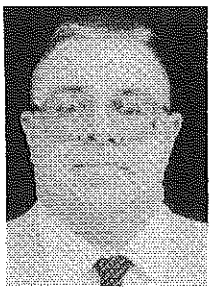
Health In The Teaching Laboratories



By Glen M. Miller

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If you have the opportunity to travel around the United States and visit agricultural education programs in the secondary schools, you become impressed by the ability of teachers to manage all kinds of laboratories. New or old, small or large, teachers of agriculture do a good job of managing their facilities. Most safety equipment is in place, machinery is thoughtfully placed and in adequate working condition, and thought has been given to student safety. Teachers are aware and concerned with student safety and are doing all they can within the constraints of their budget and facilities to provide a safe environment.

Teachers are often more concerned with everyone's safety than their own. Have you ever noticed when teachers talk about laboratory accidents that many of the most serious accidents have happened to teachers — not students? When I think of the colleagues in my own experiences in teaching, I remember the person pinned between a tractor and a car when unloading from a trailer — a teacher; the person whose artery was cut because of an exploding grinding wheel — a teacher; the person suffering exposure to toxic fumes — a teacher; the person suffering a stroke due to a blood clot moving from a deep puncture wound — a teacher; and the person with a severe hearing loss due to operating machinery — a teacher.

Dr. Stan Burke (1989) found that of the 954 accidents reported in Virginia, 159 involved teachers. An alarming 86% of the teachers responding reported being involved in an accident. The per capita rate of accidents was 6 per teacher. Why do teachers, who stress safety with their students, experience serious accidents and often long-term reductions in health? Three factors could be responsible for increased risks to the health of teachers in the laboratories.

They are:

1. Opportunity
2. The Superhero complex
3. Unaware of risk

Opportunity

Teachers have more opportunity to experience accident or injury simply because they are in the laboratory more consecutive hours than students. Teachers may be moving from skill area to skill area conducting demonstrations and supervising. This leaves the opportunity to cut corners and to fail to take all necessary safety precautions. Teachers are sometimes distracted by multiple activities and students who need help. Fatigue plays a role when many students are involved in complex skills.

The Superhero Complex

Teachers believe they are indestructible and indispensible. Teachers will do things in the laboratory they would never allow students to do. When alone, they believe they can lift incredible weights, be unharmed by fire, repel flying objects, ignore the loudest noise, and generally work without the benefit of safety devices they require their students to use. The sad fact is that there is positive reinforcement for a period of time for ignoring the safety rules. You may accomplish a task time after time without safety precautions. You start feeling like a superhero — indestructible.

Teachers also imagine themselves as indispensible. I must go to work even though I am ill because no one else can do the job. Normally, an ill teacher in the lab is doing a disservice to self and students. Risks resulting from inattention and medication are real. The teacher's ability to supervise others is also reduced.

Unaware of the Risks

Like so many other occupations, teaching agricultural education and agricultural mechanics is full of subtle and hidden dangers to our health. What are the long term effects of stress, of exposure to toxic fumes, dust, vibration, chemicals, and noise? Let us zero in on noise.

Personal safety equipment and first aid equipment must be grouped for easy access and use by students. Safety equipment must include hearing protection devices.

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Farmers who attended the 1988 Farm Progress Show in West Brooklyn, Illinois had hearing losses at the rate of 47% for men and 18% for women (Lankford, 1988). Far surpassing the general population, this finding is significant for teachers. In fact, on average, 323,000 people working in agriculture are exposed to noise levels exceeding 85 dBA every day (EPA Report No. 550/9-81-101). The health risks fall into several categories.

Loss of Hearing

The damage done to the ear by excessive noise is a very subtle thing in most cases. We notice the noise when it begins, but after a time we think we have adjusted to the noise. What has really happened is the cells in the ear that have been detecting the noise and sending messages to the brain have temporarily stopped working. If we leave the noisy environment, we normally recover. A person may leave school and play the radio in the car on the way home. The next morning, when the car is started, the person notices that the radio is very loud. The temporary loss (or threshold shift), has corrected itself with rest. If we continue to abuse the sensory cells in our ear day after day, sooner or later they stop working. We may notice that parts of speech are missing as we listen to conversations. This type of loss is permanent. A hearing aid may help by amplifying the sound for the few sensory cells that are still working in the damaged frequency(s).

