

EARLY IN 1994, A LOCAL TEACHER requested a field trip to the Mississippi State University Forest Products Laboratory for her third-grade class. We arranged a quick tour and some age-appropriate demonstrations about wood and named the combination "The Wood Magic Science Fair" to make the trip seem more interesting. The children seemed interested and well-behaved, and we were mentally congratulating ourselves until one little girl challenged us with "all you do is cut down trees and destroy the ozone!"

**POPULAR SCIENCE
FAIR HELPS CHILDREN
LEARN ABOUT THE
FOREST PRODUCTS
INDUSTRIES.**

This statement was rather startling, especially since one of the girl's parents worked in a factory making wooden furniture. She did not know that forest products companies replant trees, nor had she ever been shown how dependent she was on forest products for things she used every day. It was apparent that there was a real need for children to learn more about forestry and forest products.

Why are children unaware of the workings of our industries, and what are some of the possible consequences? In large measure our lack of prominence is likely due to the increasingly less-rural population in the United States. According to the U.S. Census Bureau, even Mississippi had about 80% of its population in metro areas in 1992. Mills are becoming less visible as they become relatively more isolated, and due to risk of liability even children of forest products company employees often do not know what their parents do. At the same time that mills are becoming less visible, however, harvesting operations are more prominently featured in the media. Harvesting operations necessarily mar a

MISSISSIPPI STATE UNIVERSITY'S WOOD MAGIC SCIENCE FAIR

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(above) Plywood demonstration. One of the students tries to break the plywood made in a small laboratory press.

(center) Professor Mike Barnes and two helpers form a handsheet.

(right) Barnes and his two helpers prepare to press a handsheet between blotters.



EDUCATION

familiar landscape, while uncut border strips along roads and waterways may only contribute to the problem by disguising replanting operations. Publicity about cutting old-growth forests in the Pacific Northwest and in sensitive rain forest habitat usually does not differentiate among forest types, and it is possible that some of this information may result in negative attitudes about the pine plantations in the Southeast as well. Based on the experience with the first, casually organized Wood Magic Science Fair, it seems imperative that children should be informed that our industries are committed to conservation, sustainable growth and the efficient use of the timber resource.

PREVIOUS INDUSTRY EFFORTS AT PUBLIC COMMUNICATION

Forest products industries do not have a proven record of effective communication, especially with children. Consider, for example, the proactive campaigns used to improve the industry's public image and enhance its visibility. Some things we have seen include:

- PR booths at public events
- Coloring books and other literature
- Free tree seedlings
- Environmental education programs such as project Learning Tree, Washington State's "Forests of Washington," etc.
- Industry-sponsored education programs such as TAPPI's "Paper Express".

Some of these programs are, obviously, aimed at adults rather than children. Public relations booths, for example, are static and are usually targeted at an older audience, although we have seen them used for much younger audiences as well (probably with lesser effect). Coloring books are appropriate for children, but often the message (if any) seems to be aimed at children who are too young to appreciate the content without guidance. Giving away free tree seedlings (whether to families or to schools), in our opinion, gives the wrong message to young children. This seems to tell the child that the country is running out of trees and that every additional tree will make a difference: Please help us plant more!

(right) Veneer is used in furniture making. Vikram Yadama is holding a piece of fancy hardwood veneer and asking students if they remember learning about how veneer is made during the plywood demonstration.

(below) Sawmill demonstration. Students learn about the difference between heartwood and sapwood at the sawmill demonstration.



Some educational programs are quite good, but these have their own limitations. Project Learning Tree (PLT), for example, is a thoughtfully constructed, well-evaluated program for responsibly teaching environmental

education, but from our perspective it has two weaknesses. First, PLT is a teacher education program, and it is up to the teacher to choose among the various PLT modules and to implement them into his or her classroom. There is no guarantee that any given module will be incorporated into curricula. Secondly, forest products are not the primary focus of most of the modules in the PLT pre-K- through eighth-grade Activity Guide.

