

# STUDENTS TEACHING STUDENTS: HABITAT TOURS, AN OUTDOOR LAB EXERCISE

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The outdoor environment is not organized into chapters like a biology text. On a stroll through the woods, one does not encounter carbon atoms first, then proteins, then prokaryotes, and then eukaryotes with increasing complexity as one moves further into the woods. However, certain areas of the woods may contain organisms that are successful in that specific physical environment. These areas are called habitats and each has its representative plants and animals that live and reproduce successfully there (Kormondy, 1984). Recognizing the characteristic living components of different habitats (i.e. reading the landscape; Leopold, 1949) is one of the first steps in understanding how all life is interrelated. It is also one of the first steps in becoming better connected to the natural environment of which we are a part. But many times venturing outdoors into a world of ravenous mosquitoes, venomous snakes and glistening poison ivy can be literally traumatic for many students whether they are biology majors or not. How can we get students to be more comfortable in and better connected to the outdoor environment so that they can relax, use their powers of observation and ultimately, start asking questions themselves about their natural surroundings?

One way is to get them outside more often. An effective method is an extended field class summer trip like Mountain Ecology (Davis, 1993). The students camp in the habitat that they are studying and become immersed in all aspects of that environment. Another method is to conduct outdoor field investigations either on campus or at a local natural area. But how can we get this outdoor experience to be user friendly? How can it be more interactive? How can we get the information that is learned to last longer and be applied later?

Recent studies on teaching strategies have shown that the best learning occurs when students are working in small groups on a specific task or specific question. (Angelo, 1993) These studies also say that information is retained longer when

lectures are minimized and replaced with interactive learning sessions where students teach students (Angelo, 1993). The instructor acts as a coordinator, a mediator, a resource person, someone who fills in needed information. Students study a topic and explain the meaning of the concept to each other in their own words using analogies and examples from their everyday lives that make sense to them. This encourages student ownership of that information because they have spent time themselves figuring it out and listening to others explain the topic as well. (Roy, 1996; Angelo and Cross, 1993)

I have used this teaching strategy in several of my outdoor field ecology classes and in several outdoor laboratory sessions in my introductory biology class. In small groups the students read the landscape, observe the living components of the immediate natural environment and answer focus questions about that environment. There are two goals of these investigations. One is to introduce the students to the major plant and animal components of a specific habitat. The second is to use this awareness to reduce anxiety, stimulate appreciation and foster the ability to ask questions about their environment on their own. In this paper I will describe a simple outdoor lab exercise involving students giving tours of a particular habitat to fellow students.

## Materials and Methods/Logistics

Prior to the investigation, students were given a brief description and summary of the habitat which they were to read. This summary gave the students an idea of what plants and animals to expect in this area. They were reminded that observations and information gained here will be used to compare with other life zones or habitats later.

*Habitat tours*—The class was divided into teams of 4 students. Each team was assigned a certain topic that they investigated. In my most

recent Mountain Ecology class, a two week camping trip that investigated and compared the living components in altitudinal life zones at several mountainside sites in Wyoming, 4 students were in a plant team and 4 students were in an animal team. Each member of the team was given a worksheet that contained specific questions for that team to answer (see box at right). Each team member had a notebook, a field guide for the area and binoculars. Each team was given 45 minutes to go out and investigate an area within 1/4 mile radius of the campsite or parking lot and focus on the questions answered on their sheets.

**Questions on the animal worksheet included:**

- What are 5 signs of (non domesticated) animal presence found in the area?  
(signs = feathers, fur, tracks, burrows, droppings, nests, trails, others?)
- Describe size, color, composition or other details of the sign and who you think left it.
- What animals were actually seen during the observation period?
- Describe the colors, size, and behaviors of each.
- What were 3 major animal SOUNDS heard? Describe each one.
- What was the function of each sound?
- What were 3 types of insects observed? Describe the colors and behaviors of each.
- If a lake, pond or stream is nearby describe 3 animals seen near or in the water.
- Of all the animals observed which one seemed to have benefited by the presence of humans? Why? Which one has been put at a disadvantage by humans? Why?
- Include definitions, notes or topics to read or ask about and add later.

When students returned from their group investigations, they took the other student team and the instructor on a tour of their surroundings. They tried to teach the other students about what they saw and other answers to questions from the worksheet. When one student team had completed their tour, the second student team took over. They showed the others what they had observed and learned from their investigation. Team members were kept the same but the assigned plant or animal emphasis was switched when a new habitat was visited.

**Assessment**

After each tour students were given time to write more in their notebooks about what they saw and learned. This time gave them a chance to look at the field guide and habitat description again. They were encouraged to include

They were asked to keep track in their notebooks of what they saw and questions that arose. They were encouraged to use their field guides and discuss with each other what they were seeing and hearing during their investigation time. Students were encouraged not to pick or sample flowers or vegetation and not to disturb animal signs so that the upcoming tour could see and learn about them later. Field guides that work well are those that include many pictures and descriptions of plants and animals in an area. An example would be the Audubon Nature Guide Series. I used a book called Western Forests by Whitney for my Mountain Ecology class.

**Questions on the plant worksheet included:**

- What is the Site Location? Approx. Elevation?
- What is the name of the life zone/habitat for this site?
- Write a simple 3 sentence general description of the vegetation at the site.
- What are 3 distinguishing trees found in this life zone site? How is each identified?
- What is the age distribution of these trees?
- What are 5 most common non-tree, flowering or non-flowering plants found in this site? How is each identified? Is there a specific type of soil or preferred location where each is found in the site?
- What are 2 rare or uncommon, but colorful or unusual plants found at the site? How is each identified? Why is each unique or unusual?
- Have humans, animals or natural forces had any impact on the trees or plants found here? Describe your observations.
- Include definitions, notes or topics to read or ask about and add later.

diagrams, sketches, personal comments and further questions that might be answered later.

After visits to 2 or 3 habitats, students gather with the instructor to begin talking about comparing 2 of the habitats. The instructor may start by giving a few examples of questions like why can't Aspens survive in the Sub-alpine zone or why do yellow-bellied marmots get more gregarious as altitude

increases? Students ask and answer many of their own questions during this session and, as a result, become knowledgeable and more confident when it comes to write the required paper which compares the plant and animals communities of two

life zones. Students are then given more time to adjust and complete their notes. They are asked to write a statement about the effectiveness of these habitat tours as useful methods of learning about their natural surroundings.

