

C₃ BONDS

VOLUME 3, ISSUE 1

FALL 2004, YEAR 1



C₃ Welcomes A New Group During June!

With two full years of its project completed, the C₃ team eagerly welcomed the newest group of teachers to join this professional development opportunity on the Louisiana Tech University campus. Participants taking part in the National Science Foundation funded program during the 2004 summer institute included the following:



Donna Alford, Downsville High School
Linda Bates, El Dorado High School
Rebecca Berzas, St. Edmunds High School
Stacy Campbell, Ruston High School
Lydia Clary, Weston High School
Pat Edington, Ruston Junior High School
Willia Hatter, Homer High School
Tonya Jones, Carencro High School
Jennifer McSween, Ouachita Christina School
Abbra Mack, North Little Rock High School
Tammy Pilgreen, Lillie Middle School
Mary Beth Plair, East Thibodeaux Middle School
Natalie Rowe, C.E. Byrd High School
Evelyn Scott, Lillie Middle School
Sherrie Stevens, Livonia High School
Emilie White, Quitman High School

The group spent the first two weeks of June engaged in studies that integrated instruction in chemical concepts with how to effectively implement reform based strategies in their students' classes. The study was developed

around the Hindenburg disaster. Topics included renewable energy sources, buoyancy, density, properties of gases, gas laws, molecular theory, electrolysis of water, molarity, conservation of mass, atomic theory, balancing



equations, stoichiometry, and thermodynamics, among others. In addition, emphasis was placed on the history of science and key figures involved in the development of scientific information. As part of the instructional process, the participants engaged in hands-on/ minds-on learning experiences that involved use of the scientific method, experimental design, process skills, and inquiry. Various aspects of the science reform movement (teaching strategies such as cooperative learning, learning cycle, alternative assessment, and constructivism) were modeled, discussed, and assessed. During the academic year, these educators will attend four weekend workshops, participate in an electronic learning community, and host project staff for multiple classroom observations and visits. Each participant returns to Tech during the summer of 2005 for the second phase of the project. During Year 2, participants continue their training with chemistry and focus on their role as leaders in science education. C₃ congratulates these teachers on a **JOB WELL DONE** and looks forward to continuing this partnership in the year to come!



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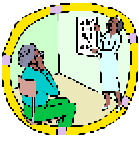
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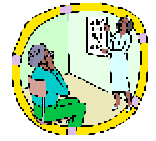
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C₃ CLASSROOM OBSERVATIONS UNDERWAY



With the 2004-05 academic year in full swing, C₃ also has its first round of classroom visits and observations moving ahead at full steam. Program Coordinator Cathi Cox is steadily working through Louisiana and Arkansas, the two states represented, in order to visit each teacher participant at least once during the first semester.

And the evidence is there—the Year 1 C₃ folks are doing an excellent job!! Each teacher has been challenged to use the learning cycle regularly and consistently, with evidence of its implementation available for



Cathi when she arrives. To date, the group is 100% with its efforts and the entire C₃ team salutes the participants for their dedication and hard work. And with less than half the group remaining on the schedule before Thanksgiving, Cathi looks forward to continuing this exciting part of the academic year in order to see what other amazing things these outstanding teachers are doing! So, be watching carefully—chances are the Jeep is headed your way SOON!! Keep up the good work everyone—you make EVERYBODY look



C₃ Gets on the Board!



During the August Reflective Reunion meeting with C₃ teachers, Program Coordinator Cathi Cox instructed the group on the use of Blackboard, the electronic on-line learning tool that will be used throughout the academic year. As a means of maintaining the sense of community that was established during the summer program and to facilitate the ongoing instruction of the group, Blackboard is being used to post assignments that each teacher completes and submits on line. In addition, it is used as a communication tool so that each teacher can respond to their colleagues and maintain a discussion concerning the issues and concepts that have been addressed in the course or introduced during this on-line compo-



nent. And as the newsletter goes to print, the Year 1 participants have edged ahead of the Year 2 group by enthusiastically embracing this unique program. All signs point to an exciting on-line learning experience for everyone involved! Assignment #1 focuses on the learning cycle and how the teachers' work with constructing learning cycle lessons is evolving. Assignment #2 will be up and running with a lively discussion about the implementation of videotaping classroom lessons for personal critique by the end of October. All C₃ participants are reminded that they have until October 27, 2004, to get the first assignment completed so they will be ready for the next step! Visit the Tech Blackboard site at <<http://blackboard.latech.edu>>.