Commendably, TAPPI's child-oriented "Paper Express" video program emphasizes the many uses of paper and even mentions the reasons for recycling and some facts about tree replanting, but neither its program nor any other fully addresses the needs of the entire industry in an





(left) Lunchtime at the Wood Magic Science Fair. Over 400 children and chaperons were each fed pizza and a soft drink at one time in a 90 x 90-ft tent.

(below) The "Wood Rack." Terry Conners adds weight to the dogbone-shaped pine sample being tested. After the sample breaks, the rocks will be weighed on a small scale.



accessible way for children. Development of the Wood Magic Science Fair may be one way to remedy this situation.

THE WOOD MAGIC SCIENCE FAIR

After the first Wood Magic Science Fair (WMSF), our faculty discussed the situation and decided to work with children to address the problems we had noted. Two primary goals were defined: first, to increase the visibility of the forestry and forest products industries in Mississippi; and second, to make children aware of the importance of forest products in their daily lives. We decided to work with third- and fourth-graders for several reasons:

- Students in the first field trip were generally well-behaved and seemed to learn something from the presentations;
- Third- and fourth-grade seems to be about the time that students first get interested in science (rock collections, chemistry sets, etc.) and this should be a good time to interest students in learning about forestry and how trees are converted into useful products;
- Younger children have shorter attention spans; and
- Older students change classes and have more than one teacher, making it more difficult to schedule a field trip like this.

It was decided from the beginning that this program would not attempt to replicate the Project Learning Tree format, as we wanted to maintain the interest and excitement that is generated by a field trip.

To make this program a success we consulted with several local teachers and planned a variety of activities and short films about different aspects of the forest products industry. Each section of the program was made as interactive as possible. When the program was set, we sent personalized letters to about 100 third- and fourth-grade teachers in the area describing the WMSF and inviting them to bring their class to the MSU Forest Products Laboratory. About 80% of the teachers contacted asked to attend, far exceeding expectations. Teachers typically arranged for one to three classes to come at once (25-75 students), and activities and presentation skills were continually refined. We found, for example, that children this age need to "blow off steam" occasionally, and some programs were more successful than others solely due to the ordering of activities. Programs contained two major segments and were typically conducted in this order:

I. Tour of the laboratory (40 min). There were four stops:

- (i) Pass-around display of lumber, wood, composites and engineered products;

- (ii) Experimental log cabin, showing effectiveness of proper design and wood preservatives to conserve wood;
- (iii) Wood testing laboratory, where we demonstrated the strength of a southern pine beam;
- (iv) Particleboard manufacturing laboratory, where we described use of waste particles from other manufacturing processes.

II. Auditorium program (90-100 min). There were nine segments:

- (i) Snack of popcorn and a soda;
- (ii) Short film "House," a commercially available short video showing a lumber mill, how a house is made out of wood, and tree replanting.
- (iii) "Our Daily Wood." The children learned how much wood people use worldwide

everyday, and they also learned that people in the United States typically use about three times as much. Students learned where the U.S. forests are. We emphasized that the industry typically replants five or more trees for each one harvested and reminded children that there is no shortage of trees.

- (iv) "Talking Computers." The children were reminded that trees grow all around the world. As part of this presentation we used a CD-ROM to teach the children a few foreign phrases by repetition. This last part had nothing to do with forest products but was very popular with both teachers and students. Several teachers told us that foreign languages fit into their curriculum requirements.
- (v) Demonstration of laboratory CNC router. This segment emphasized the high-tech aspects of our industry and gave us a platform to state the importance of learning about computers and math and staying in school.
- (vi) Demonstration of plywood manufacture. A student volunteer helped to demonstrate veneer peeling and assembled a "grilled cheese sandwich" from southern pine veneers and resin-impregnated paper. A five-minute video of a plywood mill was shown while the plywood was in the press. We invited all the students to try to break the plywood and compared its strength with that of veneer.
- (vii) "Rock Stars." This was a demonstration of wood strength parallel to the grain. We used a necked-down southern pine dogbone sample and suspended a bucket from one end into which we slowly poured rocks. Students guessed how much weight the sample would hold. Typical values ranged from 50–100 lb or more.
- (viii) Termites. Using colored pens and white paper, we demonstrated how termites leave scented trails between a nest and a food source. This demonstration was conducted for each small group of about 10–15 students. Students additionally learned that termites don't bite, that they eat wood, and that they need water to live.
- (ix) "The Thing" and "Bubbling Bazookas." These were demonstrations of wood structure in general and of red oak porosity compared with that of white oak in particular. After describing wood as being similar to a bunch of hollow soda straws, we demonstrated "The Thing." This consisted of two pieces of oak about 15 in. long (one white, one red) attached to a wooden frame. We screwed an air-hose fitting on one end and affixed a latex surgical glove around the wood at

