



The CRCST Quarterly

Volume LXVII No. 1

67 Years

Spring 2011

.....from the Editor

Norm Schmidt

I have been privileged to venture into several different regions of the Everglades National Park over the last several years. In early February I, with my sister and brother-in-law, went to the Shark Valley area near the Northern border of the park and saw neither shark nor an obvious valley (but learned that valley's, like many things in nature are relative).

What I did learn was that the different "hammocks" that pop-up amidst the sea of sedge grass are very different in their ecology. There are three basic types of hardwood hammocks:

1. Bayheads which are formed by detritus trapped in the sedge and leads to the growth of hardwoods; redbay, sweet bay, coco plum & wax myrtle. These trees provide shelter and food for some birds and amphibians.
2. Rock Reefs are ridges of limestone. The higher elevation provides a niche for hardwood trees. When seen from above they look like a serpent of trees. The Rock Reefs provide shelter for Florida Panthers and other mammals as well as birds.
3. Tropical hardwood hammocks are dense stands of primarily West Indian - pg 6



Presidential Column - Vicki Searles, President

Science should be Fun – I'm Talking about for YOU

The pebble that drops into a pond is like an idea that sparks inquiry. The concentric ripples represent new questions that emerge from the first germ of the idea. The ever-enlarging pattern of ripples refer to the integrated knowledge that is acquired as each question is explored, limited only by the force of the inquirer's enthusiasm for the search. The greater the interest and the more probing the questions, the more encompassing the study, the bigger the ideas that it develops, and the deeper and more meaningful the knowledge the inquirer constructs.

—From *Interdisciplinary Inquiry in Teaching and Learning* by Marian Martinello and Gillian Cook (1990)

What does inquiry mean to you, and how do you use it in your work? Is it something you touch on in class because that's what we are told we have to do, or is it part of your culture?

Establishing a culture of scientific inquiry in your professional life if it doesn't already exist can give you just the boost you need. It will remind you of why you fell in love with science and what made you dedicate your career to inspiring young people to experience that same connection with the natural world.

How can you make it part of your culture?

- Reflect on your classroom experiences and practices
- Keep a journal of your thoughts and observations – be creative
- Reflect and discuss those reflections with others who are committed to the same instructional practices
- Awaken your own scientific curiosity by asking your own questions and conducting your own investigations
- Embrace what you DON'T know, and strive to finish a reflection or discussion with more questions than answers
- Become a student again

Continued on Page 5

Learning Cycle for Inquiry Reminder:

5 - E Instructional Model

Engagement. The teacher designs experiences intended to make connections with current concepts and skills and to bring into question the adequacy of those concepts and skills.

Exploration. The teacher uses activities and social interaction (cooperative learning) to help students begin constructing more adequate concepts and developing better skills.

Explanation. The students have an opportunity to articulate their ideas, and the teacher helps students clarify their ideas through scientific and technological terms and concepts.

Elaboration. The teacher provides activities based on the same concepts and skills, but there is a new and different context. The students must expand or generalize their new conceptions to the different experiences.

Evaluation. The teacher uses a variety of assessments to determine the students' conceptual understanding and level of skill development. This phase also is an opportunity for students to test their understanding and skills.

- [Achieving Scientific Literacy](#), Bybee, R.

Check out this creative idea for paving using photovoltaic cells: <http://www.wimp.com/solarhighways/>

If you haven't been to the Cleveland Botanical Garden to see this years **Orchid Mania** show: "**Purple Reign**" you have until March 27 to see the beauty.

Learn how to prevent illness and disease, lose weight, gain energy, and slow the aging process with the miracle medicine - being active! Enjoy the "**Let's Get Active**" exhibit at the Cleveland Museum of Natural History through May 8, 2011.

Learn how to compost your household yard waste and food scraps by signing up for a Composting Seminar conducted by the Cuyahoga County Solid Waste District. After the seminar you can purchase a compost bin. Visit www.cuyahogaswd.org for dates and locations or call 216-443-3731.