Students hand in the comparison paper and their notebooks to be evaluated. A written exam on plant and animal identification and ecology is also given. They are graded on how well they answered the questions from the tour sheets, on adequate depth in writing about ecological topics that were discussed, on their exam performance and on their overall participation in the tours and discussions.

### Disadvantages

The habitat tour technique may be limited to relatively small lab classes and the time it takes to run a tour for each team. Lab classes of twenty students may be the maximum working size. These classes could be divided into 4 or 5 teams. A 3 hour lab session would go by quickly if each team is given 30 minutes to investigate and twenty minutes each to give a tour.

Another approach would be to have the teams start their investigations during the initial lab period and revisit their areas 3 or more times during the upcoming week. This would help them become more familiar with the territory and the living components there. Maybe even one or more night visits could be required. Tours would be run during the next lab period.

The American Society for Microbiology's Board of Education and Training announces the culmination of its two year Biofilm CD Project. The CD-ROM titled, "Biofilms: Diversity in the Microbial World," is a digitized database demonstrating the diversity of biofilms. Each image is accompanied by a legend describing the biofilm, including what organisms are present, as well as how and where the biofilm was formed. The collection is designed not as pre-packaged software, but rather as a data base of resources that a teacher can utilize to custom tailor their own unique teaching materials. Included on the CD-ROM are sample presentations and instructions for the educator on how to create presentations for the classroom. The Biofilm CD-ROM was launched at both the Conference on Microbial Biofilms, September 30-Oct. 4 at Snowbird, UT and at the NABT meeting, Oct. 16-19 in Charlotte, NC. If interested in more information concerning the Biofilm CD-ROM, please contact Janet Bauer, Office of Education and Training, ASM, 202-942-9283, Email: [jbauer@asmusa.org](mailto:jbauer@asmusa.org) or see our Resources for Teachers page at our web site: <http://www.asmusa.org/edu1.htm>

It is difficult to get everyone participating in all the lab teams. It may be suggested that each team member must present at least two of the findings during the tour.

### Conclusions

I have used habitat tours successfully in several of my outdoor class sessions. The tours get students talking to and teaching other students. They are truly learning from each other. In several groups there was disagreement about the identification of an insect or a flower. They started to question each other and criticize the identification logic that the other students were using. They had their field guides out and were paging back and forth comparing size, color, and predicted habitat. They were asking questions among themselves. They were taking ownership of the information that they were learning. They were becoming aware of, respectful of and better connected to their natural environment as a result of taking these habitat tours with their peers. In many cases students could not wait to go on the next tour to see what they could find. Take the initiative and push back the boundaries of biological education - have your students take you on some habitat tours.

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# TAKING A SECOND LOOK: INVESTIGATING BIOLOGY WITH VISUAL DATASETS

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Have you considered the use of biological images as populations to be sampled? Visual datasets allow students to practice necessary visual skills and explore visual approaches to problem solving within specific areas of biology. New visual datasets are presented with an introduction to some of the visual learning strategies along with their use in undergraduate courses. Proactive design of visual learning experiences within the biology curriculum is urged.

KEY WORDS: visual learning, images, datasets, instructional design

The study of biology presents a unique set of visual learning, visual thinking, and visual communication requirements. Students majoring in the biological sciences not only should develop specific visual methodologies, e.g. the microscopic examination of tissues, field identification of organisms, or interpretation of graphic laboratory results, but also be able to utilize their knowledge of images for thinking and communicating within the extensive visual culture of practicing biologists. Knorr-Cetina & Amann (1990, p. 259) note that "the focus of many laboratory activities is not texts, but images and displays." These are not passive media, but "objects on which work is performed in the laboratory; like other materials handled in the stream of laboratory activities, they are processed" (p. 262). Students should be able to examine these images critically for additional information about the process or source material used to generate them. They should be able to understand the limitations of their own perceptions as well as the tools used to obtain visual information. Most importantly, they must continue to build and rely on visual skills and knowledge throughout their educational and professional lives.

How can we design learning environments that support our students in these objectives? Experiences that integrate visual learning with specific content should be part of the courses we offer. Visual learning can be defined as "the acquisition and construction of knowledge as a result of interaction with visual phenomena" (Seels 1994, p.107). Visual learning is an important component of visual literacy, "the ability to understand and use images, including the ability to think, learn, and express oneself in terms of images"

(Braden & Hortin 1982, p. 41). Despite the abundance of images we expect our biology students to be familiar with and use effortlessly, what it means to be visually literate in biology has been largely ignored. With the escalating use of images in our networked society, this expectation increases. The conceptual frameworks of visual learning and visual literacy are essential in the study of all disciplines, not just the biological sciences.

By selecting biological images from specific areas of biology that allow students to practice necessary visual skills and explore visual approaches to problem solving, we can offer visual datasets for use in our courses. A visual dataset may consist of a single image or a group of related images. Each image can be explored through multiple means to provide additional qualitative and quantitative data. Often additional information about the images is provided such as magnification or scale, source material may be identified, or the process by which the image was produced is revealed such as the scanning of an object. Most images we interact with have the potential for further study, but for the purposes of this paper, visual datasets are images explicitly produced for the purposes of visual analysis.

One example of a visual dataset is the *Caminacules*, an imaginary group of organisms generated by J. H. Camin and described by Robert Sokal (1983, pp. 161-163) that can be used for problem solving activities in evolution, classification, and development. The popularity of this dataset is shown by its inclusion in a variety of curricular materials such as *Biology Laboratory*, an introductory lab manual (Eberhard 1987, p. 161) and *The BioQUEST Library* (Jungck & Vaughan 1996) on CD-ROM. Each caminacule has a distinct