C₃ WILL BE LOVIN' LAFAYETTE!!!

C₃ is delighted to once again be able to offer the opportunity for its teachers to attend and participate in the 2004 Louisiana Science Teachers Association Convention, "Sharing the Wonder of Louisiana' Wetlands". Held in Lafayette, October 28-30, 2004, short courses will be offered the first day with breakout sessions and workshops following on the next two days. All C₃ teachers will be provided registration, two nights hotel stay, and a travel allotment in an effort to facilitate their attendance at this typically outstanding meeting. The CATALyST staff will offer a short course on Thursday morning



entitled "Water Quality Quandary: Field Trip in a Box," with the annual C₃ workshop following that afternoon. Both C₃ groups, Years 1 and 2, will meet together on Thursday, the 28th, for a mandatory session from 1:00—4:00 in the Maple Room of the Hilton Towers. It should be an exciting time of professional development as well as lots of fun for everyone involved as we experience the tastes and sounds found only in the heart of Cajun Country. We look forward to having the entire C₃ family together during this time and remind everyone to register and make room reservations ASAP in order to be ready when the convention begins. For more information, contact Cathi immediately and get ready for a road trip!



REMEMBERING THE REFLECTIVE REUNION



Year 1 C₃ participants kicked off the academic year program with a special one-day session held on the Louisiana Tech campus Saturday, August 16, 2004. Before leaving the course in June, the teachers were challenged to develop a project that utilized the learning cycle and focused on a content unit from the physical sciences that would be covered in their classroom during the 2004-05 school year. The project was to include learning experiences that engaged the student, allowed an exploration phase, developed concepts, had an application component and an assessment. During a three-hour morning session, Project Co-Directors Linda Ramsey and Bill Deese, guided the teachers as they individually presented their project to the group and discussed how it could be implemented. In addition, each participant made copies of their project for the group so that each teacher was able to return to the classroom with a variety of new ideas and strategies to use when planning throughout the school year.



Program Coordinator Cathi Cox facilitated an afternoon session that focused on the specific components of the upcoming academic year follow-up. After having fun with beginning activities, the teachers worked together to first reflect on the gains experienced during the morning session followed by group presentations and discussion. Each teacher was then guided through guidelines for video lessons, classroom observations, the learning cycle, portfolio construction, and further implementation of C₃ during the year. In addition, each participant was trained in the use of Blackboard, an online system to be used throughout the academic year. By the end of the day, the group had strengthened its bond and left with a renewed dedication for the tasks ahead.



The day proved to be a wonderful time of reflection and sharing. Project Staff appreciate the hard work that the teachers put into their roles as effective educators and leaders. You're doing a fantastic job!!!

PERIODICALLY PLAYING WITH ATOMIC STRUCTURE

The Year 1 C₃ gang gathered for its first full academic year weekend workshop on September 11-12, 2004, to "Periodically Play With Atomic Structure". Beginning by assembling into cooperative groups using parts of the atom, the teachers continued by exercising their creative muscles with group presentations that partnered pop culture and their atomic component. This definitely got things going with lots of laughs! Following this fun "warm up", the participants used everyday items and information to explore the periodic table of elements. The session followed the learning cycle and featured the following learning experiences: Periodic Palate, It's In The Cards, Plastic Periodic Table, The Element Shuffle, Missing Person, and Tackling Trends. From designing a chart of favorite foods and discovering characteristics of the periodic table through playing cards, to organizing the early periodic table using Lego blocks and developing three dimensional graphical models of periodic trends, the teachers worked cooperatively to fully explore the different components of something that is certainly a staple in every high school classroom. By the end of day one, the Year 1 group had fully engaged in playing with the periodic table!