Check out some of the projects that Clevelanders are doing with vacant lots:

<http://reimaginingcleveland.org/>

Science in the News

Ten Great Sites with Free Teacher Resources from eSchool News

1. [Academic Earth](http://academicearth.org/) offers video lectures from elite universities, and it allows viewers to grade the professors. Academic Earth also offers a "Playlists" feature based around themes such as "Laws of Nature," "Wars Throughout History," or "You Are What You Eat." <http://academicearth.org/>
2. [Curriki](http://www.curriki.com/) helps connect educators, parents, and students in the development of curriculum and other educational materials. With its open-source curriculum format, Curriki allows anyone to post their teaching ideas for others to view, download, use, reformat, and reshare. <http://www.curriki.com/>
3. [FREE](http://free.ed.gov/), or Federal Resources for Educational Excellence, is a U.S. Department of Education website that compiles free teacher resources available from dozens of federal agencies. Educators can sign up for the FREE RSS feed, which notifies users when new resources are added. Otherwise, they can browse by topic, from music history to life sciences. <http://free.ed.gov/>
4. The Library of Congress' "[For Teachers](http://www.loc.gov/teachers/)" page highlights ready-to-use classroom materials that are aligned with state standards and take advantage of the Library's primary sources. It includes access to primary source sets around topics such as U.S. presidents; short facts or activities for class starters, such as "Today in History" and everyday science mysteries; themed lesson plans for dozens of topics; and even professional development curriculum. <http://www.loc.gov/teachers/>
5. The [NASA for Educators](http://www.nasa.gov/education/) page includes featured articles with information about NASA's various missions; image galleries on a wide variety of topics; information about NASA careers, internships, fellowships, and scholarships; NASA-produced multimedia materials; and more. An Education Materials Finder will help teachers locate NASA resources that can be used in the classroom; users can search by keywords, grade level, product type, and subject. With hundreds of publications

and websites indexed, the finder is the best way to locate NASA educational resources, the agency says.

<http://www.nasa.gov/audience/foreducators/index.html>

6. [The National Science Digital Library](#) is the nation's online library for education and research in science, technology, engineering, and mathematics. It provides free math lessons and activities aligned with the Math Common Core Standards, as well as [STEM](#)-related blogs and other free teacher resources and lesson plan ideas. Targeted for K-12 teachers, higher-education professionals, and librarians, NSDL also provides science literary maps and iTunes multimedia files. <http://www.nsd.org/>
7. Online professional development, TV programming and multimedia web content, lesson plan ideas, and ways to connect with other educators are all things featured on the PBS Teachers page. The website also features news and webinars for teachers to view. <http://www.pbs.org/teachers/>
8. [Teachers' Domain](#) offers free digital media from public TV broadcasters for educational use. Users can search for materials via individual state standards, Common Core State Standards, or national standards from different organizations. Website users can create online profiles in order to share the resources they have learned for a particular lesson with others. <http://www.teachersdomain.org/>
9. For over a decade, [TeAchnology](#) has been providing free and easy-to-use resources for teachers, including "Teacher Timesavers" to help educators better organize. The site also features 42,000-plus lesson plans, 9,000 free printable worksheets, rubrics, teaching tips, web quests, and other free teacher resources. <http://www.teach-nology.com/>
10. [Thinkfinity](#) is a free digital learning platform from the Verizon Foundation that offers comprehensive teaching and learning resources created by content partners such as the Kennedy Center for the Performing Arts, the National Endowment for the Humanities, the National Council of Teachers of Mathematics, the International Reading Association, the Smithsonian's National Museum of American History, the National Geographic Society, and more. Its content includes interactive student games, lesson plans focused on various

Save the Date: April 28, 2011

**AFRICAN
ELEPHANT CROSSING
THE EDUCATOR PREMIERE**

This VIP *educator only* event will be your first look at the Zoo's African Elephant Crossing.

Look for your invitation - coming soon.

themes, education blogs and online discussions, and much more. <http://www.thinkfinity.org/>

Don't Teach the Controversy

Published Online: March 1, 2011 - Vol. 30, Issue 23

Commentary

By Paul Horwitz

Premium article access courtesy of Edweek.org.

The argument is disarming. Living organisms are often remarkably adapted for a particular purpose—so much so that it seems as if they must have been created by a purposeful designer. And, at first blush, that theory appears much more plausible than the proposition that the exquisite complexity of nature arose entirely by unplanned, natural causes. Why then do we refuse to allow the creationist model to be presented and discussed in science class as an alternative to the theory of evolution? Isn't science supposed to be open to opposing opinions? Are we not repeating the error of those who refused to look through Galileo's telescope for fear that they might discover something new? Why can't we, in the words of President George W. Bush, "teach the controversy"?

