

Website: <http://2yc3.org>

Chemistry Outlook

An Activity of
The Committee on Chemistry in the Two-Year Colleges
Division of Chemical Education
American Chemical Society

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Scott Donnelly, Chair

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Notes From The Chair

Scott Donnelly
Arizona Western College
Yuma, AZ

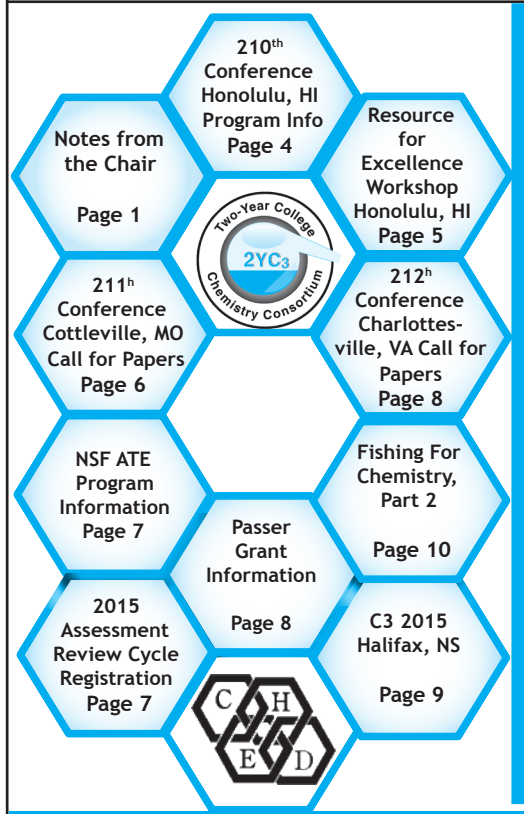
My twelve year old son, a sixth grader, asked me a simple question recently. But like many seemingly simple things it had layers of complexity, with complexity increasing as one drills down more deeply into the question itself. He asked, "Dad, chemistry is the central science right? What does that mean?" Course I was caught off guard so like millions of parents now and before me I concocted some elaborate response with fancy, impressive scientific sounding words that in the end didn't impress my son in the least, "OK dad whatever."

Humbled (and simultaneously embarrassed) by a twelve year old, that night I got to thinking about what my son asked. Not that I hadn't thought about it before (I do all the time when designing new lecture material) but for some reason I just failed miserably to answer such a simple question- What is chemistry central to? Specifically, how do I show students the centrality, or perhaps said a different way, the relevancy and/or applications, both legal and illegal, of chemistry in everyday life? I'd like to share with you some ideas that others have shared with me.

Let's start with xenon. In combination with gaseous CO_2 (5% Xe /95% CO_2) it is used as an inhalation diagnostic¹ for pulmonary function and imaging. Xenon's use in high-intensity discharge (HID) lamps such as those used in high-end automotive headlights and underwater diving are well known^{2,3}. But what about xenon's (and argon's) use as a sports' performance-enhancing substance? What, inert noble gases as doping agents? You're kidding, right? In August 2014 the World Anti-Doping Agency (WADA) added xenon and argon to its growing list of banned substances⁴⁻⁶. Why such a move? Evidence suggests that inhalation of the two gases increases the body's production of erythropoietin (EPO), which increases the production of red blood cells^{7,8}. In short, cheating. So when discussing the organization of the periodic table in the first lecture or two of general chemistry, perhaps one can stimulate student interest by mentioning xenon's link to the sports doping problem.

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ACS
Chemistry for Life®



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210th CONFERENCE

May 22-23, 2015

Windward Community College

Honolulu, HI

Contact: Christopher Guay

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211th CONFERENCE

September 18-19, 2015

St. Charles Community College

Cottleville, MO

Contact: Beth Michael-Smith

Email: bmichael-smith@stchas.edu

212th CONFERENCE

November 6-7, 2015

Piedmont Virginia Community College

Charlottesville, VA

Contact: Barbara Heyl

Email: bhey@pvcc.edu

“Notes from the Chair” ...continued from page 1

And what about the recent societal relevancy of the pyrazolone derivative phenylbutazone (PBZ)? Its recent relevance is in the food supply chain. The main source of protein for North Americans and Europeans is the consumption of red meat, namely beef. In 2013 the horse meat scandal made headlines across Europe⁹. In short, horse and pig DNA were found in meat products advertised as 100% beef. Besides the criminality of purposeful deception (= fraud), the consuming public had concerns whether the horse meat in the tested meat products contained measurable and analytically confirmed amounts of PBZ, a potent cyclooxygenase inhibitor, nonsteroidal anti-inflammatory (NSAID) drug administered to manage musculoskeletal pain and fever in horses¹⁰⁻¹². Why the concern? Prescription PBZ labels state Warning: Not for use in horses intended for food as PBZ can be harmful to humans.