Interference with Communication

Noise can interfer with our ability to hear or be heard in the agricultural mechanics laboratory. If laboratory noise is 80 dB, you must speak loudly to be heard. If the noise is in the range of 85 to 90, dB you must shout. If the noise if 95 dB, people must get very close together to be heard. Under these conditions, students may miss critical instructions or the instructor may miss the cries for help from a student in trouble.

Performance Effects

Student and teacher performance can be affected by noise. This is especially true for cognitive activities. Motor activities are also adversely effected by noise, especially when the noise is intermittent rather than continuous (Broadbent, 1979). Research has shown performance can be enhanced in noisy environments with the use of hearing protection devices (Miller, 1986). This increase in performance may be as high as 14% for cognitive activities and 3% for motor activities. Broadbent (1979) also found some research which indicated that people exhibit less helpful behavior during and after noise exposure than they do in quiet environments.

Annoyance

Constant noise is less annoying to us than intermittent noise. In some cases, people report fatigue, irritability, and sleeplessness which is attributed to noise in the environment.

Evidence for Noise and Stress Disease

Stress disease may be the result of ancient conditioning of human beings to dangerous situations. Our ancestors would experience mobilization of biological functions in preparation to fighting the danger or running away from danger. There is evidence that we may still experience this reaction. This biological reaction may lead to such stress induced diseases as heart attack, stroke, ulcers, and cancer. Research by E.A. Peterson and his colleagues found that long term noise exposures for monkeys (85-90 dB) led to chronic elevation in blood pressure. This elevation did not return to normal after the noise was stopped (Peterson et al. 1978). Hattis and Richardson (1980) implicated high noise levels with cardiovascular disorders. All of this research is potentially flawed, but should still cause us concern for our health in the agricultural mechanics laboratory.

Appropriate safety equipment must be mandatory for student use.

The Common Warning Signs

Exposures to excessive noise in the laboratory result in the following warning signs:

1. You must raise your voice to be heard.
2. You cannot hear (understand) someone less than two feet away.
3. Speech around your sounds muffled or dull after you leave a noisy area.
4. You have a pain or ringing in the ears (tinnitus) after exposure to noise.

Our Response

It is critical that teachers become aware of their health risks in the laboratory. We must be as well-educated about our own safety as we are about our students' safety. Specifically, we need to be aware that some of our exposure to fumes, dust, chemicals, stress, noise, etc., are more critical to the teacher because of exposures over the length of a teaching career.

In relation to noise, routinely protect yourself from high levels of noise. Hearing protection devices (HPD) are available in a wide variety of styles and performance ranges. I personally prefer the disposable type because I find them effective and comfortable after an adjustment period. After the short adjustment period, it is actually easier to hear and understand your students.

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Can Students Learn In Your School Environment?

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Do you report laboratory or classroom environmental problems to your administrator? Reporting environmental problems does not guarantee that they will be fixed, but it does shift the burden of responsibility.

Does your principal give you the support that you need to deal with day-to-day stress factors? If not, seek a faculty support group. Many teachers have been surprised to learn that other teachers have experienced similar problems.

Tomorrow another freshman will walk into your classroom. Will you be mentally and physically ready to provide that "unique" agricultural education experience? You owe it to yourself and "the new student" to be prepared. Preparing yourself might mean joining a wellness program, improving the physical environment you work in, or developing a support relationship with one of your colleagues.

To make a student the beneficiary of maximum learning in your classroom, take care of yourself today; mentally and physically!

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To learn about other health dangers which exist in your laboratory, contact your state department of education, your nearest Department of Agricultural Education, or the U.S. Department of Health and Human Services, NIOSH/OSHA.

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Computer Technology Resources Rediscover the Spreadsheet

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or "What if we are able to get lower quality corn at a cheaper price?" or "What happens if we change the crude protein requirements for a pen of feeder cattle?" If you change the crude protein (CP) content of one of the feed ingredients or change the CP requirement for an animal, the ration will reformulate itself accurately in seconds.

This is only one idea. You have at least two choices regarding additional templates. You can buy templates written by others, or you can write them yourself. A source of ready-made templates may be your Extension Service. Private companies and individuals have written hundreds of spreadsheet templates for agriculture. There are books and magazines containing example templates. You can easily modify any template you find to suit your needs or preferences. If you would like to design your own spreadsheet applications, an excellent source for ideas is Extension pamphlets. But watch out: spreadsheet use can be habit forming. Once you or one of your students has written a template, you will probably think of many other templates you need. You could then become a dedicated spreadsheet user.

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