Day 2 began with a recap of the periodic table through each group's development of a card sort and corresponding concept map. From there, the

teachers found themselves diving right into atomic structure. Following each group's development of initial atomic models, the topic was explored using the following learning experiences: Atomic Theory Logic Puzzle, Journey Through Time Jigsaw, Making Raisin Pudding, Reliving Rutherford, and more. Using common objects such as play dough, bb's, ping pong balls, cardboard, and various craft supplies, each teacher explored concepts connected to atomic structure that are sometimes too abstract for students to grasp. Classroom demonstrations were presented by both participants and project staff. A strong history component was incorporated as a classroom timeline was constructed throughout the workshop. And by the end of the weekend experience, all kinds of waves had been made by the following and each went home with their own set of fabulous prizes:



Donna Alford, Linda Bates, Rebecca Berzas, Stacy Campbell, Willia Hatter, Tonya Jones, Jennifer McSween, Abbra Mack, Tammy Pilgreen, Mary Beth Plair, Natalie Rowe, Sherrie Stevens, and Emilie White.

Once again, the C₃ teachers rose to the occasion and did a fantastic job while sharing their precious weekend time with their colleagues and leaders. Your efforts are appreciated more than you can know—super job everyone and keep up the good





SPOTLIGHT ON C₃ SUCCESS



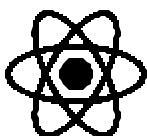
Pat Edington, Ruston Junior High School, engaged her students in a highly interactive lesson that actually had THREE learning cycles threaded through the lesson construction!



Students conducted a lab investigation focusing on inclined planes that was heavy on process skills before enjoying a demonstration of the Magdeburg Hemispheres that was both entertaining and enlightening! Wonderful! . . .



Stacy Campbell, Ruston High School, used a terrific card sort to guide her students through the complicated concepts related to fusion. Students then constructed a flow chart that reflected their understanding of the topic before ending class with a round of "Physical Science Can Be Pun!" Terrific! . . .



Linda Bates, El Dorado High School, kicked her class off with a candy bar relay that was used to review key terms that would be used in an upcoming assessment. From there, she transitioned into a card sort that expanded on the word puzzle. Poster presentations were then developed and shared. Great! . . .



Abbra Mack, North Little Rock High School, guided her students through a highly engaging TWO HOUR BLOCK like a pro. The cycle within a cycle lesson featured demonstrations, technology, a card sort and concept map, poster projects that connected to a previous exploration, and finally a fantastic creative brainstorming session on how soil is related to various products. Splendid! . . .



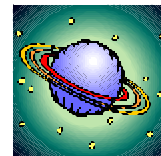
Jennifer McSween, Ouachita Christian School, also incorporated a card sort with her students that was then developed into a concept map. She modeled how to develop concept maps using common terms from the student's school experience. Then, using higher level questions, Jennifer effectively guided the students through their presentations while further developing concepts and clarifying misconceptions. Dr. Bill would be proud!! The students then built on the concept map with a "Nuts and Bolts" lab to further reinforce the concepts of substances and mixtures. Great! . . .



Tammy Pilgreen, Lillie Middle School, had her students complete element research projects following their work with Periodic Palate and Cousin Bill. The projects, which included posters, power points, and oral reports, were presented by the



individual students to the class. Good job! . . . **Lydia Clary, Weston High School,** used wonderful stories of unbelievable events to engage her students in the further study of space. After learning about meteorites that crashed through roofs and onto porches, the students were guided through a lesson that connected the composition of the planets to the periodic table. Good connection, **Lydia!** . . . And that's the report to date. It looks like we're off to a super start with the



super teachers in the Year 1 session of C₃. Individual copies of Cathi's feedback are given to each teacher in an effort for everyone to continue growing and evolving as teachers and facilitators of learning. We look forward to seeing what other exciting things this terrific bunch has up its sleeve as the year progresses—keep up the good work!