The argument is a hardy perennial. An *Education Week* article from late last year ("[Evolution Projects Yield Results.](#)" Nov. 17, 2010) described a National Science Foundation-supported project that teaches

“evolution readiness” to 4th graders by having them run virtual experiments with computer models that evolve by natural selection. As the director of that project, I feel strongly that creationism has no place in science class.

My opinion is that creationism in all its forms, including “intelligent design,” is not science; and that it is vitally important that we not teach non-science as if it were science.

“Creationism is not science because it introduces causes outside of nature in order to explain observations of nature.”

The early-20th-century physicist Wolfgang Pauli, known equally for his exclusion principle and his biting wit, once famously said of a proposed theory in a research paper, “Not only is it not right, it’s not even wrong.” The identity of the research paper that incurred Pauli’s displeasure is lost to history, but his quip is an apt description of the assertion that the adaptations of organisms can be “explained”—or “explained away”—by positing that an unknown and unknowable entity designed them that way. Such a theory can, in fact, never be proved wrong. It can never even be revised because, in contrast to evolution, which has undergone continual revision since Darwin’s day, creationism makes no testable predictions other than the trivial one that living creatures should *look* as though they were designed.

Creationism is not science because it introduces causes outside of nature in order to explain observations of nature. Theories like that do not foster inquiry; rather, they close off discussion. Discoveries of seemingly “designed” organisms are taken as “proof” of the theory, and observations of suboptimal design are viewed as indications that the external designer, though “intelligent” is not “perfect.” When all the fuss

is over, nothing is ever discovered—or can ever be discovered—that sheds new light, connects previously disconnected data, offers new insights, or generates new knowledge.

That’s why creationism shouldn’t be taught as science, not because it’s wrong, but because it isn’t science. (Though I would certainly support, and would love to teach, a class that contrasted creationism and science in order to help students appreciate the difference.)

So why is it so important that we not teach non-science as science?

It is important because science and non-science are radically different, and the difference has critical implications. Scientific theories make testable predictions about the world, predictions that often extend well beyond anything the inventor of the theory had in mind.

Darwin had never heard of the DNA molecule, so he

NSTA’s National Conference on Science Education

**Indianapolis, IN
March 29 - April 1, 2012**

Professional Development Strands:

- Mapping Our Way to Success Through the New Core Standards
- Pathways to a Sustainable Planet
- Merging Inquiry, Creativity and Innovation Through STEM
- Traveling New Instructional Roads Through Technology

Visit www.nsta.org for updates

Note: Since the national conference will be in nearby Indianapolis, there will be no SECO conference in 2012.

couldn't possibly have anticipated its role in evolution. A century later, when the central function of DNA as the carrier of genetic information was discovered, Darwin's theory of evolution predicted that the DNA of different species ought to differ in very specific ways. For example, two species that diverged from a common ancestor—say dogs and wolves—a few million years ago (relatively recently in evolutionary terms) ought to have very similar DNA. However, more distantly related species—giraffes and skunks, or snakes and butterflies—are predicted to be less similar at the molecular level because they diverged from a common ancestral species *hundreds* of millions of years ago. In other words, the more recently any two species diverged from their ancestral species, the more similar their DNA ought to be.

This is a powerful prediction! It opens up a whole new line of evidence, entirely unknown to Darwin and his contemporaries, that enables one to construct a "family tree" comprising all living things on earth.

The DNA evidence is accumulating rapidly, and evolution still stands tall. It turns out that subtle differences in the DNA of humans from different subpopulations may have profound implications for combating disease. Scientists are sorting out the details, but the basis of the technique is pure evolution. People who have lived for many generations in parts of the world where a certain disease is endemic have been subjected to intense selective pressure, affecting their genetic makeup. In other words, these individuals have evolved to acquire a resistance to the disease. By studying their DNA, we may be able to put that knowledge to work for the rest of us some day.

It's an exciting approach to solving an important problem, and it would never have occurred to anyone if we had just left it at, "Living creatures look designed, so

there must be a designer." Or, "We don't know anything about this designer, and there's no way to find out anything, so let's just leave it at that."