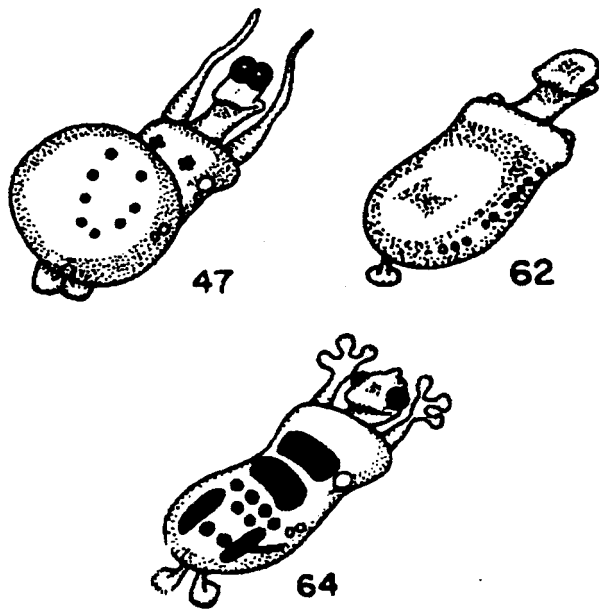


Figure 1. Examples of figures from the Caminacules.

set of phenotypic characteristics which can be used to organize the images into groups. Students “visualize” an evolutionary history for the caminacules by constructing a phenogram. Relationships between individual caminacules are determined by the identification and weighting of characters by the students. Despite preferred phenogram results by some instructors, this problem solving experience clearly provides for a rich set of “solutions.” It also opens the door for active persuasion based on visual interpretation and logic since these imaginary organisms can not have their behaviors observed, nor their molecular components analyzed. The inclusion of some fossil data (extinct forms) in the large dataset provides new information that obligates students to re-evaluate their visual data.

There are large visual datasets accessible to most instructors and students that exist at your institution. The microslide collections that can be found in every biology department are incredible visual resources. Despite this, learning experiences with prepared slides are often reductionistic. “Undergraduate students often view light-microscopy laboratories as memorization based courses. Too frequently the only major objectives of such courses is the descriptive naming of microstructures” (Blystone & Blystone 1994, p. 125). It may not occur to students to investigate the microscopic material beyond the identification of structures or an overview of the arrangement of these structures. More data is there than meets the eye and it may be used to enhance their understanding of biology.

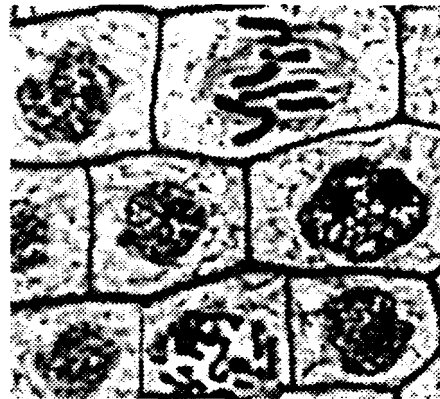


Figure 2. Longitudinal section of onion root tip as observed by light microscopy at 430X.

Let’s consider the use of a slide with a longitudinal section of an onion root tip in introductory biology (Figure 1). This slide is an excellent source of cells showing various mitotic phases. The process of “visualizing mitosis” (Milne & Milne 1958, p. 99) by making a microscopic examination of this tissue has long been a standard laboratory practice. Students are usually asked to identify cells undergoing specific phases. Even students who are not in the laboratory setting may be asked to do this by examining micrographs in their textbook (Campbell, Mitchell, & Reece 1996, p.147). A significant extension of this task is to quantify the cell cycle (Eberhard 1987, p.103) by examining individual root tip slides in lab. Using root tip tissue to learn about mitosis is not new (see Robbins & Rickett 1929, pp. 186-187). However, asking students to gather data from these images by treating the cells as populations for statistical review is an important pedagogical breakthrough. By actively investigating the number of cells in interphase and various stages of mitosis, students have the opportunity to integrate

an understanding of the reproductive process with their knowledge of structure of the plant. Students acquire terms used to describe cell structures visibly associated with specific phases through the repetitive process of counting phases. (There’s nothing like a bit of extended visual practice to familiarize yourself with these distinctive features.) The differing results shown by individual

counts allow students to address the issue of variability in living systems. Since there is not one correct "answer" to the phase frequency question, a robust set of questions concerning methods of counting and identifying as well as expectations may arise.

Blystone & Blystone (1994, p. 125) describe a wonderfully extended student approach to histological material from an inquiry-based learning perspective where students "view images as datasets." By using image workstations that support digital video microscopy, students can manipulate images that they capture directly from examination of their own slides or provided as digital images by the instructor. Students have access to powerful digital processing software such as NIH Image and Adobe Photoshop which allow them to perform a variety of measurements and manipulations. Examples of this include measuring inner and outer diameters of proximal versus distal tubules in a slide of rat kidney cortex in order to consider functional differences in these structures, creating digital serial sections through the kidney slide and recombining them to reveal a 3-D nephron, and reconstructing a chick embryo by combining several of the serial sections that have been captured from a single slide. Their students learn biology by constructing "visual hypotheses, simulations, and models" (p.131).

Visual resources are increasingly available. Visual databases from many areas of biology are available on CD, laser disc, and the web. Visual datasets are also being published in both text and digital forms. Some of these datasets come with

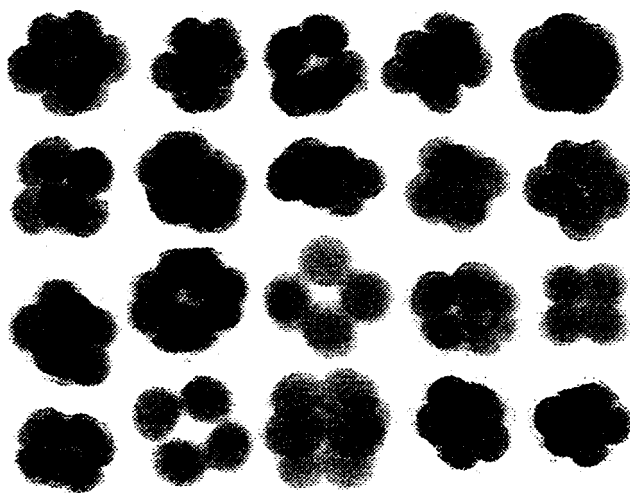


Figure 3. Starfish embryo dataset from *Image Analysis* (Blystone and Cooper 1996).