THE TOP 10 STEPS TO SUCCESS

1. Try
2. Try again
3. Try once more
4. Try it a little differently
5. Try it again tomorrow
6. Try and ask for help
7. Try to find someone who's done it
8. Try to determine what's not working
9. Try to determine what is working
10. Just keep trying!



FOR SUCCESS, ATTITUDE IS MUCH MORE IMPORTANT THAN ABILITY.

HAVE YOU REMEMBERED TO . . .

Engage your students in investigative experiences that focus on the highly critical PROCESS SKILLS?! If not, it's time to get moving in that direction!! For your convenience, a Process Skills Rubric is included in this newsletter. Use it to assess your effectiveness in this important area. Your students are counting on you!!



C₃ Teachers Pave the Way With Professional Development

In addition to working hard in C₃, many of our teachers have been involved in additional professional development opportunities. **Pat Edington, Ruston Junior High School**, and **Emilie White, Quitman High School**, are both participating in Tech's NSF GK-12 Grant Project.



As Teaching Partners, they are working closely with Tech Teaching Fellows in the implementation of more effective math and science instruction in the K-12 classroom. **Jennifer McSween, Ouachita Christian School**, attended a Flinn Scientific Workshop which she shares was an excellent resource for classroom demonstrations. **Jennifer** also indicates that the Flinn catalog is an awesome resource for chemical disposal methods as well as chemical safety storage. **Natalie Rowe, C.E. Byrd High School**, attended an InTech in-service following the completion of C₃ this summer. Terrific work gang!



LOOK AT OUR LEADERS!

Willia Hatter, Homer High School, has been named Co-Sponsor for her school's Medical Academy. She will be guiding students through a curriculum of classes and job experiences that expose them to careers in the medical field. **Natalie Rowe, C.E. Byrd High School**, shared the Learning Cycle with her colleagues during InTech training. She provided each participant with a copy of the C₃ Learning Cycle Checkbric and reports that it was a hit! Terrific work everyone—C₃ is proud of the work you do for your colleagues both in and out of your school! Keep up the good work!

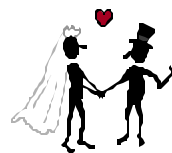


CONGRATULATIONS

C₃ congratulates **Jennifer McSween, Ouachita Christian School**, who will receive a visit from the "stork" this spring. She and her husband will celebrate the birth of her first child in May. In addition,



Abbra Mack, North Little Rock High School, will become Mrs. Cameron Best when she and her beau marry in June. Best wishes to both of these Year 1 participants as they enter new and exciting chapters in their lives!!



NEWS OF NOTE . . .

Willia Hatter, Homer High School, recently completed her certification in Biology, Chemistry, Physics, and General Science. In addition, she also received her Master's Degree in education while earning 30+ graduate hours. And if that in itself isn't impressive enough, **Willia** did it all in 2004! Way to go! . . .

Natalie Rowe, C.E. Byrd High School, was named to Who's Who Among American High School Teachers. Furthermore, **Natalie** received a QSM Grant for the purchase of CPO equipment to be used in her classroom. She is already involved with an 8G Grant that LuLu Martin, her colleague



and former C₃ participant, received for new technology in the science department. They will be implementing CPO Physics equipment, a mobile lap top station, and many other exciting new additions. Fantastic news!!



Do you have a History of Science Timeline going in your class?!?! **Stacy Campbell, Ruston High School**, does and it's great! Don't miss an opportunity to turn your students on to the variety of facets in science instruction. Help them make it come ALIVE!!

A "SUPER SCORE" SUCCESS STORY

Mary Beth Plair, East Thibodeaux Middle School, shares that her entire science department was treated to Copelands for supper when their LEAP and GEE scores in science were the most improved overall. Way to go teachers, as well as the administration, for recognizing a good thing when you have it!!





HAPPY HALLOWEEN FROM YOUR C₃ GHOSTS AND GOBLINS!!



MOLE MADNESS: OCTOBER 23

(but you may need to celebrate on Friday, the 22nd!)