The goal of science is to discover things, to create new knowledge, to understand new phenomena. Non-science does none of these things. Confronted by something it can't explain, non-science introduces another element it doesn't understand for the purpose of explaining what it originally could not. Not only does this lead to an infinite regress (who designed the designer?), it also eliminates, even worse, any opportunity to discover natural explanations for natural phenomena. And that makes a huge difference.

We live in an age when the extraordinary success of science has brought with it unprecedented problems that can be solved only with the help of science. For this reason alone, to allow non-science to be taught as though it were science would be a mistake of literally global dimensions.

Paul Horwitz is a physicist-turned-education-researcher. He has been using computers to teach difficult math and science concepts for more than 25 years. He currently directs the Modeling Center at the [Concord Consortium](#), a nonprofit company located in Concord, Mass., whose mission is to make the promise of technology a reality for children.

Cont. from page 1 -

You already know that inquiry-based classrooms promote critical thinking skills and mental habits which help your students develop higher levels of thinking. What could be the results of establishing even greater habits of mind? You and your students will be more creative, curious, flexible, innovative, sensitive and skeptical. How do I know this? In the last two years I have rediscovered my passion for learning by making inquiry a part of my culture – both at home and at work. And as life-long learners, as well as teachers,

you can reach in and grab that inner child and student in yourself too.

In an effort to spread the excitement, CRCST is sponsoring a spring symposium on Inquiry. Join others in the questions, comparisons, investigations and reflections that got us all hooked in this ever questioning world of science. You'll meet others with like interests, enjoy some fellowship, and learn a few new inquiry techniques. This year's spring symposium will be held at the Cuyahoga County Solid Waste District offices on April 12 from 4 pm until 7pm. The registration form is on page 7. Register and encourage a colleague to join you.

From the editor on pg 1:

hardwoods such as the endangered Giant Mahogany trees. Mammals and birds may use these hammocks for nest building and more long term shelter.

Another type of hammock is the result of the Alligator digging a water hole in the limestone in order to keep wet during the dry season when rain is a rare event. These hammocks are quite bright green as short bushes and soft wood trees grow on the limestone that was dug up. The inside of these hammocks includes a fresh water hole that keeps the alligator wet



and also provides a shelter for amphibians and fish. These water holes are used by all of the everglade residents for drinking water during the dry season.

The Shark Valley area has bike trails and tram rides with guides who are able to provide lots of information about the area and the everglades. There are a tremendous number and variety of birds to enjoy. There

is also a tall observation deck that is accessible by a long ramp and provides a great view of the surroundings.



The trams travel on a paved track that was partly built by Army engineers and way back when the area was not national park, by the oil company which eventually became Exxon. The oil company drilled several test wells and found oil that was of very low quality - loaded with sulfur and other impurities - making it very costly to refine.

Thank goodness.

The oil company decided to give their large land holding (now a large part of the park) to the state.

The entrance to Shark Valley is on the TAMiami trail West of Miami. When you get a chance to visit South Florida plan to spend a few hours at Shark Valley.

Did I mention that Inquiry is not limited to lab work? Here is a wonderful example of the results (and clearly research continues in the everglades) of environmental studies which include observing natural systems and individual organisms that are part of the web of life in this outstanding ecosystem.



Cleveland Regional Council of Science Teachers



2011 Spring Symposium
 Cuyahoga County Solid Waste District
 4750 E 131st St, Garfield Heights, OH 44105
 Tuesday, April 12, 2011
 4:00 pm – 7:00 pm



Tentative Schedule

4:00 – 4:45	Registration, Light Supper, Networking
4:45 – 5:25	Keynote Tracy Cindric, SECO President "Need Ideas for Inquiry? Try the Model Curriculum!"
5:25 – 5:45	Break
5:45 – 7:00	Split Groups: Inquiry Activities, Lessons & Practices
	- Pre – K through 2 Eugenia Johnson-Witt, Early Childhood Prof.
	- 3 through 5 Lee Gambol, CMNH educator
	- 6 through 8 Andrew Smith, teacher, Sheffield/Sheffield Lake
	- 9 through 12 CRABS HS educators

Additional registration forms and any revisions can be accessed at www.crcst.org
 Parking is free and in the front & rear of the building.