How can the horse meat scandal and PBZ be used in the organic chemistry classroom? I begin most OChem lectures with a Molecule of the Day. I ask students to identify functional groups, the number of sp^3 , sp^2 , and sp hybridized carbons, the number of sites of unsaturation, prominent and readily identifiable IR absorptions and 1H and ^{13}C NMR signals, and so on. This takes all but four to five minutes before I then move into the day's main lecture topic(s). I've found anecdotally that relating a molecule to some relevant issue and/or its use in consumer products tends to pique students'

attention. And even better yet, it sometimes translates into a conversation after class and hence an extended (and oftentimes rare) opportunity to convince students that chemistry, in and of itself, is worth knowing and is wildly useful.

Or what about the significance of the box of nails labeled as HOT DIPPED GALVANIZED? Dipped in what? Why galvanize a metal? Course we all know this relates to a seminal topic in general chemistry, electrochemistry.

The global importance and economic benefits of galvanization are enormous. Want to find out new ways to incorporate galvanization into your electrochemistry lecture/activities? Check out the American Galvanizers Association (AGA) homepage¹³ for almost everything you ever wanted to know about the zinc galvanizing industry. The AGA's homepage has a short (six minutes in length) but very informative video describing the industrial scale hot-dip galvanizing process, benefits, and overview of the corrosion protection chemistry. Also, peruse the International Zinc Association (IZA) for more information¹⁴.

In closing, I hope to meet you at either of the two spring 2YC₃ meetings at Front Range Community College (March 20-21) in Westminster, Colorado or Windward Community College in Kāne'ohe, Hawaii (May 22-23). For more information about these two meetings, go to <http://www.2yc3.org/php/meetings.php>.

Slán go foil (Goodbye in Irish Gaelic)

Scott Donnelly

Citations:

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13. <http://www.galvanizeit.org/>
14. <http://www.zinc.org/>

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2YC₃ Membership Form

Please consider supporting the 2YC₃ by becoming a member or renewing your membership. Annual dues are only \$25.

There is no longer a special rate on joint membership with DivCHED. If you are interested in joining DivCHED, please go to <http://www.divched.org/> and click the Membership link on the left.

I wish to: _____ Become a member of 2YC₃
_____ Renew my 2YC₃ Membership

I am a: _____ Two-Year College Teacher _____ Four-Year College Teacher
_____ High School Teacher _____ Other

Your Name: _____

Institution: _____

Address: _____
Street City, State 9-Digit Zip Code

Phone: _____ **Email:** _____

Current Member of: _____ ACS _____ DivCHED

Names of current members are posted on the 2YC₃ website. The list includes names, institutional affiliation, and membership expiration date only. Email addresses and phone numbers are NOT listed. If you do NOT want your name listed, check here _____.

- **Secure electronic payments for membership dues now accepted. Select 'Membership Form' on the 2YC₃ website to become a member.**

- **If paying by check, please send your check, payable to 2YC₃, for \$25 to:**

Thomas Higgins, Harold Washington College, 30 E Lake St, Chicago, IL 60601

210th 2YC₃ Conference

Chemistry for a Sustainable Future

May 22-23, 2015

Windward Community College

45-720 Kea‘ahala Rd., Kāne‘ohe HI 96744

Call for Papers

We invite you to attend the 210th 2YC₃ Program on May 22-23, 2015. The conference will take place at Windward Community College, located on the island of O‘ahu. We currently are looking for colleagues who would like to contribute to our program by giving a presentation or leading a workshop. We especially encourage topics related to our theme “Chemistry for a Sustainable Future.” If you would like to present on a different topic, please do not hesitate to submit an abstract, as we encourage as diverse a program as possible. The due date for submitting abstracts is March 31, 2015.

Program Highlights

The keynote address will be given by Dr. Matthew S. Platz, Vice Chancellor of Academic Affairs at the University of Hawai‘i Hilo. He will talk on “The Vision for Sustainable Chemistry at the National Science Foundation.”