Will you and your students plan anything special for Mole Day, 2003? C₃ would like to know! Let Cathi know how you and your classes celebrate Mole Day and you could win a fabulous prize. The deadline for submissions is October 27, 2004. And don't forget to share all the festive details; your plan may be copied by others next year!

AS THE CYCLE TURNS . . .

Words of wisdom worth repeating as our teachers focus on the learning cycle:



“Personally, I had never tried the learning cycle. My principal gave us a lesson plan outline to use. After noting the learning cycle however, I noticed that my textbook comes with a lesson planner that first focuses the students, then teaches them, applies what is taught, then assesses. It is a form of the learning cycle.” **Willia Hatter, Homer High School;** “I had heard of the learning cycle before C₃, but C₃ put it into a whole new perspective. It's completely different to read it or hear about it and then actually DO it (kinda like the learning cycle, huh?)” **Stacy Campbell, Ruston High School;** “I'm most challenged by the explaining phase. My instinct is to teach the concept and then have them go through the cycle and I've had to break that habit. In my mind I can't seem to "imagine" that the kids could figure the concepts out for themselves, BUT I have been pleasantly surprised at how well they can analyze information *without me*.” **Jennifer McSween, Ouachita Christian School;** “I really feel that the Learning Cycle emphasis has made a huge difference in the way I plan and teach. I think this strategy is awesome and I have shared it with other teachers as well. It really took me a long time to develop my learning cycle lesson, but it forced me to rethink the way I had been presenting the information before. My lessons seem more connected with this approach.” **Natalie Rowe, C.E. Byrd High School;** “I feel most comfortable with the engaging phase of the cycle and feel the need for improvement/growth is the exploring section. The design of useful "explore" activities is the area that presents the greatest challenge for me. It is quite easy to create a cooperative learning

IT'S ALL ABOUT ATTITUDE!

Ever wonder about those people who say they are giving more than 100%?

We have all been to those meetings where someone wants over 100%.

How about achieving 103%? Here's a little math that might prove helpful. What makes life 100%?

If:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

is represented as:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26.

Then:

KNOWLEDGE

11 14 15 23 12 5 4 7 5 = 96%

HARDWORK

8 1 18 4 23 15 18 11 = 98%

But,

ATTITUDE

1 20 20 9 20 21 4 5 = 100%

activity. However, the question *must* be answered, "Is it a meaningful learning activity?"” **Sherrie Stevens, Livonia High School;** “If I had not gone through the exercises myself, I know that I would be instructing way out of the boundaries of the students’ abilities. I first had to come to grips with the frustrations that I felt and relate to how my students must feel at times. I have found that walking in their shoes for awhile helped me get to that level of instruction that they need.” **Lydia Clary, Weston High School;** “I love anything that is hands-on, but preparation is one of the keys for a successful lesson; we are practicing these procedures daily.” **Donna Alford, Downsville High School.**

BULLETIN BOARD

Toyota TAPESTRY Grant Program - The program awards 50 grants of up to \$10,000 each and a minimum of 20 "mini-grants" of \$2,500 each to K-12 science teachers. Interested teachers should propose innovative science projects that can be implemented in their school or school district over a one-year period. Toyota TAPESTRY projects demonstrate creativity, involve risk-taking, possess a visionary quality, and model a novel way of presenting science. The deadline is 19 January 2005. More: <http://www.nsta.org/programs/tapestry/index.htm>

SCIENCE THROUGH ARTS (STAR): AN EYE ON THE MOON

During this yearlong program, students will learn about the Earth's Moon via Internet research, videoconferencing with NASA, the Cleveland Museum of Art, and other STAR participants. Students will learn about writing science fiction through videoconferences with published science fiction writers. Based on today's scientific knowledge, students will put together a mission to the Moon, including a mission to acquire new scientific information. Art will make the mission come to life. Writing, drawing, music, acting, and more could become part of this enriching experience. For more information, go to the following web site:

<http://www.grc.nasa.gov/WWW/K-12/STAR/Eye>

NATIONAL MOLE DAY IS OCTOBER 23 (22nd); MARK YOUR CALENDAR AND CELEBRATE! This year's theme is "Pi Ala Mole". As you make preparations, visit <http://moleday.org>