Questions: Vicki Searles vms@clevelandmetroparks.com

CRCST Spring Symposium Registration

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

	Fee
Symposium only (existing member)	\$10
1 year CRCST membership & symposium (<u>full time graduate or undergraduate student</u>)	\$15
1 year CRCST membership & symposium	\$25
2 year CRCST membership & symposium	\$39
1 year CRCST/CRABS membership & symposium	\$30
2 year CRCST/CRABS membership & symposium	\$49
I would like to make an additional donation of	
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Make check payable to **CRCST** Mail to: Mark Waner, Dept. of Chemistry, John Carroll University
 20700 North Park Blvd., University Heights, OH 44118

Opportunities for Teachers and Students

[Climate: The Hottest Year](#) from *Nature News*

The release of climate-science e-mails last November ripped apart Phil Jones's life. He's now trying to patch it back together. "I like to think the worst is over, but it's coming up to the first anniversary and it's something I'll always remember at this time of year, when the nights close in. This is the time it happened."

Twelve months ago, Phil Jones was a productive, if not particularly outspoken, climate scientist. That was the way he liked it. Head of the Climatic Research Unit (CRU) at the University of East Anglia (UEA), UK, Jones worked with the Met Office to compile data from weather stations around the world into a monthly series showing global average temperature.

He had much on his mind--not least a puzzling drop in North Atlantic sea surface temperatures during the mid-twentieth century that he had recently helped to discover. It was a curious finding, but Jones would soon have bigger things to ponder. On 19 November 2009, someone released roughly 1,000 e-mail messages and documents stolen from a server at the CRU. Many of them contained Jones's private correspondence, which sometimes showed him in an unflattering light.

[Scientists Propose One-Way Trips to Mars](#) from the *Washington Post* (*Registration Required*)

PULLMAN, Wash. -- It's usually cheaper to fly one way, even to Mars. Two scientists are suggesting that colonization of the red planet could happen faster and more economically if astronauts behaved like the first settlers to come to North America--not expecting to go home.

"The main point is to get Mars exploration moving," said Dirk Schulze-Makuch, a Washington State University professor who co-authored an article that seriously proposes what sounds like a preposterous idea. At least one moon-walking astronaut was not impressed.

"This is premature," Ed Mitchell of Apollo 14 wrote in an e-mail. "We aren't ready for this yet." Also cool to the idea was NASA. President Barack Obama has already outlined a plan to go to Mars by the mid-2030s, but he never suggested these space travelers wouldn't come home. "We want our people back," NASA spokesman Michael Braukus said.

[Large Size Didn't Keep Pterosaurs Grounded](#) from *ScienceNOW Daily News*

Until a couple of years ago, few researchers doubted that pterosaurs, the giant winged reptiles from the age of the dinosaurs, could fly. Then two papers appeared to ground at least the largest pterosaur species. Now a new study has put pterosaurs back in the air.

The first major challenge to pterosaur flight came from a team of Japanese and French researchers in 2009. Based on evidence from modern sea birds, the group concluded that any animal weighing more than 41 kilograms would have trouble staying aloft--a problem for larger pterosaurs, which tipped the scales at several hundred kilograms.

"That paper irritated the heck out of most people who work on pterosaurs," says David Unwin, a paleobiologist at the University of Leicester in the United Kingdom. But the criticism didn't end there. Earlier this year, a study by Canadian paleontologist Donald Henderson reached a similar verdict. He estimated that the pterosaur *Quetzalcoatlus northropi*, previously labeled the largest flier of all time, tipped the scales at 544 kilograms and thus could never become airborne.

['Fishing Down Food Chain' Fails Global Test](#) from *Nature News*

A tenet of modern fisheries science may be unfounded, suggests a study of how catches are affecting marine ecosystems. The finding has sparked a heated debate about how best to measure humanity's impact on the ocean.

A landmark study in 1998 found that we are 'fishing down the food chain' worldwide--in other words, exhausting stocks of top predators such as cod before switching attention to smaller marine animals. This has since become accepted wisdom. But a study published in *Nature* suggests that the indicator on which this claim is based--'mean trophic level' or MTL--is severely flawed.

The authors of the 1998 paper have hit back, with one of them branding the latest research "completely invalid." But Trevor Branch, lead author of the *Nature* study and a fisheries scientist at the University of Washington, Seattle, stands by the work. "At a global level we are not fishing down," he says. "The results are quite clear on that."