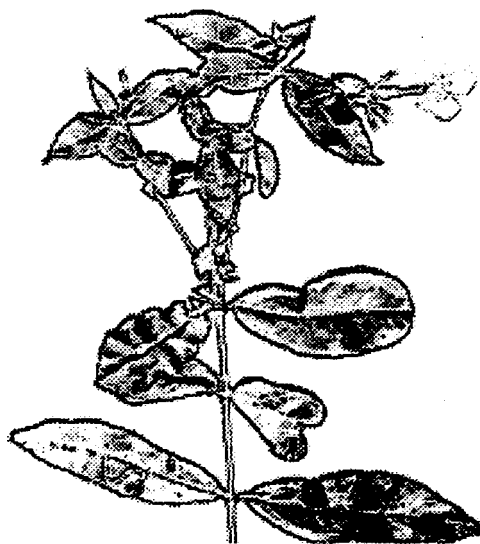


Figure 4. Whole plant image from *Oh Phlox!* (Stanley, 1996)

an explanation of the pedagogical implications of their use. The visual dataset of starfish embryos (Figure 3) enables students to explore their understanding of embryogenesis and development as well as increase their understanding of how images are manipulated and chosen for publication (Blystone and Cooper 1996, p. 64).

*Oh Phlox!* (Stanley 1996, p. 90) includes image files of individual leaves and "whole" views of mature garden phlox plants (Figure 4). It was developed to encourage visual practice prior to and following field study as well as to support visual investigation in biology. Care was taken to reduce the aesthetic bias that is often present in published images of flowering plants by incorporating all the phlox plants in a randomly selected area as images in this dataset.

How can we use datasets in our courses? There are several worthwhile approaches we can take. Let's begin by considering the leaf images from *Oh Phlox!* as a population to be sampled. Can we use this population to challenge some of the misconceptions or under-investigated biology of leaves? "In most studies of crop canopies or of the foliage of single plants, all leaves are treated as if they had the same properties" (Harper 1989, p.105). By systematic examination of these phlox leaf images, students can easily see that leaves are highly individual. They are much more likely to appreciate that "leaves on a plant or in a crop form a population, an assemblage of things that

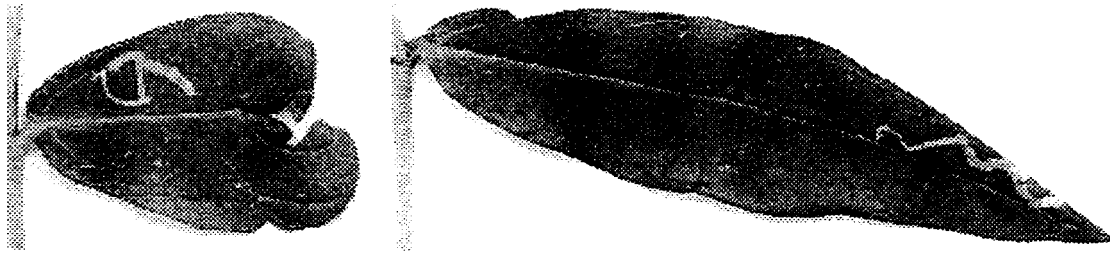


Figure 5. Selected leaf images with leaf miner damage from *Oh Phlox!* (Stanley, 1996).

can be counted, and they are manifestly not all the same. Their heterogeneity derives in part from the fact that they (like a population of rabbits in a field or of blue tits in a woodland) are not of the same age and change their properties as they age" (p. 105). Access to whole plant images as well as individual leaf images allow students to examine the leaves with respect to the development of the plant. The stem of the plant can be viewed as a transect through time. This "timesect" perspective provides visual information that is often overlooked by observers. Leaves can be considered in light of their individual and social context. Harper (1989, p. 105) points out the significance of looking at leaves "borne in different positions relative to each other" that "determine which leaves shade which. The positions they occupy within a canopy are also related to their age- in general, young leaves are found in the fringes of a canopy with older ones in the shade." Students can use *Oh Phlox!* to explore the biology of the mature plant through visual inspection and gain the practice they will need to carry out field investigations in the future.

Students could initiate their own investigations by sampling any of the myriad features of this population. They can develop hypotheses and use statistical data to support their ideas. Investigations centered on this dataset might include some standard measures of physical traits such as number of leaves per plant, percent of leaves showing leaf miner damage (Figure 5), average surface area of leaves, or leaf damage per individual leaf miner as an estimate of feeding required by developing larva. A fairly low tech estimate of leaf miner damage can be done by enlarging and printing out the image of the leaf, trimming the image, and determining the weights

of the entire leaf and leaf miner "trail." (Selected areas could be enhanced and then quantified with a digital processing program like NIH Image as well.) Behavior could be studied by determining directionality of leaf miner trails or plant growth responses after endoparasite activity. Students might examine the timing of leaf miner foraging by studying the intervals between leaves with leaf miner damage. Students could measure "green" or pixel density in new versus "old" leaves, analyze leaf shape as evidence of nutritional deficiency. An "eye-opening" experience for many students who tend to rely heavily on illustrations to identify plants in the field is to have them build a model of the "average" leaf from this population to compare with phlox leaves found in their field guide. Student directed activities could extend well beyond this list.

This increase in visual resources that support visual learning is not enough if we do not incorporate them in our courses. There are some questions we can ask ourselves that may help in making decisions about whether or not we should include visual learning objectives as part of our instructional design. Are the images we use in our lectures essential? Do our students question these images or merely memorize them? Gould (1987, p. 16) stated, "scientific illustrations are not frills or summaries; they are foci for modes of thought." Do we believe this? Are the images we encounter in journals important? If so, where will these images come from in the next generation of biologists? Do we rely on any visual strategies and knowledge that are specific to our discipline? Do our students find visual approaches to investigation in the laboratory or field problematic? If so, let's reconsider the role of visual learning in the design of our courses.

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See the "Call for Presentations" on the inside front cover.

### Come to Beloit College for the 41st Annual AMCBT Meeting October 16-18, 1997

Beloit College's attractive 40-acre campus, modeled after those of the early New England colleges, is located a short walk from the downtown business section of Beloit, WI, a community of 36,000 on the Wisconsin/Illinois State Line. Much of the land for the original College grounds was donated by pioneer residents of the community, which was founded in 1836, only 10 years before the College was chartered by the Wisconsin Territorial Legislature. The campus is dotted with pre-Columbian Indian mounds. Beloit's 50 buildings represent a variety of architectural styles and include structures designed by several nationally prominent architects.