Confirmed speakers include Dr. George Bodner (Purdue University, Indiana), Dr. George Mamiya (Independent Community College, Kansas), Mark Bishop (Monterey Peninsula College, California), Dr. Timothy Minger (Mesa Community College, Arizona), Scott Donnelly (Arizona Western College), Dr. Wm. Douglas Urban (North Central State College, Ohio), Thomas Jose (Blinn College - Bryan Campus, Texas), Roger Kwok (Leeward Community College, Hawaii), Ranjana Segal (Tarrant County College District, Texas), Dr. Ngozi Onyia (Rockland Community College, New York), Dr. Rebecca Page (Leeward Community College, Hawaii), Dr. Kathleen Ogata (Kapi‘olani Community College, Hawaii) and Thomas Higgins (Harold Washington College, Illinois).

Other highlights include an optional boat ride/walking tour of the Hawaii Institute for Marine Biology (HIMB) Laboratory facilities in Coconut Island as well as shows at the Windward Community College’s Hokulani Imaginarium, a high-tech planetarium and multimedia facility.

Travel/Directions

Honolulu International Airport (HNL) on O‘ahu is Hawaii’s major airport, serving as the entry point for most of Hawaii’s visitors. All major domestic and many international carriers serve O‘ahu. Please note that driving to Windward CC is highly recommended. Due to the lack of lodging in the near vicinity of the college, taking the bus from the Honolulu area could take upwards of two hours, whereas driving time would be 30 minutes depending on traffic conditions. Free parking is available on campus.

Directions to Windward CC can be found at: http://windward.hawaii.edu/About_WCC/Directions/

Lodging

Our recommendation for your stay on Oahu is the Ala Moana Hotel. It is centrally located in downtown Honolulu and is adjacent to the state's largest shopping mall with over 300 shops and dining options and across the street from Ala Moana Beach Park where you can enjoy surfing, snorkeling, or just relaxing after a fun day at the conference. If you're planning on visiting the world famous Waikiki area, it is only one mile away.

We are pleased to have secured special discounted rates for conference attendees:

Kona Tower w/City or Mountain View

One queen bed, 2 persons max

\$155.00 + 13.962% USD per night

Waikiki Tower w/City or Mountain View

One queen bed, 2 persons max

\$175.00 + 13.962% USD per night

If you are interested in reserving rooms at these discounted rates please contact Renette Sonomura at rsonomur@hawaii.edu. Please mention the above room rates.

Registration and Conference Website

Registration and up-to-date conference information can be found at the website:

<http://windward.hawaii.edu/2yc3/index.html>

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**Need
ideas?**

210th Two-Year College Chemistry Conference
Windward Community College, Kaneohe, HI
May 22-23, 2015

Teaching with technology...What works and what doesn't

A Resources for Excellence workshop

At this workshop, you will

- ◆ Develop customized strategies for integrating technology into your curriculum
- ◆ Connect with other two-year college chemistry faculty
- ◆ Discover resources to foster excellence

**211th 2YC₃ Conference
Conference Announcement
Call for Papers**

Gateway to the Future: Preparing Students for the Next Step

**September 18-19, 2015
St. Charles Community College
4601 Mid Rivers Mall Drive, Cottleville, MO 63376**

We currently are looking for colleagues who would like to contribute to our program by giving a presentation, leading a workshop, or participating in a panel discussion. We especially encourage topics related to our theme which is focused on serving as a bridge for students to move forward into their career or academic futures. If you would like to present on a different topic, please do not hesitate to submit an abstract, as we encourage as diverse a program as possible. The due date for submitting abstracts is September 1, 2015. The latest conference updates will be available on the 211th conference website coming soon.

Conference Chairs

John Bookstaver

Beth Michael-Smith

jbookstaver@stchas.edu

bmichael-smith@stchas.edu

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**Data and Reports on
2-Year Colleges**

Information about 2-Year Colleges, such as Landscape Surveys, Faculty Status Surveys, Chemical Technology education and technician workforce reports, can all be found at the ACS's Two Year/Community College page on "Data and reports on two-year colleges". The link for this page is <http://www.acs.org/content/acs/en/education/resources/twoyear/data-and-reports-on-two-year-colleges.html>

National Science Foundation (NSF) Grant: The Advanced Technological Education (ATE) Program

The Advanced Technological Education (ATE) program focuses on the education of technicians for the high-technology fields that drive our nation's economy. The program involves partnerships between academic institutions and industry to promote improvement in the education of science and engineering technicians at the undergraduate and secondary school levels. The ATE program supports curriculum development; professional development of college faculty and secondary school teachers; career pathways to two-year colleges from secondary schools and from two-year colleges to four-year institutions; and other activities. Another goal is articulation between two-year and four-year programs for K-12 prospective STEM teachers that focus on technological education. The program invites research proposals that advance the knowledge base related to technician education. The proposal deadline is **October 8, 2015**.