[Light Switches on the Brain](#) from the *Guardian* (UK)

Leading lights in optogenetics presented the latest developments in their field during a mini-symposium

at the 40th annual meeting of the Society for Neuroscience in San Diego at the weekend.

Optogenetics has emerged in the past decade as a high-precision tool for monitoring and controlling the activity of nerve cells. It is based on light-sensitive proteins called rhodopsins, which are isolated from algae and bacteria and are related to the proteins found in the human retina.

When rhodopsins in the human eye's photoreceptors are struck by light, they initiate a cascade of biochemical reactions, causing the cells to send signals to the brain via the optic nerve. But the microbial rhodopsins behave differently--they alter the electrical properties of neurons directly, and it is these properties that make them so useful.

[DEET of the Sea](#) from *Science News*

If you were to find yourself in the jungle without a mosquito net, slathering yourself in snot might be a good alternative. It works for fish: Scientists have discovered that some coral reef fish protect themselves from biting isopods, a marine equivalent of mosquitoes, by covering themselves in mucus before going to sleep at night.

Researchers had speculated that the reason certain parrot fish and wrasses envelop themselves each night with a big blob of mucus might be to protect against settling silt or to deter hungry predators such as moray eels. But definitive experiments were lacking. Now scientists from the University of Queensland in Australia have done the dirty work.

The team placed parrot fish in plastic tubs and after midnight, when all the fish had made their mucus cocoons, the researchers gently scraped off the cocoons from half the fishes. Then the team introduced tiny parasitic isopods--blood-sucking crustaceans that are taxonomically closer to lice than to mosquitoes--into the tubs.

[Caribbean Coral Die-Off Worries Scientists](#) from *Scientific American*

Unusually warm ocean temperatures in the summer and fall of 2005 caused a mass die-off of Caribbean corals that is the worst ever recorded there, according to new research published yesterday in the online journal *PLoS ONE*.

More than 80 percent of corals bleached and over 40 percent died at many sites in the Caribbean and Gulf of Mexico that year, the study says, arguing the 2005 event will have long-term consequences for the health

of reefs.

Such events are also likely to become more common as global warming continues, concludes a team of 65 authors in 22 countries. They predict "a troubled future for tropical marine ecosystems under a warming climate." Lead author Mark Eakin, who coordinates the National Oceanic and Atmospheric Administration's Coral Reef Watch, said the new paper presents the "first time there's been a full analysis of what happened across the Caribbean in 2005."

[New Hurdle for California Condors May Be DDT](#) from the *New York Times* (Registration Required)

BIG SUR, Calif. -- Four years ago, in a musky, leaf-lined cavity halfway up a 200-foot redwood tree here, two California condors made the region's first known nesting attempt in more than a century.

Joe Burnett, a senior wildlife biologist with the Ventana Wildlife Society and the lead biologist for the Central California condor recovery program, who had been monitoring the condor pair, was delighted with this promising development in the continuing effort to save the nation's largest bird from extinction.

When this first breeding attempt proved unsuccessful, Mr. Burnett attributed it to the young birds' inexperience. But when he climbed the giant tree to examine the abandoned nest, he was stunned at what he uncovered: the first evidence of a potentially significant new hurdle for the condor program. "The eggshell fragments we found appeared abnormally thin," Mr. Burnett said.

Craig Venter Designing Life Video Clip <http://www.cbsnews.com/video/watch?id=7076435n&tag=contentMain;contentBody>

Cleveland Museum of Natural History SRC: Workshops

SRC Contact Information: Phone: (216) 231-2075 | Fax: (216) 231-9960 | E-mail: SRC@cmnh.org

The Science Resource Center provides *high quality professional development* workshops throughout the year. To receive information regarding upcoming workshops, please register your email address at src@cmnh.org or call (216) 231-2075.

General Information on Workshops

Preregistration, including payment, is required for all workshops. Call (216) 231-2075 for further details. Fees can only be refunded with a seven-day notice of cancellation. Light refreshments, certificate of completion and parking in Museum lot are included in the fee.

Portable Planetarium: Using StarLab and CosmOdyssey

Spring Workshop: Sat, Apr 2, 2011, 9 am to noon

Appropriate for teachers of grades preK-12

Bring the night sky to your students! The Science Resource Center has two portable planetariums available for loan. Don't miss out on this awesome resource sure to wow your students and enhance your earth and space sciences instruction!