Biology students at Beloit enjoy the advantages of small classes, generous laboratory space, and state-of-the-art equipment. They are encouraged to interact extensively with their professors and with each other in an atmosphere of cooperative and collaborative learning. In addition to their regular class work, many biology majors conduct independent research, participate in professional internships, and serve as teaching assistants. The biology department occupies one full floor and parts of two others in Chamberlin Hall of Science—a spacious, well-equipped and air-conditioned building completed in 1967. Six large laboratories (botany, zoology, biochemistry, physiology, genetics/microbiology, and general biology) are designed for class use, and many smaller laboratories house specialized state-of-the-art equipment used primarily for advanced laboratory exercises, and student and faculty

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# News and Views

## Honorary Life Membership in the Association of Midwest College Biology Teachers Sister Marion R. Johnson

Sister Marion Johnson was inducted as an Honorary Life Member in the Association of Midwestern College Biology Teachers on September 20th at the annual meeting this year which was held at Loras College in Dubuque, Iowa. Sister Marion served as President in 1993-1994, as Second-Vice President (1983-1984), as an Executive Committee Member (1985-1988), and twice hosted the AMCBT annual meeting at St. Xavier University. She also was responsible for many years for recruiting vendors to our annual meeting. She is a person who is exceptionally easy to work with, well organized, and knowledgeable. Her many years of service to the membership are deeply appreciated by all of her colleagues.

Sister Marion is exceptionally well qualified not only because she has been a loyal member, active contributor, and officer of the society, she is also personally committed to what AMCBT stands for: Good college biology teaching! When you visit her office at St. Xavier University where she has long been an Associate Professor of Biology, classrooms, or labs, talk to her students, or hear of her enthusiasm for the Indiana Dunes, it is self-evident that her life is dedicated to student learning.

Sister Marion is an avid educator. She has demonstrated this through her teaching, participation in boards, conferences, and organizing. After receiving a B.A. in Biology at St. Xavier University in 1960 and an M.S. in Biology from the University of Illinois-Urbana in 1964, she went on to study and teach courses in Marine Biology, Desert Biology, Psychology, Basidiomycetes, Environmental Studies, Microbiology, Ecology-Evolution, and Plant Cell and Tissue Culture at Stanford, Arizona State, the University of Oregon, the University of Alabama, The University of Tennessee, Scandinavia, Illinois Institute of Technology, the Ecological St. of Galapagos and the Catholic University of America. Obviously, she is a polymath who simply does it all! She has a deep respect for the Kenyan winner of an alternative Nobel prize, Wangari Maathai. Sister Marion invited her and other noted environmental and peace activists to speak at St. Xavier.

Sister Marion is a curriculum innovator. She is one of those few senior professors who constantly is learning new pedagogical styles, adopting and adapting innovative materials, and urging colleagues to try something new or to at least take a look at something. At Saint Xavier she promoted the 4-1-4 plan in order that biology students could have extended field experience; she herself led student trips (courses) to Florida to observe sub-tropical flora and fauna. In addition to AMCBT, she is a member of the National Association of Biology Teachers and a variety of professional biological organizations including the Ecological Society of America, the Botanical Society of America, the Illinois Academy of Science, AIBS, Union of Concerned Scientists and other environmental groups.

Sister Marion is an internationalist. In addition to her interest in Kenya's experiments in afforestation, she has been on a Darwinian pilgrimage to the Galapagos, studied rain forests in Costa Rica, done environmental studies courses in Scandinavia, spent three weeks in the old Soviet Union on issues of importance to Soviet women, frequently served as a host for foreign visitors, and is especially committed to problems of the Third World. Hence, Sister Marion is truly one of the CITIZENS of the world and takes her responsibilities seriously.

Hence, Sister Marion is not only deserving of our praise based on her record of service, but she is an excellent role model for neophyte biology educators as to the satisfactions of a career of dedicated service in college biology teaching.

# LISTS, LEADERSHIP AND LEARNING: ORGANIZING AN EFFECTIVE AMCBT MEETING

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Advanced planning, teamwork and good food are the key elements in running an effective professional meeting. Making long lists, setting deadlines and putting yourself in the place of the meeting participant are important parts of getting organized to host a meeting of your peers at your campus. The goal of the meeting is to foster an environment that promotes effective communication between professional biology teachers. This environment must be made as convenient as possible for the participants. It must be an environment that is easy to prepare for, to get to, to get around in, to communicate in and to relax in. The participants should have everything laid out for them early, by both mail and email, and also in their registration packets when they arrive. Thus, their anxiety and frustration will be minimized and their teaching ideas and classrooms concerns can be focused upon clearly.

This paper may present timelines and details that will help future local arrangement committees prepare for the annual AMCBT meeting.

## Laying the Groundwork Before the February Steering Committee Meeting

Dates for the meeting should be picked two years in advance if possible. A typical meeting starts Thursday night at 6 pm and ends on Saturday about 3 pm. A weekend should be picked that the football team is away. This will ensure that activities associated with the game do not interfere with meeting plans and participants. This weekend should not be too early in the semester either. The 1996 meeting was held Sept. 19-21 which for some people was only two weeks into the fall semester. A weekend between the 3rd weekend in September and the first weekend in November will avoid weather-related travel problems of winter and can take advantage of the beautiful fall colors in many midwest cities.

Once dates are picked, the rooms in the buildings where the banquet and other meals will be served should be reserved at least one year in

advance. Adequate space for a maximum of 120 people to attend the banquet should be reserved. Usually about 50 -70 people eat breakfast on Friday morning and about 70 -90 have brunch on Saturday. These rooms should be able to handle speakers and receptions or have adjacent rooms that can be used for these purposes. Also, one other conference room should be reserved for executive board, editorial board and steering committee meetings. This room should hold 20 people comfortably. Audio-visual equipment like microphones, podiums, overheads, slide projectors and possibly LCD overhead plates that can be connected to a computer should be available and workable in these rooms. It is best if the same rooms or two rooms that are adjacent to each other can be used for many if not all of the group gatherings. Even if the initial registration is held here, the participants have a familiar place from which to start and to which to return. This gives a central operating site for the meeting and immediately puts the participants in a familiar situation. It is best also if this site is used only by AMCBT for the entire length of the meeting which avoids frustration and promotes group bonding.

Sometime in the fall semester one year before the meeting, the permission of the college president, academic dean, and other college administrators should be sought to hold an AMCBT meeting on campus on the chosen dates. After they have approved, a campus-wide news release should be sent to all administrative offices, food service, and faculty newsletter describing the meeting, its dates, the estimated number of people attending and a brief description of the purpose of AMCBT. Making your whole campus aware of this meeting will avoid conflicts, generate interest and foster cooperation at the site.