More information about the program can be found at:
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5464

Registration is open for the 2015 ACS assessment review cycle!

Two-year college faculty and administrators are invited to register for the 2015 ACS assessment review cycle. The ACS Assessment Tool for Chemistry in Two-Year College Programs is a comprehensive form that helps the user evaluate chemistry and chemistry-based technology education at his/her institution within the context of the ACS Guidelines for Chemistry in Two-Year College Programs. The tool can be accessed and used anytime at www.acs.org/2YGuidelines. It is designed to support a variety of goals, such as program self-assessment, strategic planning, and collecting background for grant proposals.

In addition to the tool itself, ACS offers an annual review cycle for users interested in third-party feedback on their self-evaluation. Participants in the review cycle have the opportunity for personal guidance in completing the assessment tool and reminders for its timely completion. Participants who submit their completed tool by September 18, 2015, will receive detailed feedback on their institution's strength, suggestions for growth, and resources that may help.

Feedback is provided by the Assessment Review Panel, a group of two-year college chemistry faculty with experience completing and reviewing the assessment tool. Since the tool was released to the general public in 2013, 56 institutions have participated in the review cycle, and 30 have had their assessments reviewed by the Assessment Review Panel. The review cycle is free, open to all two-year colleges, and entirely confidential. Anyone interested in participating in the review cycle should complete the online registration form at www.acs.org/2YGuidelines by June 3, 2015.

For more information on the assessment tool, Guidelines, and other resources, visit www.acs.org/2YGuidelines or www.acs.org/2YColleges, or contact the ACS Undergraduate Programs Office (2YColleges@acs.org, 1-800-227-5558, ext. 6108).

212th 2YC₃ Conference
Conference Announcement
Call for Papers

Creative Strategies for Teaching and Learning

November 6 & 7, 2015

Piedmont Virginia Community College
501 College Drive, Charlottesville, VA 22902

We currently are looking for colleagues who would like to contribute to our program by giving a presentation, leading a workshop, or participating in a panel discussion. We especially encourage topics related to our theme, which is focused on creative strategies for teaching and learning in chemistry. If you would like to present on a different topic, please do not hesitate to submit an abstract, as we encourage as diverse a program as possible. The due date for submitting abstracts is October 9, 2015.

The latest conference updates will be available on the 212th conference website coming soon:
<http://www.2yc3.org/php/meetings.php>

Conference Chairs

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Get short, timely messages from 2YC₃. Twitter is a rich source of instantly updated information. It's easy to stay updated on an incredibly wide variety of topics. Join today and follow "@2YC3".



Passer Education Grants

The Passer Grant is available to full time chemistry faculty at 2 or 4 year US colleges without graduate programs to help support continuing education. Awards may be used for short courses, advanced courses, or workshops (such as the cCWCS workshops held throughout the country). Upcoming applications for the program are due on April 1 and September 1. If you would like more information, visit: <http://www.divched.org/awards/dorothy-and-moses-passer-education-fund-0>. You may also contact the Chair of Passer Education Grant Review Committee, Sue Nurrenbern, at nurrenbe@purdue.edu or scnurrenbern@gmail.com.

C3 2015
Deep Learning: An Ocean of Possibilities

June 4-6, 2015
Mount Saint Vincent University
166 Bedford Highway, Halifax, NS B3M 2J6

The C3 2015 organizing committee, with representation from Mount Saint Vincent University, Dalhousie University and Saint Mary's University, would like to welcome you to the upcoming 42nd College Chemistry Canada (C3) conference, to be held June 4-6, 2015, at Mount Saint Vincent University in Halifax, Nova Scotia. The conference theme is "Deep Learning: an Ocean of Possibilities". The invited speakers are Andy Dicks (University of Toronto) and Pippa Lock (McMaster University, recipient of a 3M National Teaching Fellowship). Registration and abstract submission will open by February 1, 2015. We welcome oral submissions on the chosen theme or any aspect of chemistry education.

In addition to traditional 15-minute talks, there will be a "Furious Five" session, where presenters can take up to 5 minutes to share a handy chemistry teaching tip. Space is limited in this session, so be sure to get your abstract in early! All abstracts must be submitted by April 15, 2015.