NATIONAL HIGH SCHOOL ROCKET CONTEST

Sponsored by AIA, the National Association of Rocketry (NAR), NASA, and the American Association of Physics Teachers, the Challenge provides student high school teams with a realistic experience in designing a flying aerospace vehicle that meets a specified set of mission and performance requirements. This year's Challenge is to design, build, and fly a model rocket carrying a raw egg and return it safely to the ground while staying aloft for exactly sixty seconds. To obtain information about the Team America Rocketry Challenge, visit www.rocketcontest.org. The application

NEW AND IMPROVED ACTIVITIES IN MATH AND SCIENCE

Get back to school with some new and some improved activities tied to national math and science standards. An update of the Designing Craters activity was done by McREL over the summer, giving it a new look and adding more references. It is still the inquiry-based activity that Gretchen Walker produced. And as if that weren't enough, the team at McREL also matched the Mission Challenges to national math standards, putting them in student and teacher's guide formats. Now, your students can use math to solve real challenges that a mission team encountered. They'll have so much fun, they won't know they're learning! For more information visit the following web sites:

Designing Craters:

http://deepimpact.umd.edu/designing_craters/index.html

Mission Challenges:

<http://deepimpact.umd.edu/disczone/challenge.html>

Need a cool web site for sponge questions and brain teasers? Visit www.usaweekend.com, click on "Frame Games" (this gives you the puzzles for this week), then click on "Visit the Archives" (this give you all the puzzles for the past few years). Students love these puzzles and it might give you a chance to complete the necessary "first of class" paperwork that everyone dreads so much!

Kennedy Space Center's (KSC) newest website seeks to encourage middle school students across the nation to develop an interest in science and math by viewing real working experts in these fields. The "Enter the Firing Room" site provides interactive games and information linking these subjects to exciting careers with NASA. The site highlights system engineers who work in KSC's launch firing rooms. The site includes a firing room tour, fun facts, pictures, and a special page for educators. Students get a chance to meet actual engineers through videos and biographies. Videos of astronauts are also featured on the site. After a virtual tour, students can test their knowledge by taking the Launch Simulation Quiz. For more information, visit <http://enterfiringroom.ksc.nasa.gov>

How will you engage and excite students to learn about science and a new career this year? Why not consider the use of Forensic Science Instruction in your curriculum. Whether you have an established program or are interested in learning more about offering a unit or course on Forensic Science, "Clues in Crime" is for you! For classroom instruction, Eduscreen offers Teacher curriculum cards, 5-Packs, and Site Licenses, complete with lesson plans, key terms and definitions, and quizzes. Find out what adding a forensic science unit can do for your curriculum—visit www.eduscreen.com

Laboratory Safety Carousel

Developed by Terrie Johnson, Airline High School, C₃ Session 2 2002-03

Purpose: To identify safety rules in the lab and justify the necessity for them.

Students will explore safety issues. Students must follow established guidelines, which include wearing lab aprons, and safety goggles during the entire lab exploration and clean up.

Students will spend 8 – 10 minutes at each lab station. Students will move to the next lab station at the instruction of the teacher.

At each lab station, follow the instructions, answer the questions and make observations.

Lab Stations:

Station 1: Acid on clothing (Concentrated HCl in drop bottle and nylon fabric as in panty hose or pajamas)

Wear gloves. Cut a small square of nylon from the sample, no more than one-inch square. Use the eyedropper and drop 1 – 2 drops of the acid on to the nylon in the culture glass.

Record observations.

Questions:

1. What would you predict would be the effect of spilling acid on your clothing?

Station 2: Danger of acid on living tissue

Use gloves. Obtain a small sample of egg white in a culture dish using an eye dropper. Drop 2 – 3 drops of concentrated HCl on the egg white. Record your observations, use a wash bottle and squirt water on the egg and acid, record your observations.

Questions:

1. An egg white contains a protein similar to the one found in the eye, what is the effect of acid on the eye? What safety precautions should you take?
2. What is the effect of the water? Will using an eye wash remedy a chemical spill in the eye? Explain your answer.
3. Based on your observations, would you say that this reaction is reversible?