Also at this time, the local arrangements chair should put together a campus and city profile that can be used in Bioscene and the AMCBT web site to attract people to the meeting. This statement should include facts and unique characteristics of

the college as well as the city and surrounding environment. It should include travel information like airline connections and driving times and directions from major cities. It should give the reader a taste of the area and invite them to come and see it for themselves. This profile should be submitted to the Bioscene editor and the AMCBT web page web master by November 1.

The program chair and the local arrangements chair should work together during December and January preceding the Steering Committee meeting to rough out a tentative meeting schedule with times and rooms included. The program chair should work out the timing and session leaders for the meeting while the local arrangements chair plans where the sessions and activities will occur. Email and FAX communication are essential in this process. The local arrangements chair must select 2 major meeting sites. One site where meals and the banquet will be held has been described previously. The other site is the sessions site. It is best if this site is in one building only. It must include 5 or 6 classrooms for sessions, 1 or 2 computer labs, a central gathering area close to the classrooms with chairs, and a classroom or open area for exhibitors and posters. One other classroom or conference room should be available as a security room for session leaders to store computers, valuables or as a place to prepare or store refreshments.

Classrooms should seat up to 30 people comfortably and each should have an overhead projector and screen. Two standby overhead projectors should be available as well. Several of the classrooms should be laboratories where participants sit at tables rather than individual desks. These rooms should be clean with all laboratory clutter stored. Slide projectors, LCD overhead projection plates and 1 or 2 portable Mac and PC computers on carts should be available for session leaders as well. Quick access to a copy machine is another consideration to include in selecting a good session meeting site.

The meeting usually attracts about 5-10 exhibitors that each require one or two 3x8 foot tables. The exhibitor room should be near or in the refreshment area and should be located centrally to all the session rooms. This room or nearby hallways should have chairs available for participants to relax in.

The computer labs should also be in the same or adjacent buildings. It is best if there is a Mac computer lab and a PC computer lab with about

12-15 computers per lab. The computer center personnel who oversee these rooms should be notified of the planned activities and asked if they could help participants load software or test run programs prior to the meeting.

The local arrangements chair should also put together a list of 5 -8 possible field trip destinations and leaders. It is best if these leaders can be local AMCBT faculty. However, personnel that manage or direct the field trip destinations can be selected as leaders, too. Local members of the Audubon Society, Sierra Club, Garden Club, or high school teachers may agree to lead field trips as well. The leaders should decide a maximum number of people per trip. In my opinion, field trips should be a maximum one way distance of 30 minutes by car. They should showcase the local environment and try to give people the opportunity to learn new things about a new ecological community or threatened environment that they have not experienced before. Having a variety of sites is essential. Trips to prairies, wetlands, rivers, woodlands, geological sites, historical sites, or gardens are examples of variety. Field trip leaders can have one or two duties. They can be responsible only for getting the group to and from the site promptly and/or they can be the local expert who involves the participants in learning about the site and its natural interactions. A researcher who uses the area as a study site or a conservation specialist who has seen the place change or stay the same over time would be valuable leaders. A teacher who has had students doing investigations at a site would be able to offer valuable insights into how to best use the land for these purposes.

Another type of field trip that has been offered in the past but is less desirable is a sightseeing trip to the major attractions in a city. I think that these are beneficial only if the group is met by a local expert who has some biological expertise and from whom they can learn something. If the lesson learned could be applied to improved student learning all the better. In my opinion the general sightseeing tours should be avoided and used only as a last resort.

A tentative meeting schedule with a campus map, a list of tentative field trips, directions to the city and the campus and some possible speaker names should be forwarded to all members of the Steering Committee 2 weeks before this group meets at the site usually in February. The local arrangements chair reserves a conference room for

this meeting. The room should seat 15 people comfortably and should have convenient access to parking and food service. The meeting usually begins at noon Saturday with lunch for all. This lunch can be catered by the campus food service. Dinner is held at a local restaurant and the meeting continues back at the conference room until 10 pm or so. The group meets Sunday morning for a continental breakfast around 9 am and finishes business by noon. It is best if the Steering Committee could stay at one or two of the hotels at which the meeting participants are going to stay to see these facilities too. Hotel phone numbers and directions must be sent to Steering Committee members prior to the meeting as well.

#### **Steering Committee Planning Session**

The major focus of the February Steering Committee Meeting at the site of the upcoming meeting is to discuss details and agree on a plan of action for the Program Chair and the Local Arrangements Chair. Timing of sessions, speakers, field trips and meals should be finalized. Participants at the regular Fall 1996 meeting enjoyed the general timing of the sessions and overall format of the meeting. One suggestion was to include 25 minutes between sessions to allow interaction between session leaders and participants as well as interaction time with the exhibitors. Another suggestion would be to have an hour for an open discussion session for anyone who would like to attend. This session would address any problems or ideas that anyone would want to present in an informal format. Food service menus should be provided to each member so that all items for the menu for the Thursday reception, Friday breakfast, Friday reception and banquet, Saturday breakfast and Saturday brunch can be chosen here.

Ideas concerning promotional materials that will be given to the meeting participants like bags, mugs, pens, mousepads, shirts, etc. should be finalized and approximate prices and funding sources discussed as well. Corporate sponsors, like publishers or equipment companies, for receptions, refreshments and speakers should be discussed.

In the past, speakers have been chosen according to the following general pattern. One speaker should focus on the teaching of biology. This speaker should be chosen by the program chair or the Steering Committee and their topic should relate to the theme of the meeting. A second

speaker is chosen by the local arrangements chair and is usually a local person with some expertise in biology or in a current biologically-relevant issue. A third speaker is chosen by the Steering Committee who is more nationally known for their work in teaching or research.

The committee should also meet with a member of the computer staff to ask about specific needs and capabilities.

Finally the Steering Committee should tour the prospective rooms for the meeting. Computer capabilities should be checked. Room size, location, central meeting area, crowd control and convenience should be addressed on the tour. With these final arrangements made, the local arrangements chair then begins the process of listing needs and looking carefully at the schedule of events to create the proper environment for a successful meeting. All these arrangements or as many as possible should be placed on the AMCBT web page as soon as possible to notify people of the meeting and its schedule.