To borrow a portable planetarium, you must attend a training workshop at the Museum. The workshop will be facilitated by one of our astronomers. After being instructed on how to properly set up the planetarium, you will spend the majority of the time inside it, learning how to use it effectively with your students. See a variety of cylinders in use and learn essential vocabulary as you tour the night sky. Quality curriculum materials and a visit to the Museum's Shafran Planetarium are included in the workshop cost.

The portable planetarium is a cross-curricular teaching tool for astronomy, earth science and more that you can bring right into your classroom. It includes everything you need to present interactive, exciting lessons: an inflatable dome, projector, fan and accessories. Inside the dome, a projector displays a variety of images on a 180 degree-by-360 degree hemisphere.

The SRC offers the following projection cylinders: Starfield With Milky Way, Biological Cell (mitosis and meiosis), Constellations, African Mythology, Native American Mythology, Greek Mythology and World Geography. The dome can fit 25 to 35 people. It is accessible to those in wheelchairs and anyone not comfortable crawling through the entry tunnel.

Fee: Includes manual: SRC member: \$20; nonmember: \$25

Native American Workshop

Sat, Apr 16, 2011, 9 am to noon

Designed for K-8 educators, but all are welcome.

Learn the tools of the trade for teaching the subject of Ohio Indians and other Native American Indian groups such as the southwest, the plains, and the arctic. We will study their lifestyles, customs, artifacts, and artistic traditions. We will also compare cultural practices focusing on food, clothing, and shelter. This workshop covers the earliest Paleo-Indian groups through the Moundbuilders to the time of European contact. A teacher pamphlet and a thorough exploration of our Museum galleries are included!

Fee: SRC members: \$20; nonmember: \$25

Back to Basics: Local Flora

Sat, May 14, 2011, 9 am to noon

Designed for grade 3-12 educators, but all are welcome.

If you have wanted to learn how to identify trees and wildflowers, this is your time to begin. We will cover: what is/isn't a plant, why certain plants grow here, plant characteristics and identification, and then follow this up with a field trip to test our identification skills. Bring basic North American tree and wildflower field guides to the class. The field trip will be right here at the Museum.

Fee: Museum and SRC members: \$18; nonmember: \$24

The Science of Climate Change

Wed, Sept 21, 2011, 5 to 7:30 pm

Designed for grade 6-12 educators, but all are welcome.

Grade 7: Earth Systems: 1,2,3,4

Grade 9: Historical Perspectives and Scientific Revolutions: 8

Grade 10: Earth Systems: 5,6 -- Historical Perspectives and Scientific Revolutions: 7

Grade 11: Earth Systems: 7,8,9,10,11,12,13,14 -- Historical Perspectives and Scientific Revolutions: 15,16

Grade 12: Earth Systems: 5,6

Climate Change -- why is it happening? Learn activities that will help you teach your students about the "greenhouse effect" as well as how human generated carbon dioxide is changing this natural process. We will discuss the reflection and refraction of light, energy waves, thermal expansion, and heat convection.

Audio slideshow: Beautiful Science

Colorful and visually stunning - but also important in our understanding of scientific advances - the winners of this year's Wellcome Image Awards range from a close up look at a bloody sticking-plaster, to the striking shades of a ruby-tailed wasp viewed through a microscope. <http://www.bbc.co.uk/news/health-12538048>

Audio slideshow: 'The secret of life'

In 1953, two Cambridge University scientists published their answer to one of the most fundamental questions of biology - how do living things reproduce themselves? In their article for the journal, *Nature*, James D Watson and Francis Crick described the structure of a chemical called deoxyribonucleic

acid, or DNA.

Now - six years after Crick's death - the Wellcome Library in central London is making many of his private research papers available on the web, including an early sketch of the DNA double helix.

The publication marks the start of an ambitious digitization project by the library, to provide free, online access to millions of documents in its collection.

Guided by the Head of the Wellcome Library, Simon Chaplin, take a look at some of the personal papers of Francis Crick - who, it is argued, made the most significant contribution to science to date. [http://](http://www.bbc.co.uk/news/science-environment-11016755)

www.bbc.co.uk/news/science-environment-11016755

Cleveland Regional Council of Science Teachers

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