chicks (http://www.penguinscience.com/education/royds_nestcheck.php) in the harshest environment on Earth. Students keep a field journal based on daily photos from Antarctica during the breeding season starting Nov 7 – Jan 28,

2011. Other activities for your classroom include: receive a postcard from Antarctica (<http://www.penguinscience.com/education/postcards.php>), design a flag to fly over the colony (http://www.penguinscience.com/education/design_flag.php), ask a researcher a question, discover how penguins are coping with global climate change, gallery of adaptation photos, field notes, and many other classroom ready activities. Have your class watch for the first penguins of the season to arrive at Cape Royds, and let us know when you see them. Our Penguin cam takes a picture of the colony at Cape Royds every day. Go to our home page: www.penguinscience.com and click on the webcam.

Questions? Email me: Jean Pennycook, Penguin Outreach Coordinator jean.pennycook@gmail.com

Ohio Academic Goals Humbled

Philip A Geis, PhD

Changing a single word can unintentionally affect millions of lives. Recently when the state of Ohio board of education amended its science academic standards, it replaced the "MASTERY" objective with the more modest and humble "UNDERSTANDING" of science, technology, engineering and mathematics (STEM). The Ohio Academy of Science opposes this change, asking that students learn to practice rather than just be aware of STEM subjects.

In today's curriculum, students must develop mastery of the English language, and basic U.S. government and American history. Ohio high school graduates should be able to read, write, and speak our native tongue, know who the governor of Ohio is, understand the checks-and-balances of our federal government and remember that Abraham Lincoln signed the *Emancipation Proclamation*. Unfortunately, the same students are not expected to be masters of STEM... they'll not design and execute scientific experiments, compute the compound interest on their mortgage or credit card debt, know how a semiconductor works in every one of their household electronic devices or what Einstein actually discovered.

Ohio's choice of "understanding" vs. "mastery" makes our students effectively spectators of science, technology, engineering and mathematics.

For 200 years, America has prospered as a result of the ingenuity of our scientists and engineers and the inventions and opportunities they created. Where would we be today without the inventions and opportunities they created. The 20th century brought the inventions that filled factories, created American prosperity and jobs, and raised our standard of living. As

we approached the 21st century, the United States lost leadership of the lowest cost manufacturing to factories overseas, but we still invented the products those factories produced. Clearly, our national advantage lies in our ability to out-innovate other nations. I recently asked an executive of a major global company headquartered in Ohio if his company needed Ohio to graduate more engineers and scientist. His frank answer was "no." His company can hire engineers and scientists from universities in China and India where they are more plentiful, as well educated, and requiring much less pay. There is no shortage of this group as Asia is graduating TEN times more engineers than we are. THAT is a major problem for Ohio and for America's competitive advantage. You can bet your next Asian-made automobile or flat screen TV that Asian schools are teaching these students STEM "mastery" and not just "understanding."

As an industrial scientist, I've worked with hundreds of other innovators. Every one of these engineers and scientists has benefited from two essentials of their public education: one, inspiration to pursue their chosen field by a special mentor, and two, mastery of STEM subjects resulting in a focus on technical application at higher levels in college. They all had passions for their field of study, and they were ALREADY well grounded in mathematics, physics, chemistry, biology; often at advanced levels. They were masters, not spectators of STEM.

Fifty years ago we projected a need to graduate students destined to pursue university degrees in agriculture, manufacturing, the trades or civil service. However, for today's students, the future will be different. Just "understanding" STEM will leave them unqualified to compete with their global counterparts in engineering and scientific fields. With just "understanding" of STEM, they will be woefully unprepared for the new American job market. Today, we need to establish proficiency in biology, math, chemistry and physics to the same level of mastery Ohio demands for English, history, and social studies. If we want Ohio public school graduates to be highly competitive in the current world, they need to be well grounded in all STEM subjects, be inspired to pursue their futures in technology development areas where the jobs will be, and be creative in the application of those sciences. In about two years new national standards for science education will supplant Ohio's standards. A document being used to draft those standards implies that "mastery" of core ideas in science is the "ultimate educational destination."

So does a single word change from "mastery" to "understanding" in academic standards hold great significance for the future of our state? You bet it does.

Write your state senators and representatives and tell them that we want our Ohio students to be masters NOT spectators of STEM.

. . . And a response from Joyce Hinkle, Science Lab teacher, McKinley Elementary School, Fairport Harbor, OH (and CRCST Board Member)

This letter was submitted in early August by Philip A Geis, PhD, a trustee and chairperson of Science Policy Advisory Committee who also serves on The Ohio Academy of Science. I read this with great interest and concern. As a science teacher for students in kindergarten through 5th grade, I believe we can't start soon enough to get our students interested and excited about STEM subjects. And is being scientifically literate enough in a competitive world? I say **no**.