the other end with rubber bands. Enough air could be forced through the red oak piece to inflate the glove, but not through the white oak. The "Bubbling Bazookas" reinforced this concept. Each child was given a 5-in.-long piece of selected red oak and a cup of bubble soap to dip one end into before they blew on the other end. Sapwood works better than heartwood for this demonstration. (Working samples are available from the authors.)

Teachers frequently complimented the program, and we found that there are very few opportunities for interesting field trips for this age group. Requests for the WMSF were soon received from other teachers, and before long we had commitments to conduct the program for about 135 classes and even a few home-school groups (almost 3000 children). These programs reached well beyond the intended audience as parents and even grandparents often acted as chaperons, and it was not unusual to hear from families whose child enjoyed showing off what he or she had learned at the WMSF.

After conducting two and sometimes three programs a week, it became apparent that we could reach more students if the WMSF were conducted on a larger scale. After consultation with the faculty and staff, the Wood Magic Science Fair was redesigned as a week-long, annual event to educate children throughout Mississippi.

It is impractical to describe all of our preparations for our first statewide program in this brief article, but one of the first things we did was to change the format. The entire Forest Products Lab staff had volunteered to assist, so instead of having the students participate in a tour followed by a sequence of activities in an auditorium, we scheduled about 15 ten-minute events around our laboratory campus in round-robin fashion. Several events were added (such as displays of log trucks and tree planting equipment and demonstrations of particleboard manufacture and papermaking), and others which were less practical to demonstrate to larger groups were modified or discarded. Teachers again received personal invitations, and classes were scheduled according to their time and day preference on a first-come, first-served basis. Third- and fourth-graders had slightly different programs to avoid excessive duplication should students come two years in a row, and each teacher was given a custom-printed schedule with a map and a student guide so we could keep things running smoothly; a steam whistle signaled when to change from one event to another. A number of events were staged in large Army surplus tents, but the biggest challenge concerned meals for the students; the only way we could run the WMSF continually was to feed them a lunch. We borrowed 1000 chairs and an 8100-ft² tent from the university and made arrangements

with a local pizza franchise to make pizzas on-site. (Aside from personnel costs, food and soft drinks ended up being the largest single expense of the entire operation. Students were not charged to attend the WMSF, and a number of forest products companies jointly paid for the meals. Some companies also subsidized the buses that brought the children from their schools.) By week's end nearly 300 classes had come from as far away as the Gulf Coast and the Mississippi River Delta (150-175 miles away); one class even spent the night! In all, about 7400 children and chaperons took part in the one-week event. Including the students from our smaller programs, a total of about 10,000 students have participated in this program since its inception.

THE FUTURE OF THE WOOD MAGIC SCIENCE FAIR

Teachers who participated in this past year's program were uniformly enthusiastic about the WMSF, but this informal evaluative process is not a sufficient basis upon which to continue to commit the resources needed to make the Wood Magic Science Fair a logistical and educational success. We feel it is important to ensure that we are educating the students, not merely entertaining them. Our feedback from teachers indicates that we have been successful, but we also surveyed 22 classes (over 450 students) before they arrived, with follow-up surveys scheduled for both the week after and approximately six months after their visit. The results of these surveys are not yet available, but they will be used to modify the 1996 program. At least for the moment the WMSF is planned as a 10-year experiment, and we hope at some point to be able to create programs for other grades and to be able to offer this program to children in other states. **TJ**

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