#### **Considerations from March Through August Before the Meeting**

This is the time when the local arrangements chair should organize the other local AMCBT members to divide up responsibilities. Possible individual or two person jobs include food and refreshment arrangements, field trip coordination, directional signs on campus and on roads leading to campus, AV needs, registration/receipts and computer coordination. These individuals or teams should meet monthly until August and then more frequently as the meeting looms closer.

A block of local hotel rooms should be reserved. Usually 20 rooms at one hotel and 20 rooms at another hotel have been sufficient in the past. One thing to make transport even more convenient is to have a hotel shuttle bus available for meeting participants to use between the hotel and campus.

If mugs or bags or "free stuff" are to be part of the meeting, the arrangements for these should be made here. Sponsors that might help pay for these items should be contacted but not before advice of the college development office is received. Many times they can suggest people or groups to contact that might help with this project. The college public relations department might even donate money to your cause. Ultimately, AMCBT should not pay for these

items. And many times all you have to do is ask these groups and the financial support will be there.

This is also time to narrow down the field trip list to 4 or 5 good ones, contact good potential leaders and ask for their participation.

Since the menu has been finalized, it can be discussed with the food service. Care should be given to having enough food selection for vegetarians. Also it has been very important in the past to have some kind of dessert after dinner. Whether it be cherry pie or ice cream or both, some sort of sweet ending to each meal and especially the banquet adds to the success of the whole meeting.

The local chamber of commerce can be contacted and asked if they supply name tags, name tag holders, pens, folders, visitors guides, coupon books, or any other help. Many times these items are given free to the group.

It is a good time to draw up an estimated budget for the meeting. Since the registration fee has been set at the Steering Committee meeting, one can predict from attendance at past meetings how much money will be available to pay for various expenses. The major expenses include food service, field trip transportation, speakers fees, hotels and travel, printing costs and any reservation fees. The AMCBT Executive Secretary can furnish the local arrangements chair with money to cover costs before the meeting. The Executive Secretary can also furnish past meeting attendance records as well.

Exhibitors should be contacted by phone first and asked for their participation. The exhibitor fee is \$50. If they agree an exhibitor registration form should be sent to them to confirm their projected presence at the meeting. This form contains space for their name, phone number, product description, display needs and space as well as your address to which they can send their exhibitor fee.

Potential speakers should be contacted and asked for their participation. Each of the three speakers should be chosen and the specific topic of their talk should be finalized with an abstract forwarded to the program chair by July 1. Hotel arrangements for each of the speakers should be made by the local arrangements chair.

The contents of the registration folder that will be given to each participant at the beginning of the meeting can also be outlined and copies made. Sometimes the admissions office has folders that

are given to prospective students. This office may be a good source of free folders for your meeting. The following list of materials should be included inside the registration folder:

- 1) a campus map with parking areas and buildings to be used during the meeting clearly marked.
- 2) a local visitors guide with city map from the chamber of commerce
- 3) host college facts and degree summaries from the admissions office
- 4) host biology department summary brochure
- 5) a pen or pencil
- 6) a receipt on college letterhead that shows which fees were paid by whom and when. This receipt can also carry personalized information like which field trip or workshop the person is scheduled for. This will be used by the participant upon their return to their campus to get reimbursed for attending the meeting.
- 7) a final program schedule
- 8) a copy of all abstracts from all the sessions
- 9) a meeting evaluation form
- 10) a form to suggest ideas or offer involvement in next year's meeting
- 11) a list of local places to eat with addresses for the open lunch period on Friday.

Some of these can be added early to folders while some can be added only the day before the meeting.

Another form that must be available is the recorder form which is filled out by one participant in each session. The recorder form includes the session leader's name, date, number of people in attendance, summary of session topic, comments of recorder, and blank lines for the address of a dean or administrator of the session leader. These forms are returned to the local arrangements chair or the AMCBT secretary so that letters of recognition/participation can be sent to the home campus of each session leader.

#### Activities One Month Before the Meeting

Each of the speakers should be contacted once more to make sure they have what they need and if they have any questions. A meeting schedule should be forwarded to them and they should be encouraged to participate in any or all of the meeting if they can.

Student helpers should be recruited to operate the registration desk, to help set up tables or poster boards or to be general assistants that can help people get set up before each of the sessions. Biology, education or science education majors have been used successfully in the past.

Once a semi-final program has been received, individual room schedules can be printed that list times, sessions and session leaders for the whole meeting in that room.

Final programs can be distributed to all local biology faculty and they should be invited to participate in any part of the meeting.

A team of people should walk through the meeting sites and decide what kind of directional signs are needed at various sites. Signs for individual session rooms, restrooms and exhibitor room are essential. Several large signs that can be attached to road signs leading to campus may be helpful.

Van or bus reservations for the field trips should be made through the college. If more than 12 people are scheduled for a field trip it may be easier to car pool. Buses are convenient for larger groups but may be expensive as well.

One of the biggest jobs at this time is receiving the incoming registration forms. All the information on each registration form must be recorded and lists made of who is participating in which activity. People are assigned to field trips and workshops on a first come first serve basis. Registration fees, extra guest banquet fees, van transportation fees and other fees are kept track of and listed. Name tags can be printed and registration folders prepared one week before the meeting. Registration forms and all fees should be due two weeks before the meeting so that final numbers for food service, field trips and tours can be forwarded.

Small signs can be printed for use at individual tables at Friday breakfast. These signs denote interest groups and help people meet others with similar interests.

Several refreshment breaks are usually scheduled between sessions especially on Friday afternoon. It can be the responsibility of the local

arrangements chair to supply these refreshments. Try to schedule a time that day for a trip to the grocery store can be made. Pop, juice, cookies, fruit, coffee and sweets may help people through this part of the day. Sometimes the food service does not allow any food besides theirs on campus.

Be sure to recontact any session leaders that have indicated special computer needs. Encourage them to get a copy of their programs to you early to have you test them on site. This will avoid the delays due to incompatible software and hardware.

In past AMCBT meetings several multicolored tickets have been issued to participants that give them access to each of the planned meals and activities. In my experience these tickets were never collected and seemed like a large hassle for the local arrangements chair. They were not used at Loras and all events went smoothly.