To master a subject it must be practiced and applied to real world situations. So instead of just teaching about oil being a non-renewable resource, students need to come up with creative plans and ideas about how to take horrible real world events (the oil spill in the Gulf of Mexico) and find solutions. Beyond this, their critical thinking skills must lead toward preventative measures and new technologies (renewable energy, etc.) to avoid disasters such as this. Our goal should be to reach the top levels of Bloom's Taxonomy...analysis, application, synthesis and evaluation. Perhaps implementing more Problem-based Learning?

I'm all for "mastery," so all science, technology and math teachers, take note. Our task is large, but so necessary for positive change and advances in Ohio and America. Let's not settle for "understanding" but guide our Ohio students to become the engineers, scientists and mathematicians with the competitive advantage.

President's Column from Page 1

end of my year serving as president. It has been an honor to hold this position, one that was held in the past by my undergraduate academic advisor and many other notable Cleveland area educators. Come October Vicki Searles begins her tenure, offering the organization that new blood and all the possibilities she brings to the organization. I would like to highlight a couple significant CRCST activities that have been happening this summer. First, we have a new, easier to remember web address (www.crcst.org), with a new look. Currently the information there is limited and we welcome your input, whether it be about the design, layout or content you would like to see. Second, is to highlight the 40th anniversary of the CRCST Fall Conference which will be held Satur-

day, Oct. 16 at the Cleveland Metroparks Zoo. As president elect, Vicki has been hard at work planning a great day of professional development and networking with fellow CRCST members. A highlight will be the keynote by Tim Harrison, director of Outreach for Animals. His talk will focus on problems associated with private ownership of exotic animals as pets, which unfortunately has been brought to the fore by recent local news reports. He is a well known speaker on this topic and is a featured subject of the film 'The Elephant in the Living Room.' The film was previously part of the Cleveland International Film Festival, and will make its regular release debut in Cleveland the evening before our conference. Please save the date and send in your registration. We have kept the price reasonable and hope you'll come learn and share with us. The Fall Conference is also the time we hold our annual elections for open Board of Directors positions. A number of positions are open this year, and Ray Patacca (immediate past president) or myself would welcome nominations of people interested in participating in the leadership of the organization. We meet the first Wednesday of the month, 6:15pm at the Cleveland Botanical Garden or perhaps at the Zoo.

Have a great year and join us at the 40th annual Fall Conference.

Share Your Good Ideas

Don't delay—submit a session proposal for NSTA's 2011–2012 conferences today!

Our 2011–2012 conferences include:

- Hartford, Connecticut (October 27–29, 2011)
- New Orleans, Louisiana (November 10–12, 2011)
- Seattle, Washington (December 8–10, 2011)
- Indianapolis, Indiana (March 29–April 1, 2012)

Deadlines for submissions are **January 15, 2011**, for the 2011 area conferences, and **April 15, 2011**, for the Indianapolis National Conference. Info at www.nsta.org

Opportunities for Teachers and Students

Electrical Engineers organization (**IEEE**) has produced a special report about world energy needs and water resources: <http://spectrum.ieee.org/static/special-report-water-vs-energy>

Gravity Lows Mark Ancient Tectonic Plates

from *Science News*

Scientists have unearthed a new explanation for several low-gravity spots detected around the world. They're blaming the anomalies on vast "slab graveyards" that lie buried deep near the planet's core.

When these slabs of rock were buried long ago, they released water that reduced the density of overlying rock, Caltech geophysicist Michael Gurnis and his colleagues reported online May 9 in *Nature Geoscience*. Low-density rock has less mass, and so less gravitational pull.

Scientists had previously noticed that gravity's tug is smaller where tectonic plates, or large sections of Earth's crust, once plunged below the surface, Gurnis says. The team's new findings, he notes, provide insight into the causes of super-low values measured in four regions

<http://ow.ly/1K4mb>

Company Plans to Sell Genetic Testing Kit at Drugstores

from the *Washington Post* (Registration Required)

Beginning Friday, shoppers in search of toothpaste, deodorant and laxatives at more than 6,000 drugstores across the nation will be able to pick up something new: a test to scan their genes for a propensity for Alzheimer's disease, breast cancer, diabetes and other ailments.

The test also claims to offer a window into the chances of becoming obese, developing psoriasis and going blind. For those thinking of starting a family, it could alert them to their risk of having a baby with cystic fibrosis, Tay-Sachs and other genetic disorders. The test also promises users insights into how caffeine, cholesterol-lowering drugs and blood thinners might affect them.