Station 3: All clear liquids look the same

(prepare several test tubes with clear liquids, one with water, also use alcohol, hydrogen peroxide, sodium hydroxide, and acetic acid—or others)

Observe the test tube rack. What can you say about their appearance, odor and consistency. Record your observations.

Questions:

1. From your initial observations can the three liquids be distinguished? Explain.
2. What conclusions can you draw from the litmus test?
3. What safety rule should be followed concerning liquids? Describe a situation where not following this safety rule could result in the loss of life, limb or money.

Station 4: Contact Lenses

Cut two one-inch squares of acetate film (transparency material). Place one "lens" in a dish. Place one or two drops of food coloring on the edge of the film. Make observations. Place the second "lens" over the first. Record observations. Use the wash bottle to wash the color out--do not touch the lenses. Observe. Blot with a paper towel, observe.

Questions:

1. What safety rule does this simulation illustrate?
2. What do you think would happen if an individual wearing contact lenses got a splash of a chemical in their eye? Would the eyewash undo the problem? Why or why not?

Station 5: Hot glass looks the same as cold glass.

(two identical Erlenmeyer flasks, ring stand, iron ring, wire gauze, two thermometers, tongs)

Use two Erlenmeyer flasks. Fill one with water about half full, and heat it on the ring stand with the Bunsen burner until it boils. Fill the second flask with water and leave it on the lab desk. Using the tongs, remove the flask and empty the water in the sink. Empty the second flask. Use the two thermometers to measure the temperatures of the air in each flask. Record the temperatures.

Questions:

1. Compare the appearances of the two flasks. Without touching them, or using the thermometers, can you tell which flask is hot? Explain.
2. If a thermometer is not available, what is a good way to determine if a piece of glassware is too hot to touch?

Station 6: Fire Extinguishers

(Small pieces of paper, dry ice to generate CO₂, or use baking soda and vinegar, a spray bottle, thick towels, sand)

Light one of the small pieces of paper and place it in the thick glass specimen dish. Pour the carbon dioxide over it. Observe. Light a second piece of paper; cover the mouth of the dish with a damp thick towel. Observe. Light a third piece of paper; spray a mist of water over it. Observe. Light a fourth piece of paper and pour sand directly on it. Observe.

Questions:

1. Write your recommendation on the construction of fire extinguishers based on your findings at this station.
2. Which procedure above extinguished the flame fastest and most efficiently?
3. If a fire extinguisher were not available, what materials readily available in this room could you use to extinguish a fire, justify your answer with observations from this lab.

A PROCESS SKILLS CHECKBRIK

Assessing the Integration of Process Skills Into Planned Learning Experiences



Basic Process Skills

- _____ OBSERVING (gathering data using all senses, frequently extended with instruments)
- _____ CLASSIFYING (grouping into categories sharing common characteristics)
- _____ USING NUMBERS (quantifying data and manipulating the numbers, including metric and scientific notation)
- _____ COMMUNICATING (presenting observations, ideas, and results verbally, in writing, and with pictures and graphs)
- _____ MEASURING (accurately quantifying length, area, volume, weight, time, and temperature)
- _____ INFERRING (making tentative explanations based on observations)
- _____ PREDICTING (using past observations and measurements to predict future observations)
- _____ USING SPACE/TIME RELATIONSHIPS (describing spatial relationships and their change with time, including shapes, symmetry, time, velocity)

Integrated Process Skills

- _____ FORMULATING HYPOTHESES (making educated guesses about what the outcome will be)
- _____ CONTROLLING VARIABLES (keeping all influences constant except the one being tested)
- _____ EXPERIMENTING FORMULATING MODELS (employing all of the other skills to solve a problem creating a mental or physical model of a process or event)
- _____ INTERPRETING DATA (making sense of observations made)
- _____ DEFINING OPERATIONALLY (creating a working definition)

The Toshiba/NSTA Exploravision Awards Entry Form