Special receipts for payment of annual AMCBT dues should be requested from the executive secretary. Some people pay their membership dues at the meeting at registration so this situation should be planned for as well.

A disk with all the forms and meeting information should be passed to the new local arrangements chair. All suggestions and comments from this meetings and ideas for the next meeting should be passed on to the new program chair as well.

### Conclusion

The reason why people return to or become active in a particular organization is because they enjoy the people they meet and appreciate the new ideas they receive at the meetings. The role of the meeting is to foster an environment for this camaraderie and communication to take place. This meeting environment must be convenient and congenial. The meals are very important times to share ideas and talk with colleagues. The information presented here should help make future AMCBT meetings and other meetings more effective and attractive. Ultimately, this kind of meeting environment should lead to a more effective learning environment for our students.

Table 1. List of AMCBT Meeting Timelines and Duties

<p><b>A. Fall Semester One Year Before the Meeting</b></p> <p>Dates Chosen          Facility Reservations          Administrative Approval          College and City Profile          Tentative Meeting Schedule          Two Major Meeting Sites          Classrooms          Exhibitor Room/Area          Computer Labs          Field Trips          Mailing to Steering Committee</p>	<p><b>B. Steering Committee Planning Session</b></p> <p>Promotional Materials          Menus          Speakers          Meeting Schedule          Tour of Sites on Campus</p>
<p><b>C. Spring Semester Before the Meeting</b></p> <p>Local Planning Committee          Hotel Rooms          Sponsors          Field Trips          Menus and Food Service          Chamber of Commerce          Estimated Budget          Exhibitors          Speakers          Registration Folder Content          Recorder Forms</p>	<p><b>D. One Month Before the Meeting</b></p> <p>Speakers          Student Helpers          Directional Signs          Room Schedules          Final Programs          Vehicle Reservations          Incoming Registration Forms/Procedure          Refreshments</p>

**1997 INTERNATIONAL SCIENCE AND ENGINEERING FAIR AT LOUISVILLE, KY  
 DECLARATION OF INTEREST IN BECOMING A GRAND AWARD JUDGE**

Formal recruitment of judges will not begin until the Fall of 1996. However, it will greatly facilitate that process if we have a bank of names of individuals who are seriously interested in being a judge.

Science Service, Inc., of Washington is the agency that conducts these international events, and they set the criteria for becoming a judge, which read as follows:

"All judges should have a Ph.D., M.D., or equivalent OR a minimum of six years related professional experience. Judges may include university faculty, industrial scientists and engineers, representatives of private and federal research centers and agencies, and medical researchers. Affiliated science fair directors, ISEF Official Party members, or elementary or secondary school teachers are not eligible to judge."

Meals for judges will be provided. However, budget restraints will not allow travel and lodging expenses. Judges are expected to be available from Monday, May 12 through Tuesday, May 13, 1997 to complete their judging assignments. For further information contact:

Ray Reed Jefferson Community College 109 East Broadway Louisville, Kentucky 40202	phone: (502) 584-0181 (x2276) Fax: (502) 584-0181 (x2421)
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**ASSOCIATION OF MIDWESTERN COLLEGE BIOLOGY TEACHERS**

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

TITLE: \_\_\_\_\_

DEPARTMENT: \_\_\_\_\_

INSTITUTION: \_\_\_\_\_

STREET ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP CODE: \_\_\_\_\_

ADDRESS PREFERRED FOR MAILING: \_\_\_\_\_

CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP CODE: \_\_\_\_\_

WORK PHONE: \_\_\_\_\_ FAX NUMBER: \_\_\_\_\_

HOME PHONE: \_\_\_\_\_ E-MAIL ADDRESS: \_\_\_\_\_

**MAJOR INTERESTS:**

- 1. Biology
- 2. Botany
- 3. Zoology
- 4. Microbiology
- 5. Pre-professional
- 6. Teacher Education
- 7. Other \_\_\_\_\_

**SUB DISCIPLINES: (Mark as many as apply)**

- A. Ecology
- B. Evolution
- C. Physiology
- D. Anatomy
- E. History
- F. Philosophy
- G. Systematics
- H. Molecular
- I. Developmental
- J. Cellular
- K. Genetics
- L. Ethology
- M. Neuroscience
- N. Other \_\_\_\_\_

**RESOURCE AREAS:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**RESEARCH AREAS:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

How did you find out about AMCBT? \_\_\_\_\_

Have you been a member before? \_\_\_\_\_ If so, when? \_\_\_\_\_

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PLEASE MAIL **MEMBERSHIP APPLICATION FORM** TO:

Marc M. Roy  
Executive Secretary, AMCBT  
AMCBT Central Office  
Department of Biology  
Beloit College  
700 College Street  
Beloit, WI 53511

Phone: 608-363-2429—FAX: 608-363-2052 or 2718  
Email: roym@beloit.edu

CURRENT DUES ARE **\$25.00**  
**\$15.00** for Graduate Students



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Welcome to the AMCBT Home Page:

URL: <http://papa.indstate.edu/amcbt>



Featuring the online AMCBT archive for:

**Bioscene: Journal of College Biology Teaching** (1975-present)  
**AMCBT Newsletter** (1964-1974)  
**AMCBT Proceedings** (1957-1972)

Other useful AMCBT information includes:

**AMCBT Executive Committee**  
**Editorial Board of Bioscene**  
**1995 Annual Meeting of the AMCBT**  
**Searchable Membership Database** (coming soon)  
**On-line Membership Application**  
**Archive of the AMCBT ListServer**  
**Scientific Meetings of Interest to Membership**  
**Position Announcements**  
**AMCBT in the News**

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The Association of Midwest College Biology Teachers has developed its own list server to facilitate communication between its members. The purpose of the AMCBT mailing list is to provide announcements, information and discussion of a wide variety of topics.

To subscribe/unsubscribe to the list, send e-mail to:

[list-admin@biology.indstate.edu](mailto:list-admin@biology.indstate.edu)

To subscribe, send this message line:

subscribe amcbt

Information mailed to:

[amcbt-l@biology.indstate.edu](mailto:amcbt-l@biology.indstate.edu)

To unsubscribe, send this message line:

unsubscribe amcbt

will be sent to all members of the list.

If you have any questions about AMCBT-L, contact Tim Mulkey at [mulkey@biology.indstate.edu](mailto:mulkey@biology.indstate.edu)

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