The over-the-counter test marks the first foray of personalized genomic medicine into the corner drugstore. The move is being welcomed by those who hope that deciphering the genetic code will launch a new era in biomedical science. But it's being feared by those who worry it will open a Pandora's box of confusion, privacy

violations, genetic discrimination and other issues. <http://ow.ly/1K4pw>

Neuroscience: Illuminating the Brain from *Nature News*

... Advances in a five-year-old field called optogenetics are convincing these scientists to crack open molecular-biology textbooks. Using a hybrid of genetics, virology and optics, the techniques involved enable researchers to instantaneously activate or silence specific groups of neurons within circuits with a precision that electrophysiology and other standard methods do not allow.

Systems neuroscientists have longed for such an advance, which allows them their first real opportunity to pick apart the labyrinthine jumble of cell types in a circuit and test what each one does. "It has revolutionized my approach to science," says Antonello Bonci, a neurophysiologist at the UCSF Ernest Gallo Clinic and Research Center in Emeryville who began using the technique in 2007. "It can clarify unequivocally the role of specific classes of cells, and solve controversies that have been going on for many, many years."

Among the clarifications sought is the precise function of 'place' cells, hippocampal neurons that fire only when an animal finds itself in a specific location; another is the function of complex activity patterns observed when an animal is paying attention or executing a movement.

<http://ow.ly/1K4tr>

Study: A Link Between Pesticides and ADHD

from *Time*

Studies linking environmental substances to disease are coming fast and furious. Chemicals in plastics and common household goods have been associated with serious developmental problems, while a long inventory of other hazards are contributing to rising rates of modern ills: heart disease, obesity, diabetes, autism.

Add attention-deficit/hyperactivity disorder (ADHD) to the list. A new study in the journal *Pediatrics* associates exposure to pesticides to cases of ADHD in the U.S. and Canada. In the U.S. alone, an estimated 4.5 million children ages 5 to 17 have ever been diagnosed with ADHD, according to the Centers for Disease Control and Prevention, and rates of diagnosis have risen 3% a year between 1997 and 2006....

Led by Maryse Bouchard in Montreal, researchers based at the University of Montreal and Harvard

University examined the potential relationship between ADHD and exposure to certain toxic pesticides called organophosphates. The team analyzed the levels of pesticide residues in the urine of more than 1,100 children aged 8 to 15 years old, and found that those with the highest levels of dialkyl phosphates, which are the breakdown products of organophosphate pesticides, also had the highest incidence of ADHD....

<http://ow.ly/1LZxF>

NASA-funded scientists estimate from recent research that the volume of water molecules locked inside minerals in the moon's interior could exceed the amount of water in the Great Lakes here on Earth.

http://www.nasa.gov/home/hqnews/2010/jun/HQ_10-144_Water_In_Moon.html

Photosynthesis and Respiration Labs

Brad Williamson <ksbioteacher@gmail.com>

I've used both of these labs with students from 6th grade to college seniors to teachers.

In each case I introduce the technique for measuring the rate of photosynthesis or respiration to the students in a guided manner. The students or teachers then develop questions appropriate to their level and a procedure using the protocols that will answer a question that they have generated. I have found these procedures to be very accessible to students--they get what is going on so they can focus on the biology of the process they are trying to study and not focus on just getting through a complex set of procedures in a step by step program. In my mind this is what a lab program should do--help students develop an understanding of how questions are answered in science while providing deeper insights into the processes under study. The materials and supplies are so inexpensive that you can get enough supplies so that every student in you class can ask their own question and investigate it. Aside from lights which I get at Walmart for about \$6 the cost for each lab is less than 50 cents per student. Likewise the time element is taken into consideration in that neither procedure requires more than about 5 to 10 minutes per each round of data collection. I've had a lot of positive comments about both procedures from biology teachers of all levels but AP Bio instructors seem to really appreciate these modifications--perhaps you will too.

For photosynthesis:

the procedure: <http://www.elbiology.com/labtools/Leafdisk.html>

a video of the procedure:

<http://www.kabt.org/2008/09/29/video-on-sinking-disks-for-the-floating-leaf-disk-lab/>

a performance assessment that points to how I actually use the procedure in class:

<http://www.kabt.org/2008/10/13/using-the-floating-disk-assay-as-a-basis-of-a-lab-assessment/>

I don't do lab write-ups much and I definitely do not provide procedures for my students. For me that is part of their lab experience---they have to observe the procedure and develop their own protocol. If you feel you need a more structured approach, Kim F. has written an adaptation of this protocol and has it on her site <http://exploringbiology.com>

For Respiration: <http://www.elbiology.com/labtools/Microrespirometers.html>

A Safety consideration: I modified Lee's microrespirometers by taking the KOH out of the capillary and putting it into the barrel - much safer for students. Still it is easy to get too much KOH into the cotton and then expel the KOH out of the capillary--for this reason I often load the KOH in each respirometer. Make sure that students use their goggles for this lab, just in case.