As requested by the membership, we will have a lobster banquet on Friday night, at the famous Shore Club in Hubbards, NS. There is also a pre-conference Thursday outing to Peggy's Cove, NS.

Updates will be posted on the C3 website (<http://collegechemistrycanada.ca/conferences/15conf/conf2015.html>) and on our College Chemistry Canada Facebook site: <https://www.facebook.com/groups/17938199225/>

For more information, please contact:

Kathy Darvesh	katherine.darvesh@msvu.ca	(902)457-6544
Mary Sheppard	Mary.sheppard1@smu.ca	(902)491-6470

College Chemistry Canada (C3) is a non-profit organization dedicated to the promotion of the teaching of chemistry primarily at the college and university level. Originally an affiliate of the Two-Year College Chemistry Consortium (2YC₃) in the U.S., C3 became an independent organization in 1976. Dedicated to providing professional development opportunities for teachers of chemistry, C3 has sponsored an annual conference each year since 1972. These conferences alternate between east and west and have been hosted by colleges from Newfoundland to the Yukon Territory to Rhode Island. In 1985 the organization became incorporated as a non-profit association.

Fishing for Chemistry, Part 2

by Scott Donnelly

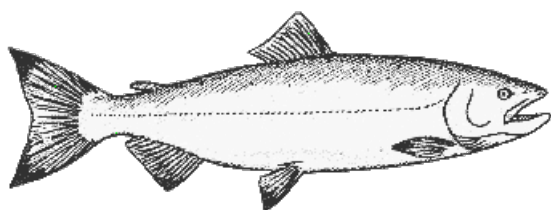
Arizona Western College, 2020 South Avenue 8E, Yuma, AZ 85365

In the previous newsletter (volume I, 2015) I ended the Fishing for Chemistry column with the following question: What chemistry discussed in General Chemistry plays a pivotal role in one of the most fascinating animal migration events on our planet? The animal migration event I'm referring to is that of Pacific salmon, namely, chinook, chum, coho, pink, and sockeye (1). This large-scale, remarkable fresh-salt water migration is an attention-grabbing way to introduce colligative properties and in particular osmosis to students. Specifically, one could chat about the osmoregulation strategies employed by Pacific salmon during their death-defying migration from fresh to salt and then back to fresh water. Then, after the introduction, osmotic concepts could be visibly demonstrated using a number of well-known demos involving carrots, celery, or potatoes (2). In this short column, I'll limit the discussion to Pacific sockeye salmon.

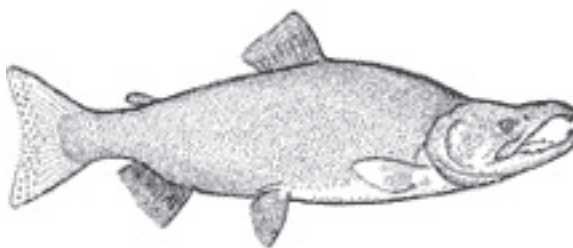
In brief, the iconic sockeye salmon spawn and grow into juveniles in a nutrient-limited freshwater environment as they migrate downstream, oftentimes tail first on account of the strength of the current, towards the nutrient-rich, salty environs of the open or coastal ocean where they spend a number of years before returning upstream to their natal freshwater lake or tributary to reproduce and then die. As the young, growing salmon migrate seaward they transition from the hypoosmotic and comparably warm waters of freshwater rivers and streams to the hyperosmotic and cold salty water of the northern Pacific Ocean. At any point during their arduous, predator-infested round-trip journey they must remain in osmotic and ionic balance or die.

On the return trip to their place of birth, sockeye salmon undergo grotesque morphological changes, especially adult males, that correlate in part to beefing up their energy reserves for the perilous, energy-intensive trip upstream swim against the relentless, unforgiving river currents.

Pacific Sockeye Salmon (*Oncorhynchus nerka*)



non-spawning phase (ocean)

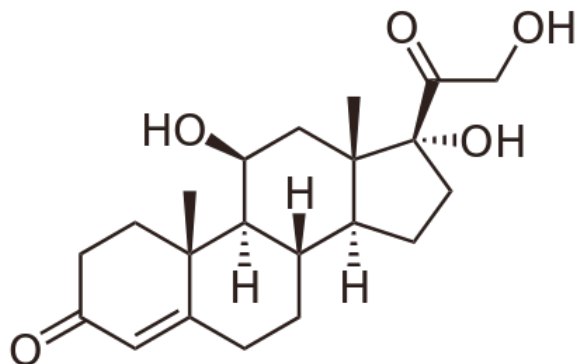


spawning phase (fresh water)

And during their return trip, like their seaward migration, they encounter changes in water chemistry that require regulating the concentration of dissolved salts inside and outside their cell membranes as migration transits from the hyperosmotic saline ocean to the hypoosmotic freshwater of rivers and tributaries. If the response to the changes in osmotic and ionic profiles of the water column does not happen as it should, then the result is premature death and ultimately the failure to pass along their genes to the next generation.