At the bottom of the page you'll find two procedures that I wrote that provide guidance to extend the investigation.

ClassWish.org helps teachers get the support they need. Parents and communities are engaged in supporting classrooms and funding the things they care about. And everyone is united in helping our children learn, grow and perform at their best.

See how easy it is to get the things your students need at: <http://ClassWish.org>

This site offers tools that our partners can use to help promote ClassWish. If there is anything you would like us to add, just let us know at info@ClassWish.org.

Spider Size is a Question of Gravity from *BBC News Online*

In some species of spider, males are far smaller than females; now, scientists think they know why. A group of Spanish researchers says evolution favors small, light males because they can more easily traverse thin strands of silk. But large females are favored because they reproduce more abundantly.

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Cleveland Regional Council of Science Teachers 40th Annual Fall Conference

**The Cleveland Metroparks Zoo
Saturday, October 16, 2010**



Tentative Schedule

7:30 – 8:15 am	Registration, Continental Breakfast, Networking & Browsing Vendor Displays
8:30 - 9:15 am	Concurrent Session I
9:15 - 9:30 am	Annual Membership Meeting
9:30 - 10:15 am	*Keynote Address: Tim Harrison ... Coming Soon to a Backyard near you . . . Unwanted Exotic Pets
10:20 – 10:50 am	Vendors & Refreshments
11:00x- 11:45 am	Concurrent Session II
11:55 - 12:40pm	Concurrent Session III
12:40 - ???	Explore Vendors, Network with your colleagues & Enjoy the Zoo.



Concurrent session topics include life, earth/space, physical, and integrated science for elementary through college classrooms. Give-aways and vendors also back by popular demand. Explore the Zoo, other professional science education organizations displays, and more. Questions: Vicki Searles: 216-635-3354 – yms@clevelandmetroparks.com

CRCST Fall Conference 2010 Registration

Please use one form per person, copy as needed. Membership in CRCST or CRABS is required.

Circle your choice in the appropriate column on the right	<i>Early-bird</i> (by Oct. 8)	<i>On-site</i>
Conference only (existing member)	\$20	\$25
1 year CRCST membership & conference	\$35	\$40
2 year CRCST membership & conference	\$50	\$55
3 year CRCST membership & conference	\$65	\$70
1 year CRCST membership & conference (full time education students)	\$20	\$25
1 year CRCST/CRABS membership & conference	\$40	\$45
2 year CRCST/CRABS membership & conference	\$60	\$65
3 year CRCST/CRABS membership & conference	\$80	\$85

***Special offer for non-CRCST/CRABS individuals: \$10 for Keynote Address Only. Contact Vicki to reserve your spot. You may pay at the door. Additional donation to CRCST - \$_____**

Name: _____ H Phone (____) _____

H Address: _____

City: _____ ZIP _____

School/Work Site _____

City: _____ ZIP _____

Phone: (____) _____ E-mail _____

**Make check payable to CRCST. Mail to: Mark Waner, Dept. of Chemistry, John Carroll University
20700 North Park Blvd., University Heights, OH 44118**

Writing in the journal *BMC Evolutionary Biology*, the researchers say their finding helps to explain why this trait is so widespread among spiders. In some species of orb-weaving spider, females are more than 12 times longer than males.

Other research has shown that in many of these species, the females have grown progressively larger over evolutionary time, probably because of the reproductive advantages. But the males have not followed suit, leading to the huge size differences--a trait known as extreme sexual size dimorphism.

<http://snipr.com/108qel>

When Religious Beliefs Become Dangerous from *Scientific American*

Every two years the National Science Foundation produces a report, *Science and Engineering Indicators*, designed to probe the public's understanding of science concepts. And every two years we relearn the sad fact that U.S. adults are less willing to accept evolution and the big bang as factual than adults in other industrial countries.

Except for this time. Was there suddenly a quantum

leap in U.S. science literacy? Sadly, no. Rather the National Science Board, which oversees the foundation, chose to leave the section that discussed these issues out of the 2010 edition, claiming the questions were "flawed indicators of scientific knowledge because responses conflated knowledge and beliefs."

In short, if their religious beliefs require respondents to discard scientific facts, the board doesn't think it appropriate to expose that truth. The section does exist, however, and *Science* magazine obtained it. When presented with the statement "human beings, as we know them today, developed from earlier species of animals," just 45 percent of respondents indicated "true." <http://snipr.com/108qfj>

SWEETWATER SEASCAPE NEWS

Here is the latest **Sweetwater Seascape** from GLEAMS and COSEE GL. Enjoy the articles and link back to our web site for other information. <http://coseegreatlakes.net/newsletter/nl15.html>

Cleveland Regional Council of Science Teachers



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