How then do Pacific salmon, in general, know where to go when returning to spawn in their natal freshwater rivers, streams, or lakes (aka the home-stream olfactory bouquet or "HSOB")? Organic chemistry plays a role.

Salmon migration upstream is guided by their remarkable olfactory ability to distinguish between the chemical compositions of their natal fresh waters from other different fresh waters where they were not born. Recent research indicates that migrating Pacific salmon experience a surge in the concentration of the steroid hormone cortisol in their blood plasma (3). The hormone thyroxine is implicated as well (4).



cortisol

How do I incorporate the migration of Pacific sockeye salmon into OChem? As mentioned in the Notes from the Chair column in this newsletter, I usually begin each OChem class with a Molecule of the Day. After identifying functional groups and asking which of the two alcohol types is more easily oxidized, students are asked to determine the relative configuration about each chiral carbon of the stereoisomer above.

What was the lure that piqued student interest in the day's lecture? A few introductory slides and a short four minute video related to the remarkable migration of Pacific sockeye salmon to their home waters for the final race of their lives (5).

References:

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2. <http://www.biotopics.co.uk/life/osmsis.html>; http://www.utsouthwestern.edu/edumedia/edufiles/education_training/programs/stars/osmosis-demo-lab.pdf; <https://sealevel.jpl.nasa.gov/files/archive/activities/ts3si-ac1.pdf>; http://lecturedemos.chem.umass.edu/solutions13_1.html
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5. http://video.nationalgeographic.com/video/salmon_sockeye?source=searchvideo; <http://video.national->

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Division of Chemical Education
American Chemical Society

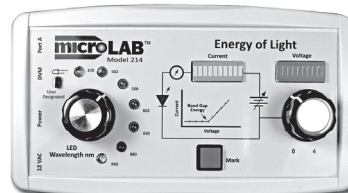
An Invitation for Submissions to the Chemistry Outlook

From the Editor: Any and all members of 2YC₃ may consider submitting interesting and relevant articles, commentary, announcements, job postings or photographs for inclusion into the Chemistry Outlook. *Do you have an interesting and relevant story to tell about your past 2YC₃ experiences?* Do you have an interesting classroom activity you'd like to share? How about a demonstration or a teaching technique that you think works especially well? In the past we have published conference commentary, "It Works for Me", photographs of students excelling at presentations and workshop announcements.

Submissions should be fairly short so that we can include more in the newsletter. Submissions may be published on an editorial appropriateness and space-available basis, and should be typed in Times New Roman font, single-spaced, 12-pt. I look forward to hearing from you!

The deadline for Volume III (2015) is June 15, 2015.

THE ENERGY OF LIGHT



Students use **MicroLab's Model 214 Energy of Light module** to measure the band-gap energy of a series of visible and IR LED's.

They can visualize, understand, and quantify the relationship between energy, color, wavelength, and frequency of light.

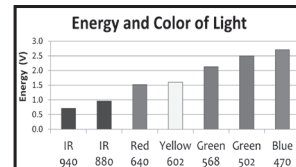
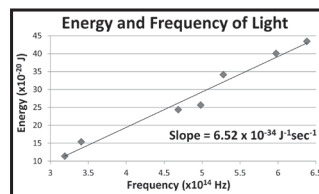
The 214 can be used with a MicroLab FS-522, or as a "stand-alone" experiment or demo using an inexpensive digital voltmeter readout.

Concepts Students Can Develop:

- Energy of light increases IR to violet.
- Energy is inversely proportional to wavelength.
- Energy is directly proportional to frequency.

The MicroLab Advantage:

- Quick data analysis with MicroLab or Excel template.
- Low cost: One module can serve two student groups.



MicroLab's FS-522 includes FASTspec™ capability and makes almost every instrumental measurement needed in general and environmental chemistry and biochemistry.

microLAB
Designed and Manufactured in the United States

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